

How nutrition can help us reduce greenhouse gas emissions from farming

By David Nickell, DSM

Why do we need to reduce emissions from farming?

We're at a tipping point globally when it comes to climate change. If we don't act now, we risk reaching a point of no return. Animal farming accounts for 14.5% of all human-derived emissions and this figure is set to rise still further as demand for animal proteins grows alongside the Earth's population. It is estimated that if animal production continues with business as usual as the rest of the world decarbonizes, then the emissions from farming will consume approximately 80% of humanity's total emissions budget if we wish to keep warming below 1.5 degrees.

What does reducing emissions mean to DSM?

We believe reducing emissions from livestock is the biggest challenge facing the animal agriculture industry. In support of the UN's Sustainable Development Goal 13, Climate Action, scientists at DSM Animal Nutrition and Health have been investigating ways to reduce both the direct and indirect emissions from animal farming for years. It's why we launched our strategic initiative, We Make It Possible, to rally the entire industry to action around of the issue of sustainability, to encourage research and innovation.

As a company, we're also taking direct action on reducing our Greenhouse Gas (GHG) emissions and holding ourselves accountable. We're targeting a 30% reduction of our direct GHG emissions and emissions from our purchased energy by 2030. Our Science Based Targets on emissions reduction are aligned with the Paris Climate Agreement and all of our products have been developed with a clear sustainability purpose which meet at least one of the UN's Sustainable Development Goals.

How does reducing emissions relate to other sustainability issues in agriculture?

Reducing emissions is complex, with many indirect factors having a cumulative impact. The ability to understand and quantify these emissions factors, then innovate and apply technology that reduces the emissions measurably and quickly will play a leading role in the future sustainability of the industry.

If we are to reach our goal of substantially reducing emissions to the point where it no longer consumes the majority of our emissions budget, then we need to look below the surface of each complex

issue. For example, food loss and waste along the supply chain may seem separate from the issue of greenhouse gases, but in fact itself contributes 8% of emissions. Thus, reducing food loss and waste would also reduce animal agriculture's overall footprint.

What is the role of feed in reducing emissions?

Animal nutrition plays a central role in the circular and low carbon economies. To make substantial improvements in sustainable animal production, feed and nutrition needs to be the key area of focus. Improving feed digestibility and reducing feed conversion ratio (meaning that less feed is needed to produce a unit of meat) is seen as one of the major levers of sustainable animal production, enabling us to farm less land for animal feed, freeing up space for human food and restoring natural habitats.

Emissions reductions are possible if best practices are implemented across species. When broken down by challenges and impact, there are three core innovations that will make a difference. These are: lifetime performance and productivity gains, improved nutrient utilisation, and enteric methane inhibition.

Feed enzymes improve feed digestibility. By unlocking the nutrient potential of feed raw materials, we can enable animals to gain the same nutritional benefit from less resources. As well as freeing up land, this can reduce GHG emissions. In addition, nitrogen and phosphorus levels in manure can be significantly lowered, meaning less is released into the environment—reducing what is a major cause of land and water pollution in some geographies. Moreover, this helps to address the growing issue of resource limitations; we have to do more with less, and here feed enzymes play a key role.

How do DSM's products specifically reduce emissions?

DSM's products are tailored per species, as each species produces different kinds of emissions and therefore different problems.

Enteric methane emissions from ruminants account for 40% of animal agriculture's footprint in the EU for example. However, dairy cows are also a crucial part of many diets and livelihoods: they support the food security of more than 1 billion people around the world. It is clear the importance cows have to human society will be unchanged in future, but it is also clear that we have to further improve the

sustainability of dairy production as demand increases.

We especially need to address the significant level of methane emissions generated by cows, and by doing so we will help animal production decarbonize. Putting feed and nutrition at the centre of the battle, we're working on a solution called Bovaer which can reduce emissions from ruminants by 30% or more.

It isn't fair to place all the blame for agricultural emissions on cattle. For example, swine produce large quantities of ammonia in their urine, which leads to eutrophication on land, a leading cause of biodiversity loss. DSM's VevoVital reduces ammonia emissions from swine by 16% on average due to its action of acidifying the urine.

In poultry, meanwhile, DSM has improved phosphorus management through the use of HiPhos—an advanced phytase feed enzyme that reduces the industry's reliance on finite rock phosphate resources by unlocking the naturally occurring phosphorus in the plant raw materials in the feed. By doing this, poultry excrete as much as 50% less phosphorus into the environment—a major cause of

freshwater pollution. This nutritional solution not only addresses the issue of finite resource use, but further shrinks the emissions profile of animal agriculture.

What should others be doing to reduce emissions across agriculture?

None of these solutions alone can transform the face of animal agriculture; together, though, they represent a huge leap forward for sustainable farming. The same is true of all sustainability challenges—no one country or business on its own will be able to change the direction of travel, but many working in tandem can achieve the targets set out in the UN Sustainable Development Goals, and more. We Make It Possible hopes not only to spur further action within DSM towards ever more innovative and sustainable solutions, but also beyond. Every business in the sector has an obligation to our planet and to ourselves, to create change.

If not us, who? If not now, when?