Eating Meat:

An Environmentalists' Dilemma?

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You cycle to work and recycle all your paper and plastics. Now, Alan Townsend, a biogeochemist at CU, has suggested another step for you to take to halt global climate change: eat less meat.

In a recent talk on the CU campus, Townsend said that cattle rearing generates more greenhouse gases than transportation — a statement backed up by United Nations Food and Agriculture Organization (FAO). However, instead of carbon dioxide, the main culprits in this case are the gases nitrous oxide and methane.

Although produced in smaller concentrations than carbon dioxide, these gases cause more of the Earth's heat to be trapped in the atmosphere per unit weight of gas.

"Nitrous oxide has 300 times the warming potential of carbon dioxide," Townsend said.

This means it is the fourth largest contributor to global warming; carbon dioxide is the largest contributor and methane is the second.

Nitrous oxide is a bi-product of the nitrogen cycle, a natural process by which nitrogen compounds cycle through air, soil and water. In the last century, however, increased fertilizer use has stimulated bacteria in the soil to produce more nitrous oxide, significantly enhancing global warming.

Nitrogen fertilizers, in general, have caused greater quantities of nitrogen compounds to be injected into the environment than ever before, causing a host of environmental problems in addition to global warming. Acid rain, polluted water supplies, reduced biodiversity of land and aquatic species, and an increase in the incidence of parasitic and bacterial infectious diseases can all be linked to increasing concentrations of nitrogen compounds.

Sirloin steak. Photo courtesy of Clinton Hill Foodie.

"Humans have changed this more than any other cycle, and things are going downhill really fast," Townsend said.

Townsend said that the biggest anthropogenic impact on the nitrogen cycle has been from modern-intensive farming practices that rely on nitrogenous fertilizers to ensure the maximum yields of crops, but the use of fertilizers to produce food is a necessity.

"It is not possible to envisage a world where we don't need to make fertilizer without killing billions of people."

However, not all foods are created equal in terms of the amount of fertilizer required to grow or produce them. In terms of fertilizer required to produce a pound of food, meat, especially red meat, is the Chevy Suburban of agricultural produce.

In a report published in a 2006 edition of Earth Interactions, two scientists, Pamela Martin and Gidon Eschel from the University of Chicago, compared the environmental impact of the average American meat-eating diet with that of a vegetarian diet. Their estimation was that the meat-based diet resulted in an extra 1.5 tons of CO_2-equivalent gases being pumped into the atmosphere each year compared to a vegetarian diet.

The answer to this problem would seem simple, if not easy: everyone could simply stop eating meat. However, Robert Jackson, a professor at Duke University who studies how people affect global change, points out that this advice may not be applicable worldwide.

While he believes that "the world would be better off on average if we all stopped eating meat and started eating beans instead," he points out that in

certain parts of the world, such as the arid and semiarid Savannah regions, people can't grow crops. In these regions, people use animals to harvest protein and if they were to give up eating meat, they would have to import food from somewhere else. Transportation comes with associated carbon costs and, in arid areas, fertilizer is not commonly used anyway.

"There is a whole lot of the world where that is the case," Jackson said.

Also, not all red meat is equal in terms of its impact on the environment. The way that beef is farmed and produced strongly affects how much greenhouse gases are pumped into the atmosphere or how much nitrogen compounds leach into the water supply.

Jackson said the perception in the U.S. is that "it is simply stock yard cattle or tofu down at the grocery store;" but there is some middle ground. Buying meat from organic farms or eating grass-fed livestock could provide a more viable solution.

Will Harris, a fifth-generation cattle rancher and beef director of the American Grass Fed Association, agrees. Harris believes that "meat has been villainized," and that the way livestock are fed and the way meat is produced are the major determining factors on both the environment and human health.

"I own my own land, I own my own herd. I own my own processing plant. There is very, very little petrochemicals used," he said.

His farm, White Oak Pastures, is the largest certifiable organic farm in the state of Georgia and he uses no chemical fertilizers or pesticides.

In order to fertilize his pastures, he uses an aerobic and anaerobic digestion system, which is technology developed in Korea, that takes the inedible portion of his slaughtered cattle and turns it into fertilizer. He also captures and recycles all the run-off from his fields and reuses the nutrients in the run. His farm is a USDA inspected zero waste facility and he harvests the cows on site, further reducing any green house gas emission associated with transportation.

Harris came to the practice of organic farming after having raised cattle conventionally for 30 years since leaving college. However, he said he became "disillusioned with the excesses of industrial commodity production," and the way that animals and the land were treated in conventional farming.

"I learned animal husbandry from my father and grandfather. I majored in animal science at university. And they are, in many cases, diametrically opposed to one another," he said.

Moreover, Harris credits his management intensive grazing pattern for sequestering "tremendous" quantities of carbon. His pastures are cattle grazed on a rotational grazing plan, whereby the grass is forever growing and being bitten off. When that happens, he explains, the roots grow and recede as the top does.

"They are growing deep and dying back, and growing deep and dying back in a natural rhythm," Harris said. "So, a lot of carbon is sequestered."

Ultimately, he believes that with sustainable farming practices, in particular grass fed livestock, "a symbiotic relationship" can exist between man, livestock production and the environment.

As researchers Martin and Eschel point out in their report, significant progress can be made without giving up meat entirely. They estimate that if every American reduced meat consumption by just 20 percent, the greenhouse gas savings would be the same as if we all switched from driving a normal sedan to a hybrid Prius.

Townsend also agrees with the middle ground approach.

"There's all kind of low hanging fruit out there for reducing the impact of the problem without having to turn society on its head," he said.

While recognizing that achieving this change might be difficult, Townsend believes that this example shows how much room for improvement exists, from public policy to personal dietary choices.

So, it would seem that it is not necessary at this stage to make drastic changes in meat consumption to make a significant impact on climate change. Moreover, researchers such as Jackson doubt the realistic probability of lessening meat consumption.

"Expecting everybody to give up meat is not realistic and probably not even good for the environment," he said.

However, the type of meat that we buy is significant. The factory farming that is required to produce vast quantities of meat at the cheapest prices are not good for human health, animal health or the planet.

"The only way to solve this problem is to pay more for food and produce it in a more sustainable and ecological manner," Jackson said.

This means if we want to save the planet, we have to vote with our pockets as well as our palates. ❖