

Hugh Grierson Organic, Newmiln Farm, Tibbermore, Perth

Introduction

Newmiln Farm runs a broad mix of activities. On the 350 hectares, the farm has the following enterprises – beef, sheep, laying hens, table birds, pigs, potatoes, and cereals.

Carbon footprint

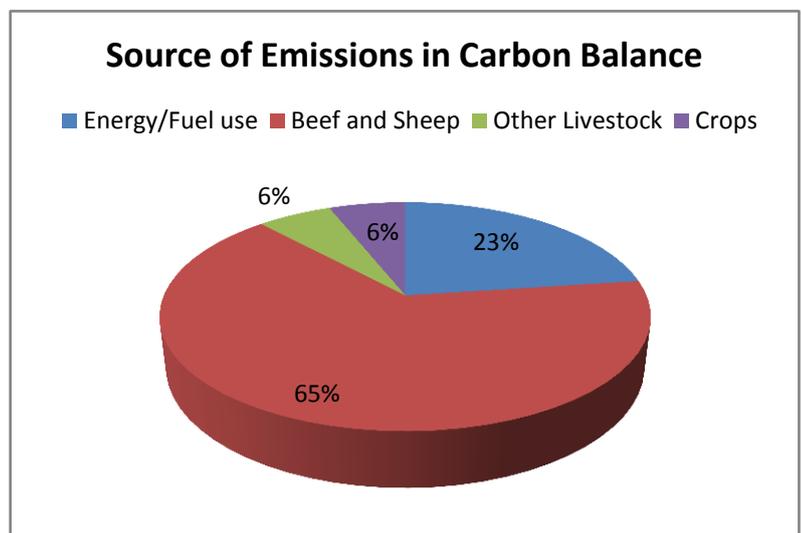
The carbon footprint for Newmiln Farm has been carried out using the CALM calculator which is available to use freely at www.calm.org.uk. The calculator enables farmers to assess the carbon balance of their farm. It produces a 'whole farm' report which indicates the level and type of emissions of different areas of the farm system enabling the user to identify 'hotspot' areas where improvement could be made and quantify the affect that such changes could have on the farm's carbon footprint.

Source	CO2 (kg)	CH4 (kg)	N2O (kg)	Total CO2 eq (tonnes)
Energy/Fuel use	149,426			149.43
Beef and Sheep		18,972	90.65	426.51
Other Livestock		1,222.2	40.5	38.22
Crops			127.13	39.41
Land use change (soil carbon loss)	-128,568.12			-128.57
Woodland	-295,095.07			-295.10
TOTAL	-274,237.19	20,194.2	258.28	229.91
Emissions per hectare				0.66tonnes CO ₂ eq/ha
Emissions per kg of produce (meat and crop combined)				0.07kg CO ₂ eq/kg

Using the above data, we can see that Newmiln Farm's overall carbon footprint for the last 12 months is 229.91 tonnes CO₂eq. This equates to 0.66 tonnes CO₂eq per hectare. Based on an average annual output of 3315 tonnes of meat, eggs, potatoes and crops, the carbon emissions are 0.07 kg CO₂eq per kg of produce.

This is a relatively low figure, and Newmiln farm can be commended for this. If we have a closer look at the results, we can observe the following: the highest carbon emission is by far the methane and nitrous oxide released through the beef and sheep activities.

The second highest contributor to farm carbon emissions is energy use. Contributing 23% to Newmiln's carbon footprint, energy and fuel use is an area that can be addressed in future. Finally, crop and other livestock activities (poultry and pig production) each contribute



approximately 6% of the farm's carbon emissions. It is clear that the majority of emissions in the farm's footprint come from cattle. These emissions are predominantly methane from enteric fermentation as well as some nitrous oxide and methane released from manures. Methane is produced as part of a natural and vital process and can therefore not be eliminated. However, they can be reduced through careful attention to livestock management to optimise production intensity, fertility, breeding and health and welfare.

EBLEX, the UK's beef and sheep farming information centre, suggest that beef farmers can reduce their emissions from cattle in a number of ways, including:

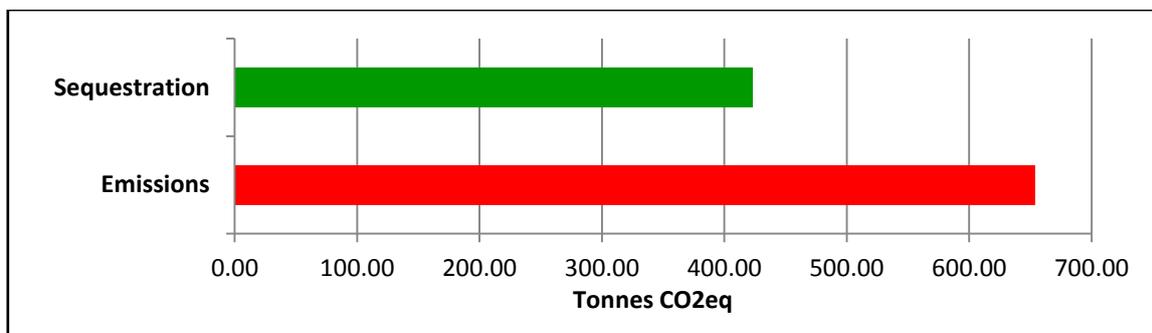
- Making changed to feed
- Improving health, fertility and management
- Adopting better manure management strategies
- Breeding for lower methane production

Making these changes will also benefit the farmer financially. Dairy cattle, for example, can produce up to 650 litres of methane per day per animal, "most of which is released from the animal by belching. In addition to its impact on the environment, the gas also represents a loss of energy, with up to 10% of the energy that cows eat being lost in this way." (DairyCo)

Improving efficiency through the measures mentioned above, could all contribute to improving emissions while also improving profit margins. The EBLEX factsheets can be found at <http://www.eblex.org.uk/research/climate-change.aspx> (more information is also at DairyCo, here: <http://www.dairyco.org.uk/resources-library/technical-information/climate-change/>).

Carbon Sequestration

Carbon sequestration, or the storage of carbon, is one way farmers can reduce their carbon emissions. This happens naturally in undisturbed soil, permanent pasture and woodlands. Newmiln farm have a high sequestration rate as they have have 24 hectares of woodland and in 2002 converted 80 hectares of arable use land into grassland. The following graph shows the sequestration and emission comparison.



Soils under permanent pasture in Scotland are thought to contain an average of 843 tonnes CO₂eq per hectare in the top 1m of soil. Soils under arable or rotational (temporary) grassland contain significantly less with an average of 550 tonnes CO₂eq per hectare in the top 1m of soil. This is because the routine disturbance of the soil within a rotational or arable system interrupts soil processes and increases the level of microbial activity and therefore CO₂ released by the soil – this all results in carbon being lost to the atmosphere.

In summary, Newmiln farm's carbon emissions predominantly come from the beef and sheep activities. This can be partially addressed using various factsheets available through EBLEX, DairyCo and the Soil Association. As farmers make such changes, positive results will follow with both environmental and economic benefits. The emissions from activities elsewhere on the farm are relatively marginal, but can also be addressed through minimising soil disruption and concentrating on improving energy and production efficiency.