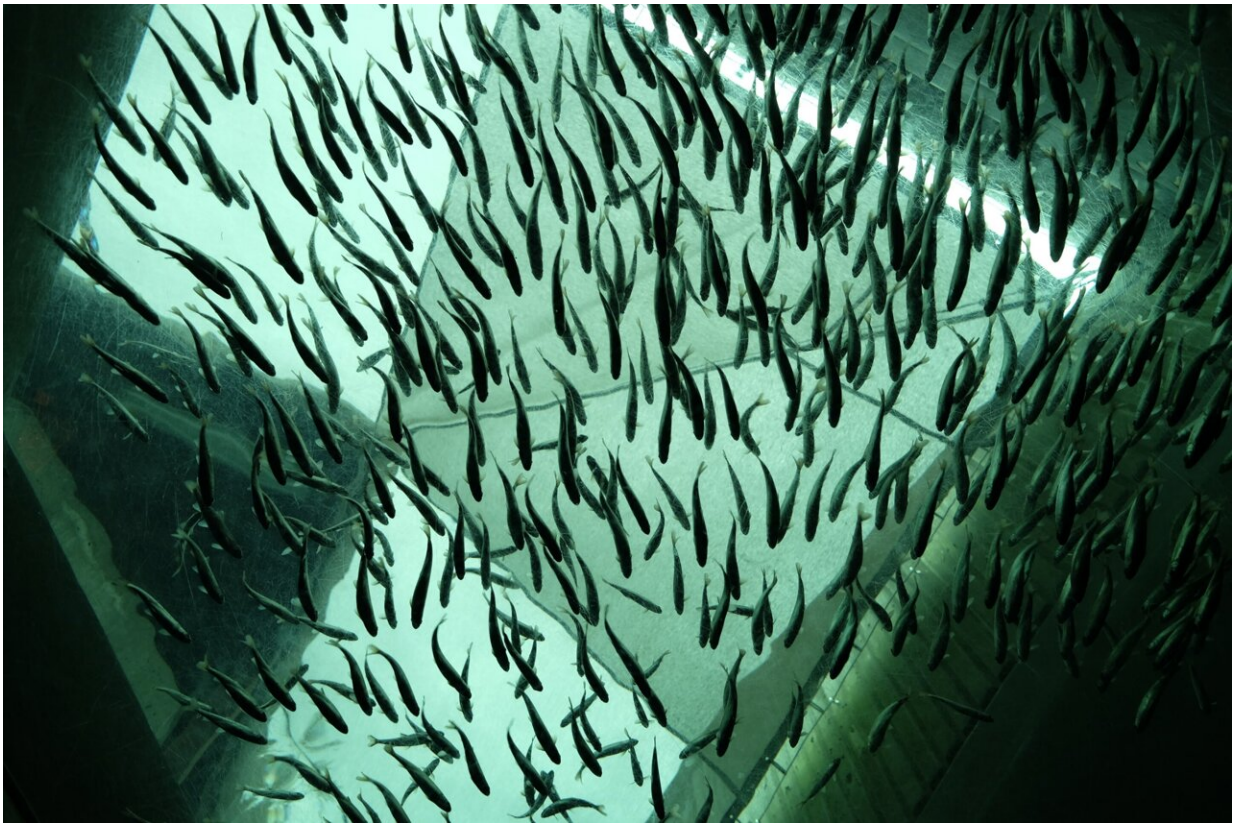


A climate villain? Measuring and managing meat's impact on the planet

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Look at just about any popular media article on personal changes you can make to save the planet and near the top of the list you'll likely see cutting out meat—or at least decreasing meat consumption dramatically.

But is animal protein the climate villain it's made out to be? And can we continue to eat meat in a way that's sustainable?

Three researchers in the Department of Animal Science and Aquaculture in Dal's Faculty of Agriculture agree that when it comes to feeding a growing [global population](#), animal protein is part of the solution. But they also say animal production industries can improve on their greenhouse gas emissions and other factors related to sustainability.

"It's not sustainable to just be growing plants, because we will either starve, or the soil system won't be able to handle all the plants we need to grow," says Stefanie Colombo, an associate professor and Canada Research Chair in Aquaculture Nutrition.

Agriculture is a significant contributor to greenhouse gas emissions, accounting for about a quarter of all emissions globally, Dr. Colombo says. So with demand for [animal protein](#) rising, it is essential that producers continue to improve efficiency and lower emissions.

That's been the trend for decades in [beef production](#), says Ghader Manafiazar, as assistant professor who specializes in sustainable livestock production systems. He notes that measuring emissions is challenging, citing a project that employed 17 people and spent \$2.5 million to study how much methane 1,000 cows produced. Forty-five years ago, Canada had some 10 million [beef cattle](#). That number has dropped by more than half, while beef production has increased. More importantly, farmers are getting these efficiencies while reducing the total amount of feed.

"There is a correlation between feed intake and [carbon footprint](#)," Dr. Manafiazar explains, "because when animals take in more, they digest more and at the same time produce more methane. So if they eat less, we are able to reduce their contribution to global warming."

But Dr. Maniafazar is also researching more high-tech options, including using machine learning to develop an algorithm that could predict methane emissions based on genetic traits, "to see if we can find some kind of prediction equation." Cattle could then be bred with the desirable lower-emissions genetic profile.

Bruce Rathgeber, department chair and an associate professor specializing in poultry production, also points to ongoing improvements in layer and broiler hen production. He says there have been times when "performance has overlooked the impact of welfare," but that there is a better balance between the two today.

Dr. Rathgeber says it's important to move forward in a measured way, to avoid unintended consequences. For instance, when the European Union banned antibiotics in broiler hen feed, the overall use of antibiotics went up, as prescriptions for sick birds increased.

For Dr. Rathgeber, that points to the importance of an integrated approach: not just eliminating antibiotics but also "reducing density in barns, managing the bedding better so that bacterial proliferation is managed. Farmers became experts in a lot of other aspects and moved away from relying on a drug to take care of a lot of things for them. There's a lot of learning going on."

The promise of 'blue foods'

For Dr. Colombo, feeding the world means paying much more attention to blue foods—animals, plant, and algae that grow in the water. "Blue foods are a powerhouse," she says, not only because of their benefits to human health, but also for their environmental promise.

"Farmed aquatic foods have lower [greenhouse gas emissions](#) than a lot of crops and industrial livestock production," she says. "We need to harness

the power of the oceans and reduce some of the environmental footprints overall of the food production system. We can do better, and that's by producing more aquatic based foods."

As with other forms of animal production, aquaculture has made mistakes, Dr. Colombo says. She points to early pelletized farmed salmon feeds as an example.

"They were fed a pellet, like a dog kibble, originally harvested from wild fisheries like sardines and anchovies, and then ground up and made into fish meal and fish oil. Salmon are carnivores, so nutritionally for them that was perfect, but it made no sense: you can't harvest wild fisheries like that to make a fancy fish like salmon."

Today, she says, the amount of fish meal and fish oil has been dramatically reduced, and farms are using more "upcycled" ingredients, like spent brewery grains which can be cultured to grow micro-algae.

And we need to think beyond the species we are currently raising. She cites striped bass as a species "on the cusp of becoming a sustainable industry in Nova Scotia."

Whether on pasture, in barns, or out on the water, there are still more gains to be made.

Overall, Dr. Manafiazar says, North American livestock industries have "done a really good job" of lowering emissions. For instance, the CO₂-equivalent emissions of a kg of Canadian beef are less than half that of Brazilian beef.

"We are among one of the countries with lower carbon footprints," he says. "But the point is, that doesn't mean we don't need to take action."

Provided by Dalhousie University

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