World's livestock industry offers huge potential for greenhouse gas reduction

By Jeff Mulhollem, March 23, 2016

Reducing the large and growing contribution of the livestock sector to climate change while ensuring that global nutritional security and health needs are supported is an urgent global research and investment priority, the researchers concluded.

That's the conclusion of a study conducted by an international team of researchers that included Alex Hristov, professor of dairy nutrition in Penn State's College of Agricultural Sciences. Hristov oversaw key components of the report assessing the potential for reducing greenhouse gas emissions by improving animal nutrition and management and by using feed additives to curb enteric methane emission from ruminant animals.

"The report concludes that the economic potential of these management alternatives is less than 10 percent of what is technically possible because of adoption constraints and barriers, costs and numerous trade-offs that must be made around the world, particularly in poorer, undeveloped countries," Hristov said.
"The developed world has high absolute emissions but significantly lower emissions intensities than the developing world due to improved livestock genetics, nutrition, health and management practices. Many regions of the developing world -- for example, parts of Africa, Asia and Latin America -- have high livestock emission intensities due to low productivity and large numbers of animals."

In research last year, Hristov demonstrated that a feed supplement fed to high-producing Penn State dairy cows resulted in a 30 percent reduction in the animals' enteric methane emissions.

Technical mitigation potentials of supply-side options for reducing emissions from the livestock sector. Red represents the range for each practice.

Image: Penn State

A prominent conclusion in the new report, published this week in the journal Nature Climate Change, is controversial -- that a global transition to a healthier, low-meat diet would reduce mitigation costs. Reducing the demand for livestock products, at least in theory, is a powerful mitigation option, the document states.

Hristov disagrees with that finding, but he understands why the idea is attractive to some scientists around the world.

"This research paper represents a diversity of opinions, and one of them is that if people -- in the Western world mostly -- reduce their meat intake, it will result in reduced greenhouse gas emissions," he said. "It is a controversial concept, and I don't believe in it, but it is out there. We are trying to present mitigation practices that can reduce livestock emissions without cutting down on meat consumption."

However, Hristov conceded, the demand for meat in the developing world only will increase as the economies of developing countries grow, leading to higher disposable incomes and rising consumption of animal products.

In a changing climate, considerations such as those discussed in the research article are critical because the world's livestock industry is huge. And one of the findings of the recent international conference on climate change in Paris called for curbing global greenhouse gas emissions from animal agriculture.
Twenty billion animals make use of 30 percent of the terrestrial land area for grazing. In addition, one-third of global cropland area is devoted to producing animal feed, and 32 percent of fresh water is used to provide direct livelihood and economic benefits to at least 1.3 billion producers and retailers. As an economic activity, livestock production contributes up to 50 percent of agricultural receipts globally.

This graphic shows the mitigation potential for carbon sequestration in grasslands around the globe through rangeland rehabilitation and grazing management.

Image: Penn State

The livestock sector also is very dynamic, according to the researchers. Global per capita consumption of livestock products has more than doubled in the past 40 years. Increasing human population, incomes and urbanization are projected to accelerate increases in the consumption of milk and meat over the next 20 years.

The project's lead researcher, Mario Herrero, chief research scientist with the Commonwealth Scientific and Industrial Research Organization in Canberra, Australia, noted that this new account of the mitigation potential for the global livestock sector is the most comprehensive analysis to date because it considers both the supply and demand sides of the industry.

Livestock has a role in a healthy and sustainable diet, and the sector has an important economic and social role, particularly in developing countries, he explained. "We need to balance the optimal levels of consumption to achieve good health outcomes and maintain the economic and social benefits, while also capitalizing on the mitigation potential the livestock sector offers."

Sustainably intensifying livestock production is one way to maintain production levels while realizing the mitigation potential of the agricultural sector, Herrero pointed out. "Reducing the large and growing contribution of the livestock sector to climate change while ensuring that global nutritional security and health needs are supported is an urgent global research and investment priority."
The research was carried out in partnership between Australia's Commonwealth Scientific and Industrial Research Organization; the International Institute for Applied Systems Analysis; the Consortium of International Agricultural Research's Climate Change, Agriculture and Food Security Research Programme; Colorado State University; the University of Aberdeen; Chalmers University of Technology; Penn State; Wageningen University; Karlsruhe Institute of Technology; the International Livestock Research Institute; University of Oxford; and the Netherlands Environmental Assessment Agency.

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