Written evidence from Quality Meat Scotland (MET0042)

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Meat Scotland to advise on such matters. This advice is freely available and further information can be provided by the designated contact above.

Agriculture

16) Are there emerging technologies, such as methane suppressant feed products or approaches to slurry management, that could aid with methane emissions reduction in agriculture? What impact could they deliver?

16.1 This inquiry focuses on methane however, it must be remembered that the main sources of GHG emissions vary across farm systems. For instance, in low input smallholder systems, methane from enteric fermentation is the largest proportion of the GHG emission, but this may not be the case in more specialised and highly productive systems. [1] There are several methods and technologies that are currently available to be implemented by farms in order to reduce methane emissions. The following is a summary of some and the impact they could have.

16.12 Microbiome-driven breeding is a new approach to selecting for livestock which naturally produce less methane emissions than average. This is on an individual animal basis, rather than breeds as a whole, as some animals produce much less methane than others from the same herd and subject to the same conditions. A study carried out in Scotland at SCRUC by Martinez-Alvaro et al., (2022) predicted a possible reduction of up to 17% per generation. This means the genetic gain per generation would be equivalent to an up to 8% reduction in methane emissions per year or cumulatively up to 50% in 10 years.[2]

16.13 Improving efficiency through methods such as reducing calving intervals, improving nutritional quality and improving animal health, means that the same output can be produced from fewer animals with lower associated emissions being an indirect result. The Moredun Research Institute's report 'Acting on methane: opportunities for the UK cattle and sheep sectors', highlights that "poor animal health is a major constraint on efficient livestock production, and therefore a source of excess methane emission here in the UK, and across the world". Improving herd efficiency could be further enhanced and monitored by the use of 'smart cattle sheds', such as SRUC's Green Shed and precision

[1] PowerPoint Presentation (saiplatform.org)

[2] https://www.gov.scot/publications/reducing-emissions-agriculture-role-new-farm-technologies/pages/7/

livestock farming (PLF) technologies. This would demand a high investment cost and would link together an animal health monitoring system, management of microclimate and methane extraction.

16.14 Vaccines could help to decrease number of methanogens present in the rumen. The vaccine works by triggering an animals' immune system to generate antibodies in the saliva which then pass into the animal's rumen and suppress growth and function of methanogens.[3] Work of such a vaccine is at the initial stages and the efficacy is not yet fully ascertained, although some in vitro experiments have achieved GHG emissions reductions of 30%.[4]

16.15 Feed additives are now available on the market, with several options to choose from. This method is easily applied but comes at a cost and does not serve to produce any benefit other than to reduce enteric fermentation. The health risks associated with using these additives must be considered.[5]

It should also be noted that while feed additives or specialist feeds are an appealing solution there are a limited number of systems in which they can be introduced. At present, feed additives, and methane suppressing feeds must be fed to animals in routine, which is unsuitable for animals that are extensively or even outdoor grazed. Similarly, methane suppressing feeds may not be appropriate for some classifications of stock. As well as this, there may be an issue with availability and affordability of these feeds in the short term until they can be produced and made available at scale.

16.16 There are several procedures that could be undertaken in relation to manure management in order to reduce methane emissions, such as adding a fluoride and tannin additive (TA-NaF) to manure and reducing the storage temperature. In experiments with pig manure, TA-NaF has demonstrated a 95% reduction in ammonia emissions and 99% reduction in methane emissions (Dalby 2021).[6] In relation to reducing storage temperature, the SAI's report notes that "at higher temperatures, bacterial activity increases resulting in more methane production. By reducing the storage temperature, methanogenic activity decreases".[7]

17) How effective are existing policies and incentives, such as Slurry Infrastructure Grants, in driving methane reduction?

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[3] https://www.gov.scot/publications/reducing-emissions-agriculture-role-new-farm-technologies/pages/7/

[4] https://www.gov.scot/publications/reducing-emissions-agriculture-role-new-farm-technologies/pages/7/

[5] PowerPoint Presentation (saiplatform.org)

[6] https://www.gov.scot/publications/reducing-emissions-agriculture-role-new-farm-technologies/pages/7/

[7] https://saiplatform.org/wp-content/uploads/2022/09/220907-final-ghg-mitigation-report.pdf

17.1 Quality Meat Scotland's remit focuses on red meat production in Scotland. As agriculture is a devolved matter, we are not able to comment on the effectiveness of UK policies from direct experience.

17.2 However, as a general comment on slurry storage, the rapid removal of manure from housing to closed storage is known to have high impact on preventing potential methane emissions. This can come at a considerable cost to farmers, who will need to invest in barn adaptation to remove manure quickly and store it with a gas-tight seal.[8]

18) What other policy tools, frameworks or incentives could be employed in agriculture to drive methane reduction?

18.1 Again, QMS is primarily considered with agri-food policy in Scotland. We note that arguably all mitigation measures implemented on farm will require investment from farmers, from infrastructure changes to upskilling. Although profitability can sometimes be an indirect result, these changes made do not always provide a return on investment (such as feed additives and manure treatment) and in helping the government achieve their climate change targets, these extra costs should be supported.

18.2 Precision livestock farming tools such as animal mounted sensors, present farms with a good return on investment, but have a significant initial cost which is a barrier to uptake.

18.3 The most effective tool to reduce methane, and other emissions in the red meat supply chains remains to be more effective and efficient breeding underpinned by genotype and phenotype data. A nationalised, livestock data and breeding service. A model for this service, already exists using small amounts of statutory data to provide information to producers to help make better breeding decisions. This tool is called MyHerdStats and operated by ScotEID. When combined with genotype information this tool could provide invaluable data and improve breeding efficiency. If the information on which animals were likely to produce less methane, producers could be incentivised to breed from these animals.

19) How can efforts to mitigate methane emissions in agriculture be integrated into broader approaches to facilitate and incentivise climate and nature-friendly farming practices?

19.1 As the Moredun Institute's report 'Acting on Methane' points out, "UK ruminant agriculture has an opportunity to be at the forefront in helping to be part of the solution - but to contribute to a solution, methane emissions from ruminant livestock need to fall".[9] Many innovations have

[8] https://saiplatform.org/wp-content/uploads/2022/09/220907-final-ghg-mitigation-report.pdf
[9] https://ruminanthw.org.uk/actingonmethane/

already been developed in order to combat climate change effects contributed to by the livestock sector, such as precision nutrition and ruminant genetics – however, these are not recognised by the National Atmospheric Emissions Inventory Any future, novel tools, including methane supressing feed products (MSFPs) for example, must be certified, measured and endorsed as tools which will be incorporated into the National Atmospheric Emissions Inventory, before they can become viable mitigation measures.

19.2 In order for any changes in enteric methane emissions intensity to be tracked as a result of using MSFPs and other tools, comprehensive baselining of livestock needs to be carried out at farm level in advance.

19.3 As above, it is crucial that government ensures that validated innovations and tools are documented, quantified, and represented in the National Atmospheric Emissions Inventory. Those same standards must apply to officially approved farm level carbon calculators. Unfortunately, systems are not in place to proactively validate new science and update baseline carbon accounting.

19.4 As above, a greater amount of information being made available to producers will ultimately have a positive impact on efforts to reduce GHG emissions. Countries which have implemented such systems have already demonstrated that greater efficiency is an outcome of national data programmes.

19.5 As such, standardising and effectively managing carbon auditing needs to be a government priority to facilitate climate and nature-friendly farming practices.

20) How can efforts to reduce methane reduction be balanced against other important considerations in the agricultural sector, including food security?

20.1 GHG emissions control, including methane, does not rely on a shrinking ruminant sector, but instead is built on livestock health and welfare which lays the groundwork for other interventions – without this foundation, any supplementary measures will not be as effective.

20.2 Increasing herd efficiency and selective breeding for low methane emissions (when combined with maintaining productivity levels) are methods that could have a two-pronged result: safeguarding food security whilst reducing methane emissions.

20.3 The Sustainable Agriculture Initiative (SAI) Platform points out that "increasing animal productivity by improving the genetic potential of livestock, with benefits for reproductive performance, feed conversion efficiency, health and liveweight gain, has been found to be among the most effective approaches to GHG mitigation". It is also one of the methods currently most used by farmers, so there is a head start over other methods and technologies.

20.4 Similarly, regarding enteric methane production, selective breeding for low methane emissions does not mean lower performance and may improve overall efficiency since methane production represents a loss of energy.

20.5 It should be noted that both methods require a long-term breeding strategy, but the profitability benefits to farming businesses could also help protect the UK's food security.

20.6 Ultimately, as highlighted by the Moredun Institute, "high herd and flock health status provides economic and welfare benefits, but also supports new methane emissions mitigation measures such as breeding, nutrition, and the use of feed additives".[10]

20.7 In summary, greater efficiency underpinned by data sharing and a national strategy on utilising livestock genotype, and phenotype information can reduce GHG emissions while improving productivity and profitability. Providing data to producers to empower them to make better breeding decisions.

[10] https://ruminanthw.org.uk/actingonmethane/