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Farming for a Better Climate highlights practical ways to improve farm efficiencies and lower the carbon footprint. From farm drainage to improving livestock management, this newsletter keeps you up to date on some of the activities on the four volunteer climate change focus farms and takes a look at some of the practical ideas from these events and other FFBC meetings held around Scotland.

Being precise at Upper Nisbet
New application technology can make arable operations more precise, helping to avoid waste and cut costs, as was explained at a recent Climate Change Focus Farm meeting hosted by Robert and Jac Neill of Upper Nisbet.

“The new technologies offer farmers all kind of help” said Moira Gallagher (SAC Consulting in St Boswells). “For example even a skilled driver cannot avoid some overlap as they drive machines back and forth across an undulating, irregular field which could mean spreading fertiliser twice in some areas or leaving gaps in others. GPS guidance can reduce overlaps from about 4% to 1.5% and calculate the most energy efficient way of doing the job. Over a 250 hectare enterprise like Upper Nisbet, improvement in precision can generate savings between £2,500 to £5,000, let alone the environmental benefits”.

Local farmer Alistair Hodge (Whitsome, East Newton) explained his experience with precision farming; other speakers at the meeting included Blair Hardy (Massey Ferguson) and David Sharp (Kuhn) plus Aidan Monaghan (SOYL). In summary:
• Soil testing and assessing field pH would be a good starting point for those not already looking at precision farming
• New to GPS? Choose a system that will provide all data on one box in the cab
• GPS technology can collect a lot of data. How much time can you invest in the information you have and how are you going to use it?
• You may not save on fertilisers and seed purchase costs, but you will be making best use of these products on the farm, maximising yields and improving farm profitability.

**Beef production; improving efficiencies**

Although Upper Nisbet is primarily looking at arable measures, we couldn't pass up the opportunity to look at the award winning beef enterprise with SRUC specialists Gavin Hill and Basil Lowman.

Robert and Jac have developed the herd of 300 suckler cows over 12 years, mostly Limousin x Friesian. The Upper Nisbet herd is spring calving but Robert and Jac are aiming to start calving earlier and tighten the calving period. Farm facilitator Moira Gallagher had asked the group to bring their own figures for last years calving, which ranged from 8 weeks to 6 months. With an average gestation length of 285 days, a cow has 80 days to get back in calf if she is to rear one calf/year; it can be 42 days before a cow starts cycling after calving, so achieving a tight calving period requires a high degree of management.

Good cow health has been the key to profitability at Upper Nisbet. Robert Anderson (Merlin Vets) stressed the importance of vaccination and disease control, highlighting how poor health will affect calving interval and barren rate. There are 20 individual pens at Upper Nisbet allowing cows to calve in yard then be housed individually; these pens have had huge benefits in terms of Johne’s control and reducing cross infection risks.

Gavin Tait (Generate Breeding) discussed the pros and cons of Artificial Insemination (AI). The disadvantages included an element of organisation and planning, plus additional handling. However on the plus side, AI is an affordable way to improve herd genetics, help to control or prevent disease transfer and tighten up the calving period.

Key points from the meeting included:
• Review culling policy. Upper Nisbet operates a ‘10 years old and you’re out’ culling policy – it’s easier to finish younger cows, less work at calving but you do need plenty of heifers to replace cull cows.
• Look at ways to tighten the calving period.
• Discuss health policy with your vet.

**The most efficient farms have lowest gas emissions**

Work carried out by QMS and SRUC has demonstrated a clear link between low greenhouse gas emissions and strong technical performance on Scottish livestock farms. You can read the report titled ‘Estimating Greenhouse Gas Emissions from Scottish Livestock Enterprises’ [here](#).
Sheep production; improving efficiencies
Unprecedented weather conditions last year resulted in poor lamb growth rates, less lambs finished and an increase in liver fluke; not an ideal situation. Farmers attending the Torr discussion group meeting in February were treated to an ‘away day’ to visit both Cogarth and Viewfield Farms (by kind permission of host farmers Andrew Nelson at Cogarth and Marcus and Kate Maxwell at Viewfield Farm) with SRUC specialists Rhidian Jones and David Keiley. Both visits looked at practical ways to improve sheep health and efficiency of sheep production, all of which can help to cut greenhouse gas emissions.

Minimising losses at lambing
What are the best ways to minimise losses at lambing? This was the question asked at a meeting at Glenkilrie earlier in the year. Led by Dr John Vipond (SRUC sheep specialist), the meeting covered what’s new in sheep feeding, the carry over effects from last summers weather problems and animal health issues. With the main inputs agreed as being labour, feed and medicines on sheep farms, the majority of costs are associated with the ewe. Industry targets relate to ewe weight – for every kg of ewe at mating they should produce 1kg (sold or retained for breeding) of lamb. The comparison was made between New Zealand and Scotland; in New Zealand 0.72kg of lamb per 1kg of ewe at mating is produced. Data from Scottish farms taking part in the study suggested the number was slightly lower at 0.66kg. John said “although this is ambitious, it is not an unachievable target. Increasing productivity from the ewes will improve the farm business and the farm’s carbon footprint”.

Glenkilrie group at Oatridge Soil Aeration event
Previous poor weather, problems with lack of forage produced from grassland or grassland being unable to carry the stock required are all challenges farmers are faced with this year. With an uncertain and changing climate, effective field drainage could become even more important.

David Houstoun and the Glenkilrie climate change focus farm group travelled to Oatridge SRUC campus, West Lothian to visit the Soil Aeration event. Key aspects covered at the event included a reminder about the role played by soil biology, importance of maintaining the correct soil pH, recognising drainage problems, farm drainage schemes and issues such as compaction, waterlogging and how you can remedy these.

Practical guides
Farm drainage, assessing soil structure and soil management are all topics covered in our practical guides. From the home page at www.farmingforabetterclimate.org, click on ‘Improving farm efficiency’ box, towards the bottom of the page click ‘downloads’ to view the full list to date.
Improving soil structure, drainage techniques and reducing soil compaction
Following on from the SRUC drainage event at Oatridge College, a number of smaller events were held around Scotland to help farmers consider the best action for soils following the wet weather in 2012/13.

Events in Stranraer, Lanark, Auchincruive and Stirling, plus the day at Torr as mentioned in the previous newsletter, looked at ways farmers could cope with the unprecedented run of wet weather we experienced over the summer, autumn and winter months.

General points from these meetings included:
- Assess soil structure; a good soil structure will be more resilient to compaction
- Manage compaction; compaction will reduce soils natural drainage ability
- Review current drainage schemes; would existing schemes benefit from some maintenance (see text box)?
- Better drainage could reduce flooding risks, both on the farm and further downstream
- Waterlogging and flooding conditions could favour the snails that play a part in the fluke life cycle
- Unused nutrients washed off land are a cost to the farm business, lead to increased emissions and could pollute surrounding waters.

Improving farm drainage; steps to consider

1. **Investigate the site and identify problems.** Start with the ditch/outfall, check if the main ditch needs cleaning out or not, check if the pipes, outfalls and culverts are clear. Obtain old 1:2500 maps and/or drainage reports to help identify where the drains are, dig holes to look at the existing drains, check if they are silted or rooted up/ochre/clear/underwater. If the drains are clear and it has been very wet it could be due to levels not being rights, holes are silted and water can’t get into the pipes. This needs to be checked.

2. **Prepare and budget a plan.** Decide what the solution is; maintenance of the existing drainage system or a new drainage system? New drainage is expensive. If there is no old system in place, it’s likely there will be a reason to why it hasn’t been drained. If soils are peaty it is low priority. Check if you are allowed to drain. Also collaborate with neighbours, as the problem might also be theirs.

3. **Drainage design.** Design a new plan for the desired outcome, allow for expansion at a later date, design from the outfall back, where possible install ditches on boundaries, isolate the site-gravel catchment plan, minimise requirements of culverts, install correctly sized pipes, decide on desired spacing and if necessary decide on the level of gravel backfill, are all essential in drainage design. Schemes with gravel backfill will work better and last longer; the backfill maintains easy route to drains and connects old systems but at around £15/ton delivered, it is expensive. Gravel is usually backfilled to just below the plough level, although gravel may need to be filled to the surface depending on the undulations of the field. Drains must be laid across the slope to intercept water.

4. **Carry out and record the work.** It is essential that the person undertaking the drainage work is experienced and competent; poorly designed and installed drainage systems can be very costly to the farm business.
Soil, muck and money; nutrient management at Torr

Looking after the basics in soil and nutrient management could save money, protect water quality and contribute to mitigating climate change; that was the message at a recent event at Torr in partnership with the Soil Association.

James Bretherton (AgScope) successfully enthused the group about soils, explaining about the farms ‘hidden livestock’ in the form of billions different microscopic organisms of many different species present in a healthy farm soil (many of which we know nothing about).

Influencing the palatability of grass to improving field drainage are just two of the functions provided by a good healthy soil. Soil is the farms greatest resource but can be easily overlooked. Getting out with a spade can be time well spent; smelling the soil can give an indication of soil health, with stale or sour soils indicating a soil under stress. James advised a compare and contrast method; take a spit of soil from within the field and compare with a sample taken by the hedge or fence line. This could give you an idea of how your soils could be performing.

Knowing soil nutrient content gives you a starting point, helping you decide how much additional fertiliser you need to apply to support the growing crop. Using examples from Torr, Bill Crooks (SRUC) highlighted the benefits of nutrient budgeting using the freely available PLANET Scotland program and how it can provide you with a nutrient budget for the farm. Audrey Litterick (Earthcare Technical) was able to go a step further and demonstrate how muck and composts can enrich soil organic matter and explained how you can put a financial value on slurries and manures; they may be worth more than you think.

Jackie McColm (SEPA) explained how to minimise runoff risks, keeping valuable nutrients on the farm, plus some of the requirements under Diffuse Pollution General Binding Rules. Adequate slurry storage on farm allows you to spread when the nutrients will be of most benefit to the growing crop and avoid being forced to spread in less than ideal weather conditions which could also increase pollution risks.

By the end of the day it was clear that taking a second look at soils and nutrients could save you money in the long run and deliver more benefits than you think.

Notes from Climate Change Focus Farm meetings are available on the FFBC website; from the FFBC home page, click the ‘Our Focus Farms’ box; towards the bottom of the page, click ‘downloads’ under the related items heading. Could you be our next climate change focus farm? To make an informal enquiry about what is involved, contact rebecca.audsley@sac.co.uk

Efficiency savings at Stewart Tower

The last 12 months have provided agriculture with some of the most challenging weather conditions in living memory, writes retired SAC Consultant Sinclair Simpson. Neil and Linsay Butler at Stewart Tower put in place around £7,650 of efficiency savings in 2012 just
through taking a second look at routine practices in what was a difficult growing season. Activities included:

- Targeting which fields got muck and adjusting NPK additions accordingly
- Grass reseeds; addition of highly productive grass/clover swards. The reseeds followed a long run of cereals and contained few competitive weeds, removing the need for a herbicide treatment.
- Choosing disease resistant winter wheat varieties (Alchemy) and spring barley (Concerto) which suited their crop management systems.

Sinclair Simpson has written a number of Practical Guides including maximising production of grass leys, establishing a grass clover sward, a quick and easy ‘forage calculator’, and what we can do to alleviate soil compaction; see www.sruc.ac.uk/downloads/120198/improve_farm_efficiency. As Sinclair retires from SRUC we would like to thank him for all his help and support with the initiative.

Where have we been lately?
Aside from working with the climate change focus farmers (green dots), the map shows we’ve also been hosting meetings on other farms across Scotland (red dots) in 2012/2013. Here is a bit more information on a couple of the recent events:

Feeling the heat
What are the pros and cons of installing a 150kW woodchip boiler and what would you do differently next time around? These were some of the questions asked of farmer Robert Warnock (Bankhead Farm near Bathgate) as he kindly invited others to learn about his experiences with wood fuel. Steered by SRUC’s Forestry Consultant Craig Dinwoodie, the group also heard about sustainable forest management, creating a home supply of wood fuel and other diversification opportunities. One farmer said that “the event had been really useful and I now feel better informed to make a decision about buying a biomass boiler”.

Muck management
Isle of Islay was the setting for a workshop to help make the best use of slurry and muck on the farm. Speakers highlighted the potential cash value available in slurry and manures and how it could reduce your carbon footprint, how to make the most of nutrients on the farm, plus information to improve storage and handling.

The meeting covered some of the rules around slurry handling and application “it was an
interesting talk and has been valuable to hear other peoples views” commented one farmer.

What are other farmers doing? New Farmer Case Studies; On farm benefits of natural flood management

Working with Tweed Forum and Scottish Borders Council, Jim and Graeme Sinclair at Crookston Farm manage 24 hectares of floodplain, benefiting the farm, wildlife and towns and villages downstream. Following a meeting at Crookston Farm to look at sheep management and their Natural Flood Management (NFM) approach, reported in the last newsletter, Jim and Graeme have kindly volunteered to share their experience further in a new farmer case study, available here

For more information on the work carried out by the Tweed Forum, see www.tweedforum.org

Kirkton and Balruddery; adapting to an uncertain climate

Working with The James Hutton Institute and ClimateXChange, Farm Manager Euan Caldwell is one of the new additions to our case studies section. Euan talks about how Balruddery is managing activities to reduce the inconvenience factor when the weather is against us. Many of the measures put in place also help to reduce diffuse pollution risks too; you can view the case study here

Tony Waterhouse at SRUCs Kirkton hill farm has also highlighted how Kirkton has been affected by extreme weather events, losing a number of fences and bridges in a severe flood event. Read Tony's case study to see what plans he has made to make Kirkton more robust in the face of a changing climate here.

How have you been affected by unpredictable weather conditions? What steps have you put in place to make your farm business more robust? Could you help other farmers by sharing what you have done in a case study? If so, contact rebecca.audsley@sac.co.uk

Woodland Carbon Code; creating woods and income

New woodlands that meet Woodland Carbon Code standards can generate a new income stream, create a legacy for future generations, and contribute to tackling climate change, writes Vicky West from the Forestry Commission. Many businesses would like to invest in woodland carbon projects, but need assurance of standards to be confident the projects are well managed and will capture the carbon they claim. Launched in 2011, the Code enables landowners to benefit whilst helping businesses reduce their carbon footprint.

To meet the Code, projects must:
• register within two years of planting commencing
• show that the woodland creation wouldn’t have happened without additional carbon finance
• meet the UK Forestry Standard
• have a long-term management plan
• estimate the carbon to be captured
• allocate some carbon to a ‘buffer’ to compensate for future losses
• monitor and certify carbon capture at regular intervals
Creating Code-compliant woodlands can unlock a new revenue stream for landowners from selling the rights to the captured carbon, thereby supplementing other income from forestry grants, timber, wood fuel and sporting activities. To date, participants in this emerging market have typically received **between £3 and £10 per tonne of carbon dioxide (tCO₂)**. With a typical new native woodland capturing about 300-400 tCO₂/ha over 50 years, carbon income can be significant.

So far over 130 projects have registered which are expected to create 14,000 hectares of woodland and sequester around 5 million tCO₂. A group certification scheme helps reduce the paperwork and cost for smaller projects.

Farmer Jim Reid at Milton of Mathers in Aberdeenshire as created 17 hectares of native riparian woodland in two valleys previously used as rough grazing. The woodland will capture almost 8,000 tCO₂ over 70 years, 6,500 tCO₂ of which can be sold, the remainder contributing to a shared ‘buffer’ in case of future losses. The Green Insurance Company purchased almost 5,000 tCO₂ from this project so they could claim the carbon benefits as the woodland grows. The woodland also provides some firewood for the landowner, new habitat for wildlife and opportunities for recreation as well as sequestering carbon.

See [www.forestry.gov.uk/carboncode](http://www.forestry.gov.uk/carboncode), email climatechange@forestry.gov.uk or speak to your Forestry Commission Woodland Officer or local Woodlands Adviser for further information.

**How efficient are your cows... how efficient are you?**

Many farmers see climate change, carbon management and practical economic farming as separate subjects. Running a technically efficient farm has a positive effect with regards to carbon management. Jimmy Goldie, SAC Consulting Senior Dairy Consultant outlines some useful points to consider:

**Forage Quality**

Improving forage quality by 1 MJ per kg DM (11.5 ME compared to 10.5ME) has a significant effect on feed efficiency. This could save up to 1kg of concentrate per cow per day. For a 200 days winter this equates to 200kg. At £250 per tonne, this is a saving of £50 per cow or £5000 per 100 cows. For growing beef, the same increase in forage quality for growing cattle could achieve 45kg extra weight gain over the winter period or allow animals to be sold 6 weeks early.

Forage quality can be improved by:

- Cutting date – forage quality reduces by 0.5D per day or 0.5MJ per week
- Pit Management – spreading grass in the clamp, rolling well and excluding all the air
- Ensuring a good fermentation using an additive if necessary

**Grassland Management**
Maintaining sward quality, maximising grass intake and supplementing grass rather than substituting grass can achieve efficient milk production. Protein levels in grass silage can range from 10% to 17%; achieving the upper range can have a significant contribution to dietary protein.

**Efficiency of Production**
Feed efficiency is calculated by comparing the amount of feed fed compared to the amount of milk produced. Feed quality, genetics, fertility, mastitis, lameness and disease can all affect feed efficiency. Stale cows are not cost effective; if your herd has an extended calving interval, feed efficiency and milk production is not cost effective. A 440 day calving interval could cost £16,000 per annum over a 400 day calving interval.

**Dairy Heifers and Young stock**
Calving heifers at 2 years old reduces the rearing cost and reduces the time for a heifer to start earning money. The table below estimates the cost of rearing a dairy heifer, assuming £1.30 per head per day:

<table>
<thead>
<tr>
<th>Per 100 Cows</th>
<th>2 years</th>
<th>2 years 6 mths</th>
<th>3 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost</td>
<td>£950</td>
<td>£1186</td>
<td>£1423</td>
</tr>
</tbody>
</table>

**Calving Rate**
100 cows should yield 40 heifer calves per annum. At a 25% replacement rate you should have 15 surplus heifers to sell, which at £1500 per head is a total of £22,500.

These are just a few ideas to consider; review your farm system and efficiency and set targets to achieve efficient and profitable production.

**What is FFBC?**
With Scottish Government funding and support from NFUS, SRUC are running the Farming for a Better Climate (FFBC) initiative to help you identify practical steps to reduce farm emissions linked to climate change.

The key to reducing greenhouse gas emissions is **improved efficiency**, which is also vital for a sustainable and profitable business. **Demonstrating that we are taking action now could offset future regulations for the agricultural sector.**

Farming for a Better Climate aims to identify some of these practical steps and demonstrate what others have found when putting these steps into practice on their farm. It promotes 5 key action areas that we can all benefit from:
- Optimising fuel and energy use
- Renewables
- Locking carbon into soils and vegetation on the farm
- Improved nutrient use
- Optimise livestock management

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Funded by the Scottish Government as part of its Climate Change Advisory Activity. See [www.farmingforabetterclimate.org](http://www.farmingforabetterclimate.org)
For profiles of the climate change focus farms, practical guides and farmer case studies, take a look at [www.farmingforabetterclimate.org](http://www.farmingforabetterclimate.org)

### Dates for the Diary

**Looking Forward at Arable - Scottish Borders, 10th July 2013**

Courtesy of William Grimsdale, Mountfair Farming, Dykegatehead, Whitsome, SRUC invites you to an afternoon looking forward at Cultivation Systems, Science, Precision farming and Agronomy. The meeting starts at 12:00 with lunch; all farmers are welcome to attend this free event. For more information please call Donald Dunbar at the SRUC St Boswells Office on 01835 823322.

**SRUC acknowledges support from the Scottish Funding Council and Scottish Government for its programmes of knowledge transfer and exchange**

### Grow more grass with the GrassMaster Event, Wednesday 31st July, Kilwinning, Ayrshire

The Soil Association are hosting a practical day looking at increasing grass productivity through hands-on field assessment: providing guidance on rejuvenating, reseeding, and over-seeding; what varieties to sow and why; and aftercare of a new ley. Speakers are Charlie Morgan, GrassMaster and Iain Eadie, British Seed Houses. The day will also include a visit to Knockrivoch Farm. The event is free of charge to primary producers & £60.00 plus VAT to others. Places are limited and booking is essential so lunch and resource packs can be provided. For further information please call Lyn on 0131 666 0847 or email lmatheson@soilassociation.org

*With support from SRDP’s Skills Development Scheme & QMS*

### Getting in touch

What would you like to see covered in future newsletters? You may already be taking steps to mitigate or adapt to climate change; we would love to hear about them.

You can send a general enquiry to climatechange@sac.co.uk or contact one of the team:

- **Project Coordinator** — Rebecca Audsley, SAC Auchincruive Office. Email rebecca.audsley@sac.co.uk Tel 01292 525089
- **Glenkilrie and Stewart Tower Focus Farm Facilitator** — Peter Lindsay, SAC Perth Office. Email peter.lindsay@sac.co.uk Tel 01738 636611
- **Torr Focus Farm Facilitator** — Gillian Reid/David Keiley, SAC Dumfries Office. Email Gillian.reid@sac.co.uk or David.Keiley@sac.co.uk Tel 01387 261172
- **Upper Nisbet Focus Farm Facilitator** — Moira Gallagher, SAC St Boswells Office. Email moira.gallagher@sac.co.uk Tel 01835 823 322

If you would like to be notified when the next newsletter is out, email climatechange@sac.co.uk and ask to be added to the mailing list. Your email details won’t be shared with anyone else.

Thank you for reading the newsletter!