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BEEF AND DAIRY CAN BE GOOD FOR THE PLANET

Making a case for cows

By Suzanne Nelson

Cows get a pretty bad rap these days. Bovines are, well, quite gassy and cow farts have become officially part of the national discourse. The methane cows exude has been blamed as a more potent contributor to global climate change than carbon dioxide, the primary byproduct of burning fossil fuels. (There's nothing like a little potty humor to enliven a newscast.)

For those down on cattle's ecological cred, reducing or eliminating the consumption of meat and dairy has become the logical solution. Veganism is the new green.

"I do hear a lot of cow bashing these days," says Rob Hogan of Hogan's Magnolia View Farm in Carrboro, who raises a couple dozen cows a year.

But are cows really worse for the atmosphere than cars and all of the other implements of a global industrial economy?

The answer, while complicated, appears to be "no."

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For starters, cow farts aren't really the problem; burps are. As it turns out, bovine burps are responsible for the vast majority of the methane released. But that is far from the only misconception about cows' role in making the planet suitable—or not—for human habitation.

At first glance, the environmental case against cows is a mighty one.

The United Nations Food and Agriculture Organization estimates that livestock production generates nearly a fifth of the world's greenhouse gases—more than human transportation. A study last year by the National Institute of Livestock and Grassland Science in Japan estimated that 2.2 pounds of beef is responsible for the equivalent amount of carbon dioxide emitted by the average European car every 155 miles (presumably even less for the gas-guzzling American auto).

There are a couple of things wrong with interpolating the climate impact of beef and dairy consumption in the United States from worldwide data. Much of the "carbon footprint" of consumption of cow products worldwide is from clear-cutting rainforests to create grazing lands (both because of the burning itself and the loss of trees as a "sink" for carbon dioxide—a natural reservoir where it is used to make oxygen). While clear-cutting remains common in countries such as Brazil, it is rare in the United States; we import only a tiny fraction of our meat from such countries.

Cows do emit climate-altering gases. Methane is the byproduct of the fermentation of vegetable matter in the cow's digestive tract, mostly in the first of the animal's four stomachs, also known as the rumen. This gas, along with some carbon dioxide and nitrous oxide, is burped out. Methane is 20 times more potent a greenhouse gas than carbon dioxide, according to the Intergovernmental Panel on Climate Change.

The technical term for this process is enteric fermentation, and according to the U.S. Environmental Protection

Agency, it edges out pollution from the natural gas industry in total methane output from human-related sources.

So cow burps are producing more methane than the production, storage and distribution of natural gas in the United States? That sounds pretty bad, but to put the figures in perspective, landfills still easily lead the country's methane sources. The culprit? The anerobic fermentation of kitchen waste. When composted, food scraps enrich the surrounding soil and produce mostly carbon dioxide, whereas the rotting of food in landfills, deprived of oxygen, creates methane.

Other significant sources of methane emissions include coal mining; the production, transportation and storage of crude oil; wastewater treatment; and even rice cultivation.

And cows aren't really adding more methane to the planet so much as cycling what's already above ground. Methane emissions from enteric fermentation represent the transformation of carbon already in circulation between the earth and the atmosphere; whereas, burning fossil fuels always results in a net increase in carbon.

In short, getting rid of cows isn't going to solve our greenhouse gas problems. In fact, it may make things worse.

Allowed to thrive according to their species' needs, cows (and other ruminants such as goats and sheep) do something relatively unique in the animal kingdom: They give the land more than they take out. And the result is a net decrease of climate-altering gases from the atmosphere.

"Curiously enough, a cow is 90 percent inefficient. Ninety percent of what she eats goes right back out. It just so happens that the conversion that takes place in the rumen makes the nutrients more available in the grass than what was in the soil," explains Bill Dunlap, who raises about a dozen beef cows a year in Lakeview, N.C.

So a cow eats the grass, digests it in her four stomachs and, in the process, makes the nutrients more readily available to the soil for the next round. Better-nourished soil means more vegetation. And this vegetation sequesters carbon dioxide from the air and releases oxygen, in many cases far better, even, than forests. (Depending on their maturity, forests actually produce methane.)

Rich, fertile soil contains large quantities of carbon. Poor soils contain very little.

So grazing cows on depleted soils not only makes the land more fertile, in the process it traps carbon. Happily for climate stability, the process of making soils rich in organic matter, and thus carbon, can be accomplished relatively quickly. And the catalyst is the presence of ruminants.

There's only one problem with this system: In the United States, it's barely been tried. Unlike the United Kingdom or New Zealand, for example, America doesn't have a tradition of what's known as management-intensive grazing—basically rotating cattle on pastures in a way that maximizes the animals' nutrition and continued growth of vegetation.

"The magic in the cows' stomachs stems from the fact that their intestines are 100 feet long, and there are four stomachs," says Jeff Poppen, who farms biodynamically northeast of Nashville, Tenn. A cow's digestive tract looks like 1970s green shag carpeting, he says, and inside there is a "whole lot of different flora and fauna, all kinds of life." Those microorganisms extract nutrients from fibrous material insoluble in the human gut.

At the annual Carolina Farm Stewardship Association conference in Durham in November, Poppen told attendees well-managed cattle are the only animals that can live off two acres and make four acres fertile. (The original definition of cattle included goats, sheep and even bison and buffalo.)

After decades of petrochemical farming, our soils are in desperate need of just the kind of fertility—organic matter, microbial activity and nutrients—that cattle can provide, Poppen says.

But cattle have to graze in order to make that happen. Right now, the vast majority of U.S. cattle start life eating grass but are "finished" on concentrated animal feeding operations, or CAFOs (which is why the label "grass-fed" on your steak from the grocery store isn't nearly as significant as "grass-finished"). CAFOs are an environmental disaster by every measure: water quality, oil consumption, energy use and greenhouse gas emissions.

The process of fattening up cows on feedlots with tens of thousands of their brethren—the dominant beef and dairy practice in this country —still creates manure, of course. Pools and pools of it, actually. Those manure lagoons are visible on a small scale on any number of local confinement dairies around the Triangle.

[image-2]

In theory, the manure from feedlots and confinement dairies could just be reapplied to the land, recreating fertility and other benefits of having the cows graze on pasture in the first place. But the concept only works in the abstract, although confinement dairy operations commonly spray the manure on their fields anyway.

"Manure put directly on soil just washes away," Poppen says. Not only that, but it volatilizes into the atmosphere as ammonia, he adds. "The nitrogen is going out into the atmosphere," so instead of being available for soil fertility, it is polluting the air.

And that is why "manure management" is not only high on the EPA's list of methane contributors, but also a significant contributor of nitrous oxide. Although far less nitrous oxide is released every year than carbon dioxide or even methane, it is 300 times as potent in terms of a greenhouse gas.

Yet, by far the most abundant contributor to nitrous oxide emissions is "agricultural soil management," according to the EPA. And here again, feedlot animal operations—and the chemical fertilizers used to grow crops when cows are taken off small farms—are directly connected.

"Agricultural soil management" is code for tilling the soil and/or applying synthetic fertilizers and manure. In order to grow grains and other forage crops for livestock, the ground is tilled (or weeds are wiped out with herbicides), and then nitrogen is added to feed the crops, either by petrochemical fertilizers or liquefied manure.

All of those practices are made virtually obsolete by management-intensive grazing, which maintains its own nutrient loop. Pasturing animals allows for the aerobic decomposition of manure, preventing the release of much methane into the atmosphere.

Nonetheless, it's the chemically produced feeds that are federally subsidized. And all the while, all cows are uniformly denigrated for the mismanagement of their brothers and sisters by factory farms.

"The way we do cows today—the confinement system—is definitely bad for the environment. It could only be thought of by idiots. I could understand why people would be appalled," says Sally Fallon, president of the Weston A. Price Foundation, a D.C. nonprofit dedicated to the preservation of traditional foods, including meat and dairy.

Fallon is skeptical that the production of methane from animals raised according to their species' needs is a

significant threat to the climate. "What did the world do thousands of years ago when there were billions of animals, buffalos and zebras farting all the time?"

A Swedish study in 2003 suggested organic beef, raised on grass rather than concentrated feed, emits 40 percent less greenhouse gases and consumes 85 percent less energy than meat from feedlots. (However, according to U.S. Department of Agriculture guidelines, "organic" in this country does not necessarily mean grass-fed or grass-finished.)

Similar studies in New Zealand and Great Britain suggested that pasture-raising dramatically lengthened cows' lifespans, making them more fertile and better milk producers for longer, reducing the number of animals needed to produce the same quantity of milk.

If properly managed, grazing cattle can provide more protein per acre, with a lower carbon footprint, than even organic vegetable production, Dunlap says—especially if consumed locally. That's because they return 80 to 90 percent of what they eat to the soil in the form of readily available nutrients, and the nutrient and microbial activity help sequester carbon and nitrogen.

A report released by the USDA's Agricultural Research Service revealed that soil stores two to three times more carbon when the grass is grazed than when it is harvested for hay or not harvested at all.

Ruminants on pasture also haul their own feed, reducing the need for fuel-guzzling tractors and trucks that plant, harvest and transport feed for confinement-feeding operations.

Raising cattle on pastures has another advantage: "You can graze cattle on land that you can't grow row crops on, pretty successfully," Dunlap says.

A Cornell University study last year found some dairy and meat in humans' diets was actually more efficient for land use than strictly vegetarian fare. Fruits, vegetables and grains must be grown on high-quality cropland, whereas cows and other ruminants can be supported by lower-quality cropland. And for the high-quality land to remain fertile sustainably, crops such as legumes and grasses have to be included in the rotation.

Those legumes and grasses, in turn, can be fed to cattle or grazed directly. The leguminous crops fix atmospheric nitrogen into the soil for use by plants through the action of soil microbes—exactly the opposite of the nitrogen released by farming for feedlots. Cows are a potential source of those soil microbes.

"Do you want your food for life by chemicals?" Poppen asks. "That is what the alternative is. Chemicals are really bad for the land. They kill the soil."

Hogan, the Carrboro farmer, points out that "the whole process of making fertilizer" is detrimental, as it releases greenhouse gases in both production and usage. Even more fundamentally, adding chemical nitrogen to a field puts the nitrogen-fixing bacteria in the soil out of a job.

"Then they are not there," Poppen says. "Then when it doesn't rain, the water-soluble fertilizers don't work, and then there is no nitrogen."

Poppen, a vegetarian himself for many years, pointed out that vegetarianism started with a dictate by tribal and religious leaders to refrain from eating cows so there would always be enough to keep the soil fertile.

"I had a lot of vegetarian friends who thought the earth should not have cows," Poppen says. "We can be vegans, but we still have to have cows."