

Torr Farm, Auchencairn – Carbon Footprinting Case Study

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Sam Adams www.soilassociation.org/lowcarbon @low_c_farming**Introduction**

Torr Farm is an organic dairy farm comprising of 389ha. It is situated on the Solway Coast, about 20 miles west of Dumfries, Scotland. The farm is 30ha woodland, 45ha rough grazing, and 80ha cereals. The remaining land is grass for silage and grazing.

The business currently has a breeding stock of 182, mainly Holstein-Friesian and Montbelliarde. All of the offspring are kept for breeding or finishing.

The farm is exploring renewable energy options such as wind and biomass.

Carbon footprint

The carbon footprint for Torr Farm has been carried out using the new Farm Carbon Assessment Tool (FCAT). This is more of a 'toolkit' than the usual carbon calculators¹. Instead of just giving a numerical figure of the farm's carbon balance, it shows farmers how their activities compare with recommended low carbon practices. Although developed by the Soil Association, it is applicable to farmers from all sectors, including organic and non-organic.

It is available to use freely at www.soilassociation.org/fcat. It produces a 'whole farm' report which indicates the level and type of emissions of different areas of the farm system. This enables the user to identify specific 'hotspot' areas where improvement can be made and also to quantify the effect that such changes could have on the farm's carbon footprint. Unique to FCAT, the tool has twenty one technical factsheets incorporated into the report.

Farm activities in relation to carbon emissions can be divided into four areas. FCAT provides a graphical analysis for each area of farm activities, which are discussed in turn below. The graphs rank specific farming practices from 0 – 5, the higher the number the closer to low carbon farming 'best practice'. The lower the number, the higher the GHG emissions and the carbon footprint. These lower numbers are the 'hotspots' that should be addressed by the farmer in order to decrease carbon emissions on the farm, increase efficiency, and minimise wastage.

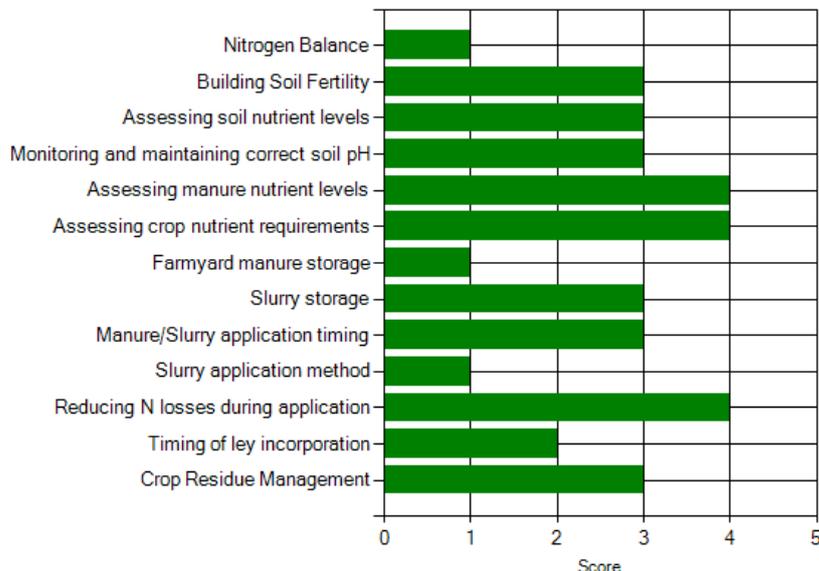
Nutrients and Manure

The graph below looks at thirteen farming activities to do with nutrient and manure usage on the farm. We can see that there are some activities that are close to 'best practice' - assessing manure nutrient levels, assessing crop nutrient requirements, and reducing N losses during application. Each of these three activities scored 4/5 and the farm can be commended for this. What this tells us, is that every few years the FYM/slurry is tested for its nutrient content. It also tells us that the crop nutrient requirements are monitored regularly (from other information, we have found out that Torr Farm uses nutrient budgeting software).

In terms of reducing N losses during application, the high score indicates that there are a number of good practices employed by the farm when it comes to applying the nutrients to the field. These would include avoiding windy, wet or snow-covered days, never applying to wet or saturated ground, and incorporating the nutrients within 48hrs.

¹ Other calculators include CALM www.calm.cla.org.uk, the COOL Farm Tool www.coolfarmtool.org, and Cplan www.cplan.org.uk

Many of the activities fall in the middle of the graph. However, there are three activities that have scored only 1/5. Firstly, nitrogen balance would have scored higher with a lower 'farmgate' nitrogen balance. Secondly, FYM storage would have scored higher if manure was placed on a hard standing, if an impermeable cover was used, if manure is turned, and if run off was collected. Lastly, slurry application method scored low because a broadcast spreader was used. Best practice recommends using any type of injector or trailing shoe

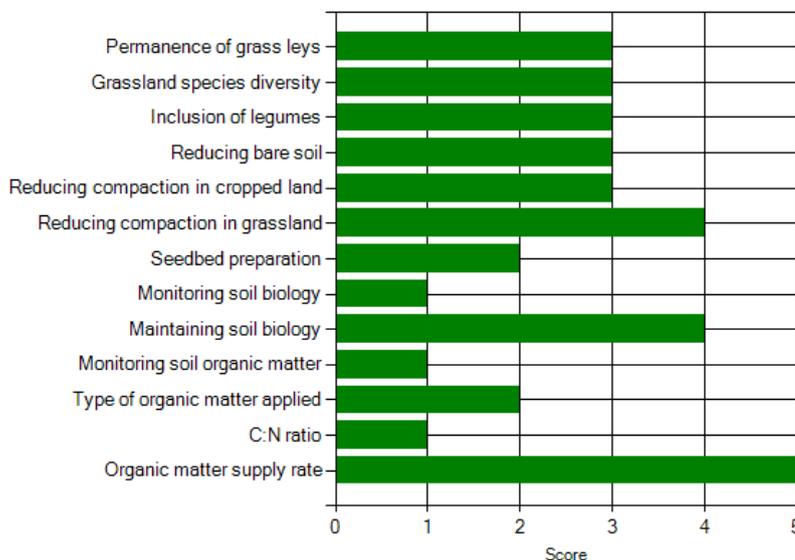


Soil and Grassland

The second graph looks at soil and grassland management at Torr Farm. Again, this graph presents a mixed result, with some close to 'best practice' and others needing attention.

The organic matter supply rate scored 5/5. This is because it is applied frequently, every 1-2 years, which has a huge impact on encouraging carbon-capturing beneficial micro-organisms.

There are three areas that scored only 1/5. The first two involve the monitoring of soil biology/soil organic matter (SOM). A higher score would come from regular monitoring, including worm counts and soil biology testing. Lastly, the carbon-nitrogen ratio would have scored higher if it was taken into consideration so as to avoid N lock up and to optimise biological activity.

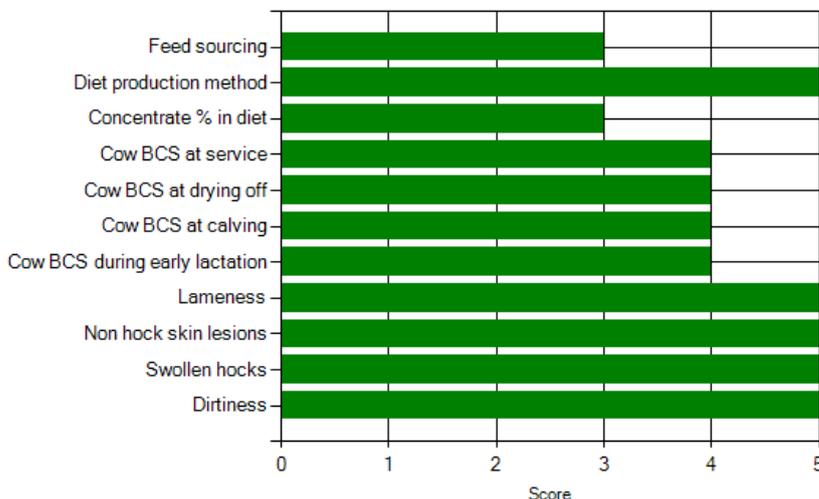


Livestock - Dairy:

This final graph show very clearly that Torr Farm excels at low carbon farming practice in the area of livestock management. Across the entire graph, we can see that each activity has scored at least 3/5 and usually 5/5.

This means that the livestock are healthy, with a high 'body condition score', eating home-grown food, with limited concentrate supplement.

In terms of the carbon footprint, this is a huge saving. Ruminants produce an enormous amount of methane, a greenhouse gas 21 times stronger than carbon dioxide in terms of global



warming potential. While we are not aiming to stop the natural process of enteric fermentation and cattle belching, low carbon farming advises that healthier animals are more efficient at converting feed into meat and milk. This means less energy is expelled as gas. This greater efficiency results in a lower environmental impact, as well as a higher economic return.

Energy Use

Energy use contributes to a farm’s carbon footprint through the burning of fossil fuels, which in turn releases CO2 into the atmosphere. Reducing energy use on the farm decreases both CO2 levels as well as financial costs. Generating your own energy has the exciting potential of selling it to the grid and adding a new source of revenue.

The table on the right shows two areas of energy use at Torr Farm. The top box looks at how many litres of fuel the farm has used. This is then converted into ‘kg of CO2 equivalent’ that is released into the atmosphere.

The first box shows that over 2012, Torr Farm’s fuel use released 95,413kg of CO2 eq. The second box shows that electricity use on the farm has generated a further 77,638kg of CO2 eq.

Adding the two boxes together, we see at the bottom of the table a total of 173,051kg CO2 eq. In other words, **over 2012, Torr Farm’s energy usage released an equivalent of 173 tonnes of carbon dioxide into the atmosphere².**

Fuel use on farm

Fuel Type	Emissions (kg CO2 eq)
Red Diesel	91,203.7
Diesel	4,209.5
Petrol	N/A
LPG	N/A
Heating oil	N/A
Propane	N/A
Coal	N/A
Natural gas	N/A
Total	95,413.2

Electricity

Electricity	77,638
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Total emissions from energy and fuel use	173,051
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Conclusion

In summary, the FCAT analysis has shown that Torr Farm is already farming according to many of the best practices recommended within low carbon farming research and advice. Of particular mention are the high scoring livestock management activities. Also mentionable is the organic matter supply rate which scored 5/5.

The ‘hotspot’ needing attentions at the farm is to do with regular monitoring of chemical and biological activity. This includes various activities such as knowing the farm’s nitrogen balance, monitoring soil biology, monitoring soil organic matter, and knowing the C:N ratio. Other ‘hotspots’ that we’ve mentioned are the storage of FYM and the method that slurry is applied to the farm.

Torr Farm should also continue exploring renewable energy options, which have great potential to generate income for the farm as well as decrease carbon emissions. Likewise, the maintenance and expansion of woodland and hedgerows will lock carbon in the soil and have an even more pronounced effect on the farm’s carbon footprint.

It is recommended that Torr, like any farm, selects only a few of these hotspots instead of taking them all on at once. Using technical factsheets, such as those within FCAT, will provide farmers with the information required. It will be most effective to start small and make the changes in practice gradually. As farmers make such low carbon farming changes, positive results will follow with both environmental and economic benefits.

² Note, FCAT does not compare figures with other farms or a national average. The recording of energy usage is intended for the farmer to monitor on an annual basis, working towards improving efficiency.