

Environmentally responsible food production: ruminants

Livestock production's impact on the environment is part of a global conversation about environmentally responsible food production. While ruminants, including dairy cattle, are often singled out in media stories examining agriculture's impact on the environment, a closer look at the science of farming and the nature of the bovine species shows that today's dairy technology makes milk production remarkably efficient and supports environmentally responsible food production. Such efficiency is integral to feeding the future; an initiative at the heart of Trouw Nutrition's research and development efforts.

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Animal nutrition and farm management practices are driving improved efficiency on modern dairy farms. Management practices, such as intensive dairy feeding and innovations such as calf milk replacer support efficiencies and environmental stewardship. Additionally, the nature of bovine animals is well suited to environmental resource utilisation that promotes responsible food production. For example, bovine animals are physiologically suited to exist on plant substrates that cannot be consumed by humans or most other animals.

Introducing nutrition and farm management technologies to emerging economies can allow dairy and beef farmers around the globe to balance environmental stewardship and animal welfare with economic efficiencies, all while meeting growing demand for safe, high-quality protein.

Environmentally responsible food production

As fewer but larger farms are meeting growing demand for protein, farmers are balancing the economics of livestock production with environmental stewardship.



According to a recent report from the Intergovernmental Panel on Climate Change (IPCC), both livestock and crop farming have made substantial strides in productivity over the past six decades while requiring little in the way of additional resources.

Data shows that since the 1960s, global cropland has increased by just 15% and pasturelands by only 8%, while these resources have yielded a 3.5 times increase in crop production and 2.5 increase in animal production.

Data from the IPCC further shows that greenhouse gas emissions per unit of food produced today are about 60% lower than in 1960.

Although the total footprint of food production has increased, it has grown at a much slower rate compared to the human population, which has more than doubled since 1960.

Innovations in agricultural technologies have largely accounted for rapid improvements in efficiency. However, improvements have not been implemented equally across all regions and are mainly deployed in advanced economies.

Implementing these technologies on farms in low- and mid-income countries could reduce the impact of dairy production as today, low- and mid-income regions account for 70% of ruminant emissions.

The benefits of high-performing dairy animals

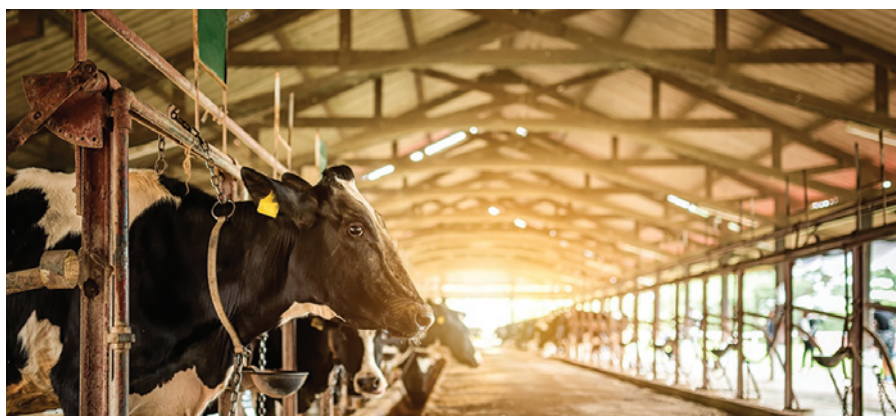
Variability in production efficiency across geographies points to tremendous opportunity. Today's global herd of dairy animals is estimated to be between 200M and 300M. Among this herd population, about 42M professionally reared cows are producing 40% of the world's milk. Considering global demand, a herd of just 100M dairy cows could meet production requirements.

Shifting resources now used to maintain a huge herd of low productivity cows towards higher productivity, allows cows to produce more milk with the same or even less resources and environmental footprint than today.

Meeting protein demand and conserving environmental resources is not simply a matter of improving animal productivity. The bovine species while being highly adaptable and resilient, present a low reproductive rate and a slow development rate and this implies a large cost in resources to maintain a productive herd.

As domesticated animals, cattle also present farm management challenges. In modern intensive dairy farms, it is common to replace one third of the lactating cow

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herd every lactation. As about 50% of dairy farms' animals are not lactating, the cost of feeding non-productive animals imposes a significant economic burden on the producer, and the resource efficiency of milk production.

However, the news regarding efficiency becomes more positive once a dairy cow begins lactating. A high producing dairy cow is able to allocate about 60% of her feed for milk production and requires only about 40% for maintenance.

Improving dairy animal efficiency

Two ways to improve resource efficiency in ruminant production include increasing the productivity of each animal and reducing the culling rate. This combination approach supports improved economics and positively relates to animal welfare.

For example, in regions such as the Netherlands, some farmers have produced cows yielding more than 100,000kg of milk in the animal's lifetime. While such yields are not common, the successes expose the opportunity for a next level of efficiency in dairy farms.

Other feeding practices can also influence the efficiency of food production, beginning in the early life stages. For example, just half of live calves born today receive a milk replacer. This suggests many litres of milk

that could be used for human consumption are being allocated to rear calves.

This has become especially relevant with the current trend toward lifting severe restrictions on milk supplied to dairy calves imposed in the past. Feeding animals according to their quantitative and qualitative needs is part of responsible animal production. Providing calves with a high-quality milk replacer can free up more milk, supporting adequate nutrition for humans and animals.

A holistic look at efficiency

Considering the complete production cycle of a dairy cow and the opportunities for interaction between different ruminant animals may provide a better evaluation of an animal's efficiency and its impact on the environment.

For example, there is an increased focus on efficient rearing of calves from dairy origin for beef production.

More dairy cows are inseminated with beef breed semen and the management and nutrition of these calves is receiving more attention. Such practices allow for more efficient use of animal resources, leveraging dairy production to produce beef protein.

Assessing an animal's efficiency and its impact on the environment can be challenging when applying traditional animal efficiency measures such as growth rate or

feed conversion. Viewed through these metrics, ruminants may appear to be less efficient than other species, such as poultry.

However, efficiency can also be viewed by evaluating an animal's output in terms of finished food produced and the opportunity to integrate resource streams and reduce losses in the complete food production system.

Crop residues derived from cereals, oilseeds, vegetables and many other crops account for 60% of the world's crop yield and these residual foods serve as an available food source for ruminants – providing protein without requiring additional resources.

Considering the amount of consumable protein an animal yields also impacts its efficiency. The six-week growth period of broilers and their impressive feed utilisation is clearly an efficient way to produce quality food protein. In contrast, ruminants appear less efficient in their reproductive and development rates and feed conversion. However, when we consider the edible value of the inputs consumed and the output produced, the feed efficiencies of ruminants become more equitable with other species.

For example, a broiler retains protein efficiency but yields meat protein in specific fractions of its carcase – breast, thigh, wing – for human consumption, whereas 100% of the protein in a cow's milk is food protein.

Analysing food efficiencies from the land where crops and grasses grow all the way to the nutritional value of what we finally put in our mouths gives a much better perspective on how we can feed ourselves efficiently with renewable resources.

Feeding the future

Ruminants – including dairy cows – have been a part of food production since the birth of agriculture. As the world's population is projected to surpass 9.7B by 2050 creating additional demand for food, ruminants are an efficient cornerstone in an integrated food production system for feeding the future, while responsibly utilising the Earth's resources. ■