Grass Utilisation and Carbon Audits

Rumbletonrig
Climate Change Focus Farm

Notes from Meeting on 7th December 2016

The fifth meeting of the Climate Change Focus Farm discussion group at Rumbletonrig looked at making the best use of grassland and improving efficiency of resources.

Getting Started with Rotational Grazing

Making the change from set stocking to rotational paddock grazing can greatly improve grass utilisation, animal performance and reduce the forage cost per animal grazed.

Getting started with rotational paddock grazing can seem a challenge. SAC Consulting's Sheep & Grazing specialist Poppy Frater was invited to provide some easy steps to follow and factors to consider when thinking about rotational grazing:

- **Step 1 -** Calculate supply of grass using sward stick or rising plate meter
- **Step 2 -** Calculate demand for animals. See diagram below.
- **Step 3 -** How much grass do you want to leave behind? Graze too low < 900 kgDM/ha impacts on regrowth. High residual >2000 kgDM/ha reduces sward quality. Therefore you should aim for residual of 1500 kg/DM/ha.

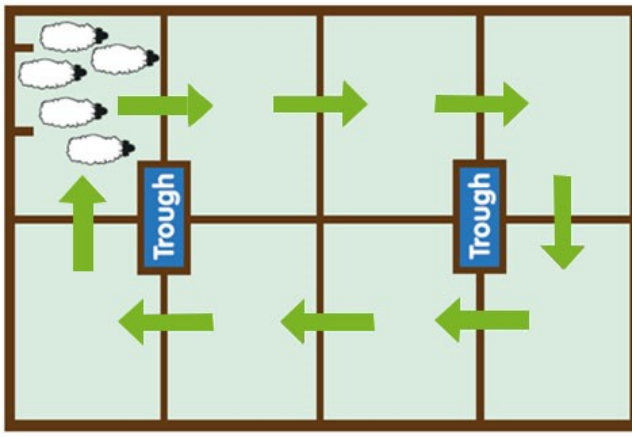

Figure 1 - A rotationally grazed paddock. Note livestock numbers can be increase to reduce the number of divisions within a field.

- **Step 4 -** Time Scale. How many days before you return to 1st paddock? This depends on the time of year and grass growth, the following are general suggestions: Spring 15-20 days, Summers 25 days, Autumn 30-40 days and Winter 90 – 100 days.

Example using 8 hectare field:

- Grass supply 2400 kgDM/ha x 8 = 19,200 kgDM
- Planned residual 1500 kgDM/ha = 12,000 kgDM
- Available feed (excluding growth) = 7,200 kgDM
- Animal requirement 100 x 380kg heifers @ 3% body weight (Table 1) = 1,140 kgDM/day
- Divide available feed by animal requirement = 7200 / 1140 = 6

⇒ 6 days feed available (or divide field into two using electric fence and move after 3 days).

Table 1. Animal requirement - calculating demand

Stock	Allocation (% of bodyweight)
• Dry ewes or cows • Mid pregnancy ewes or cows • Mature rams or bulls	1.5
• Late lactation cows • Late pregnancy ewes or cows	2
• Finishing cattle • Early to mid lactation cows • Mid or late lactation ewes • Replacements, including ram lambs	2.5
• Growing cattle • Early lactation ewes* • Flushing ewes or cows	3
• Growing lambs	4

Focus Farm meetings are free to attend and all farmers are welcome. Find us on Facebook or follow us on Twitter @SACFarm4Climate, or contact farm facilitator Donald Dunbar on **01835 823 322,** email donald.dunbar@sac.co.uk for more information.

Farming for a Better Climate is funded by the Scottish Government as part of the Farm Advisory Service (FAS). The Climate Change Focus Farm programme is supported as part of its Veterinary and Advisory Services (VAS) legacy activities.

Whole Farm Carbon Audit

What are Greenhouse Gases?

Carbon auditing involves a process to help individuals and businesses to calculate their carbon emissions i.e. greenhouse gases (GHG) from their farm, enterprise or product.

Table 2. Agricultural greenhouse gas emissions

Greenhouse gas	Where on the farm?
Carbon dioxide CO_2	Burning fossil fuels. Use of oil, diesel and electricity on farm. Can make up 10% of the farms emissions. Lifetime in the atmosphere; 20 to 200 years.
Methane CH_4	Natural bi-product of enteric fermentation. Can make up around 40% of emissions depending on farm type. Methane is **25 times more potent** than CO_2. Approx 12 yrs in the atmosphere.
Nitrous oxide N_2O	Soils naturally produce nitrous oxide but levels can be increased by cultivation and N fertiliser. Can make up around 50%+ emissions depending on farm activities. Nitrous oxide is **289 times more potent** than CO_2. Approx 115 yrs in the atmosphere.

Emissions from CO_2 (Carbon Dioxide), CH_4 (Methane) and N_2O (Nitrous Oxide) are converted to carbon dioxide equivalents (CO_2e), so the different emissions can be grouped together and expressed as one value, often 'per unit of saleable product' i.e.

- Beef & sheep - kg CO_2e / kg dwt
- Crops - kg CO_2e / kg grain

Whole process is commonly known as carbon foot printing or carbon auditing. The audit results allow benchmarking against other similar types of business and if done annually, provide monitoring of change within a business.

Financial Benefits

- Identifies opportunities for improved efficiency and reduced emissions.
- Strong correlation between efficiency and low carbon emissions (cost savings).
- Potential for producers to gain higher prices and/or better contract terms from their suppliers.

As part of the focus farm programme Rumbletonrig has completed two years of carbon audits (Table 3).

Table 3. Comparative of Rumbletonrig Audit Results with Similar Farm Type

Spring calving lowland sucklers enterprise	Rumb. (Yr 1)	Rumb. (Yr 2)	Average from like farms (18 farms)
Enteric fermentation	16.90	15.97	17.32
Manure management	**6.98**	**6.60**	6.30
Fertiliser	3.65	**4.27**	3.96
Purchased feed	0.19	0.15	0.96
Purchased bedding	**0.96**	0.48	0.76
Fuel	**0.99**	**1.23**	0.87
Electricity	0.07	0.09	0.12
Other	0.48	0.24	0.58
Total emissions (kg CO_2e/kg dwt)	**30.23**	**29.02**	**30.88**

Emissions from Rumbletonrig per kg dwt are reducing. Benchmarking against the group average allows you to focus on areas of difference and to see if there are opportunities to improve your use and cost of inputs or changes in management.

Farmers can take advantage of free professional assistance to complete a Carbon Audit under the Scottish Government Farm Advisory Service (FAS). Further details on how to apply can be found at www.fas.scot/carbon-audits/ .