Teagasc LIFE BEEF CARBON Newsletter 9

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INNOVATIVE IRISH FARMER APPLYING SLURRY WITH LOW EMISSION TECHOLOGY

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Penultimate European Beef Carbon Farmer Network - Ireland

Ireland hosted the third European farmer network of LIFE BEEF CARBON on Tuesday 4th May 2021. The event took place virtually via a webinar facility due to COVID-19 travel restrictions. Teagasc organized the webinar with support from national and European partners. It was open to participating farmers and advisors, and the wider public. One hundred fifty people watched the event on Zoom. The webinar was conducted in English with translation provided by Eurideas for French, Spanish and Italian attendees.

Advisors, specialists and farmers presented a wide array of low carbon practices to the viewers of the penultimate European BEEF CARBON farmer network. The options varied from breeding more carbon efficient cattle via genomic selection to applying manure with low emission spreading equipment. Dr Andrew Cromie, Technical Director of the Irish Cattle Breeding Federation, described genetic trends in Irish beef cattle and highlighted that replacement beef heifers with a higher Eurostar index i.e. genetic merit had the lowest carbon footprint on live weight basis. He discussed the importance of reducing slaughtering age to mitigate emissions and showed direct measurement of methane emissions from cattle validated the benefits of genetic selection.

Feed consumption is among the main drivers of methane and carbon emissions on a cattle farm. The production of feed is also a major source of carbon emissions. Better management of nitrogen inputs, particularly organic sources, is key to reducing emissions related to feed. Mark Plunkett, Teagasc Soil and Plant Specialist, outlined the main steps cattle farmers can take to increase the nitrogen replacement value or organic manures. Timing of manure application was identified as the critical step for optimizing nutrient use on livestock farms.

Plant uptake of N is greatest in spring. Therefore, it is the best time to spread manure. It also reduces the farms N fertiliser requirements, which saves money. Applying the majority of manure in spring, under the right weather conditions, is also among the most important carbon mitigation practices. Additional reductions in feed related carbon emissions can be achieved by 1) applying stored liquid manure onto the soil in narrow bands with a trailing hose/shoe instead of broadcasting slurry and 2) by switching from nitrate-based fertilisers to protected urea.

Innovative LIFE BEEF CARBON farmer, Ricky Milligan, pointed out the advantages of using trailing shoe equipment during a virtual walk of his beef farm in Co. Kildare. He was pleased the equipment cut his N fertiliser bill and reduced odours and emissions from organic manures. Ricky operates a spring-calving suckler calf to beef herd and brings some dairy calves to beef. He breeds Hereford cattle and aims to finish them off grass before their second winter. His beef carbon plan focused on becoming more technically efficient. Ricky did this by reducing age at first calving by 6 months to 24 months and by increased calving rate to 1 calf/cow per year. In addition, he improved soil fertility via nutrient management planning and liming, and extended the grazing season to increase grass utilization. He also measured grass and put in more paddocks to remove grass surpluses as bales. Overall, these changes reduced the Milligan's beef carbon footprint by more than 15% over a 5 year period.

The benefits of improving technical efficiency were reiterated in the second virtual walk on the farm of Ger McSweeney's. The Munster beef producer made similar improvements to Ricky in terms of soil fertility and grassland management. In addition, he reduced age at slaughter by a month, improved maternal and terminal beef traits, and increased weaning efficiency i.e. average weight of a calf at weaning relative to the average weight of the dam. The latter was achieved through a combination of increasing genetic merit for milk production and reducing suckler cow size. Ger further reduced carbon emissions by switching from CAN to Urea and via introducing white clover into the swards on the farms.

The Signpost Farm initiative, presented by Tom O'Dwyer, aims to increase the adoption of the climate smart farming practices after LIFE BEEF CARBON. The Teagasc led initiative was launched in 2020 and is supported by industry and state bodies. Demonstration farmers are a core element of the Signpost programme. The demo farms are spread throughout the Republic of Ireland and act as hubs to mobilise local advisors and farmers. A wide range of farm enterprises are represented in the new initiative including beef. Signpost farmers will showcase science based carbon mitigation strategies and monitor carbon sequestration as part of the national agricultural soil carbon observatory. The experiences and results from the Signpost programmes will be upscaled via an advisory campaign. This will increase engagement with the wider farming community, and help to stimulate further climate action in the agricultural sector.

Spain hosts 4th European Beef Carbon Farmer Network

The final European Beef Carbon Farmer network took place on Spanish farms on Thursday 20th May 2021. One of largest beef producer associations in Spain, ASOPROVAC, led the organisation of the fourth network. Irish, French, Italian and Spanish farmers, advisors, researchers and industry stakeholders watched the network via a Zoom webinar. An in-person event or farm visits were not possible because of continued COVID restrictions. The pandemic did not, however, prevent Spain's beef producers from walking their farms online and showcasing actions to mitigate carbon emissions from beef production.

The first virtual tour of a Spanish beef farm was held on the estate of Juan Masa. He has been particapting in LIFE BEEF CARBON for 4 years and is part of the innovative cohort of beef farms. Juan's farm, La Brujera, is located in the mid-west region (Extremadura) in the province of Caceres. Suckler cattle are brought to beef on his farm and sold as weanlings. Juan usually maintains 400-450 cattle on 750 hectares, of which 80% is in grassland and the balance is used to grow cereals and vetch. Limousine is the predominant breed on the farm.

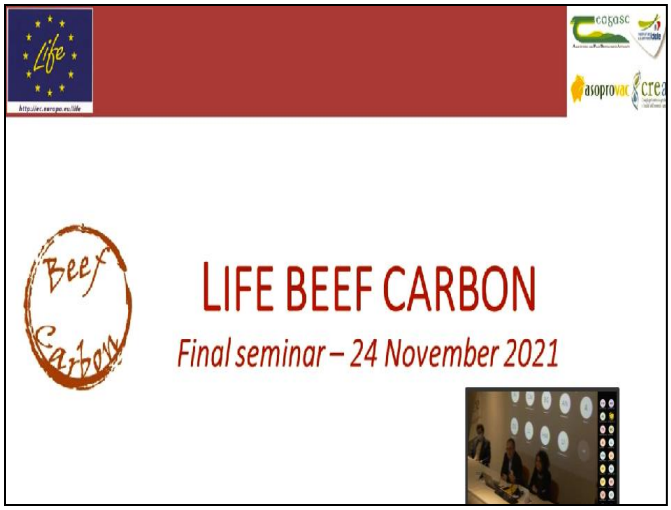
Methane from enteric fermentation, a digestive process in ruminants, was the main driver of carbon losses on Juan's farm, accounting for 58% of annual emissions. His beef carbon plan focused on improving reproductive performance and herd health to mitigate methane and carbon losses per unit of beef. Ultrasound scanning and testing of bull semen were key to improving reproductive performance on the farm. These technologies enabled Juan to cull empty cows and remove infertile bulls from herd. He also improved the genetic merit of female progeny in terms of fertility and monitored body condition throughout the breeding season. Juan coupled gains in fertility with increases in aveage weight gain. He switched to multiphase feeding to ensure the nutritional needs of cattle were fully met in the growing and fattening stages of their life cycle.

Better nutrition mitigated emissions related to feed production and manure management. Together these sources caused about 21% of the farm's carbon emissions. Juan further reduced carbon emissions from manure by investing in better storage facilities and by burying manure on the day of application. Altogether, the actions in his plan reduced the carbon footprint of beef by 15% in less than 5 years. His footprint fell from 11.1 kg CO_2 equivalent/kg live weight in 2016 to 9.4 kg CO_2 equivalent/kg live weight in 2020. A similar relative reduction in beef carbon footprint was realized on the suckler calf to weanling farm of Rodeznera Pizarilla. The farm is also located in Extremadura and followed the same approach to mitigate carbon emissions from suckler cows and calves. His plan to cut emissions from feed production differed slightly from Jaun's in that he partially substituted compound feeds with by-products from the local area and he reduced the volume of fuel consumed by machinery. Rodeznera plans to capture more carbon too by planting oak trees and installing renewable energy technologies.

Practices and technologies to mitigate carbon emissions from specialized beef fattening systems were showcased on a farm in the Castilla La Manche region of Spain. Halving the amount of soy in the diet, regular changing of bedding material, multiphase feeding and minimum tillage were highlighted as important carbon actions for this system. Applying these actions simultaneously reduces the carbon footprint of beef fattening systems by about 10%. Replicating the carbon actions of this and other types of innovative farms at a national scale could improve the carbon footprint of Spanish beef substantially. ASOPROVAC is working closely with multiple actors in the industry to make this improvement, and plans to identify additional techniques and practices to make beef production more sustainable in terms of carbon.

Final LIFE BEEF CARBON Seminar

The participants of LIFE BEEF CARBON gathered for the final time with industry and policy represenatives at a closing seminar in Brussels on Wednesday 24th November 2021. The headquarters of the COPA COGECA was the venue for the hybrid conference. Stakeholders attended in-person and virtually via Microsoft Teams.



Thomas Sanchez, a Senior Policy Advisor at COPA COGECA, opened the seminar and outlined Europe's policy to tackle climate change. He discussed the potential implications of climate policy for the beef sector and the "fit for 55"climate package. This ambitous package was agreed by member states in 2021 and has risen the EU's carbon emissions reduction target for 2030 by 15 percentage points to 55%. The new target is relative to a 1990 baseline and is a substantial rise on previous commitments. "Fit for 55" complements existing goals in the European Green Deal and aims to put the continent in a position to reach net zero carbon emissions i.e. climate neutrality by 2050.

Cutting carbon emissions by more than half in the next decades will be challenging for all sectors, particularly beef. The final results of LIFE BEEF CARBON largely confirmed this assertion, showing an average reduction of 13% for the beef carbon footprint of the innovative farms. Josselin Andurand, explained that the bulk of this improvement was due to increases in technical efficiency. He also warned that this strategy alone would be insufficient to fulfil the sector's medium-term carbon commitments.

Fortunately, more than 40 actions were identified to mitigate carbon emissions over the course of LIFE BEEF CARBON. Several of the actions identified reduced emissions by enhancing carbon sequestration in soil and/or vegetation. Josselin indicated that this biological process could offset the carbon footprint of beef by up to 20%. However, the carbon captured by many of the actions applied on the farms, e.g., better grassland management, could not be quantified accurately with current accounting and auditing tools. There is therefore an urgent need to refine the carbon sequestration module of auditing tools to reduce the over or under estimate of carbon emissions from beef production.

Technological solutions were used to a limited extent to control emissions on the innovative farms. These innovations tend to be too costly, or are impractical to use on commercial farms. Financial supports can overcome the former obstacle and are already provided for specific carbon technologies. Josselin and Jean Baptiste Dolle agreed that more technologies will be needed to meet the long-term carbon targets for the sector. Genomic selection and methane reducing feed additives were highlighted as particularly attractive options. The latter is normally ineffective after a few weeks, but a couple of additives have emerged that can permanently reduce methane by 15% to 30%. Coupling effective feed additives with genomic selection, carbon capture and other technologies e.g., renewables could make future beef farming systems carbon neutral or carbon negative.

Carbon plans summarizing the actions that worked on the farms in the project were presented by French, Irish, Italian and Spanish partners during the seminar. All of plans indicated substantial scope to reduce carbon emissions, but scaling up the carbon actions in the plans was identified as a major barrier to mitigation in the beef sector. Jean Baptiste pointed out that the

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upscaling challenge could be overcome by offering incentives for implementing climate actions. He showed how associations in France have recently begun rewarding farmers for mitigating carbon emissions. McDonald's, the largest restaurant chain in the world, is considering offering similar incentives to speed up carbon mitigation in the beef supply chain. Eloi de la Celle, Supply Chain and Sustainability director for McDonald's France, presented the corporation's strategy and roadmap for reducing the carbon footprint of beef. Farming is at the centre of McDonald's climate strategy and according to Eloi should be seen as part of the climate solution. The company is working to transform beef into a low carbon product and is keen to show customers how farming initiatives such as LIFE BEEF CARBON can improve the footprint of beef. Future initiatives will continue to support beef farmers implement carbon mitigation actions and will help the sector move towards climate neutrality.