Grass-Fed Beef: Good for the Environment

by Ridge Shinn, Rotokawa Cattle Company

Grazing benefits the environment.

Corn-fed feedlot beef creates global problems.

1. Climate Change

See endnotes1,2 on the following pages; see also www.carbonfarmersofamerica.com

a) The net effect of grazing **combats global warming** by taking carbon out of the atmosphere. Raising 100% grass-fed beef is sometimes called **carbon farming.**

- Grazing *correctly* sequesters carbon in the soil.
- The model is grazing buffalo on the Great Plains.
- The key is the *movement* of the herd and the *resting* of the land.
- The animals trample the grass into the soil, where the carbon is absorbed.
- New grass sprouts in the manure-enriched soil, and the process is repeated over and over again, absorbing more carbon.
- Microbes create inches of new topsoil to absorb more carbon.
- Emissions of methane or other greenhouse gases are dwarfed by benefits of carbon sequestration.

b) *Eliminates* carbon emissions from growing corn to feed cattle — .26 T of CO2 per acre (04T for diesel, .14T for fertilizer, .08T to dry it). See endnote 3.

c) *Eliminates* methane production in manure lagoons at CAFOs.

2. Energy shortage

a) 100% grass-fed and finished beef is **produced with solar energy**, and can be produced *locally*, even on hilly terrain (saves transportation from the CAFOs of the Midwest).

b) Growing corn to feed cattle is too *energy intensive* to be sustainable and consumes more energy than it produces. See endnote 4.

- Corn uses 140 gallons per acre for all inputs; diesel, fossil fuel derived fertilizer and energy to dry. See endnote 5.

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3. Depleted soil

Grazing provides

1. biologically active soils
2. increased soil flora and fauna
3. 93% less erosion than growing corn.
4. See www.Eatwild.com and www.soilfoodweb.com.

4. Food supplies for humans

100% grass-fed and finished beef is an *environmentally sustainable health food*. Why?

a) *Grass-fed beef eliminates mad cow disease.* There is no feedstuffs that contain ruminant parts.

b) Grazing cattle *do not host dangerous E. coli*. See endnote 6.

c) Grass-fed beef is *essential for health*, with a perfect ratio of Essential Fatty Acids (EFAs): ratio of omega sixes to omega threes (1:1 ratio in 100% grass fed beef v. 14:1 ratio in grain fed). See www. eatwild.com

Endnotes

1) **Increasing pastureland would help reduce global warming.** From http://www.eatwild.com/environment.html

Carbon dioxide and other greenhouse gasses are increasing in the Earth's atmosphere, leading to changes in our global climate. The grasses and legumes found in pasture are highly effective at removing excess carbon dioxide from the air and storing it in the soil as carbon, a phenomenon known as "carbon sequestration." Soils in the grazing land in the Great Plains have over 40 tons of carbon per acre, while cultivated soils have only 26. In recent years, land that had been planted in row crops was allowed to revert back to pasture as part of the US government's Conservation Reserve Program (CRP). The pastureland gained an average of one-half ton of carbon per acre per year during the first 5 years after planting. This means that 18 million tons of carbon were removed from the atmosphere each year as a result of farmers putting over 36 million acres of land into the conservation program.

2) *Excerpt from* **Can Cattle Save Us from Global Warming?** By Jay Walljasper, senior fellow of Project for Public Spaces; expanded from an article appearing in *Ode* magazine (June 2007).

Scientists agree that organic matter in topsoil is on average 50 percent carbon up to one foot in depth, and bumping that upward by as little as 1.6 percent across all the world's agricultural land, according to John Wick and Abe Collins, would solve the problem of global warming. Soil scientists studying the issue are more measured in their predictions, but still enthusiastic about the potential of soil sequestration of carbon to reduce the threat of global warming.

The central idea of carbon farming is to move the animals frequently — as once happened with wild herds chased by predators — so grasses are not gnawed beyond the point of natural recovery and plant cover remains to fertilize the land and sequester carbon. The sequestration process works like this: The grass takes in carbon from the atmosphere; the animals trample the grass into the soil, where the carbon is absorbed; new grass sprouts and the process is repeated over and over again, absorbing more and more carbon.

This was the natural cycle before the enclosure of the commons. Bison roamed the great American plains, as did other large herds in wild lands throughout the rest of the world. Even in places where livestock farming prevailed, the grazing lands were still held in common and animals wandered freely under the watch of shepherds or small farmers. With the privatization of grazing land, this ecological system was disrupted to the point where today raising livestock is rightly seen as one of the most environmentally destructive industries.

Carbon farming is an attempt to recreate the natural conditions of a commons even under the structure of private property in order to reverse the effects of global climate disruption. Read the entire article,
http://www.pastureland.coop/Can+cattle+help+prevent+global+warming%3F

3) *Excerpt from* **Costs and Benefits to Agriculture from Climate Change Policy** by Bruce A. Babcock, *Iowa Ag Review*

Iowa farmers who plant both corn and soybeans use approximately four gallons of diesel per acre to cultivate, plant, and harvest their crops. They also use about 60 pounds of nitrogen fertilizer, 50 pounds of phosphate, and 65 pounds of potash across the two crops. And corn farmers typically use propane to dry their corn.

The carbon dioxide (CO_2) emission from using a gallon of diesel fuel is 10.1 kilograms. Thus, Iowa crop farmers emit about 40 kilograms (0.04 metric tons) of CO_2 per acre in diesel. If the price of CO_2 is $20 per ton, then farmers will have to pay $0.80 per acre extra for their diesel fuel.

Natural gas is the primary source of energy used to produce fertilizer. One source (Gellings and Parmenter, 2004) estimates that the energy used to produce, package, and transport different fertilizers is approximately 33,000 British thermal units (Btu) per pound for nitrogen, 7,000 Btu per pound for phosphate, and 5,500 Btu per pound for potash. Natural gas emits 117 pounds of CO_2 per million Btu. This adds up to about 0.14 tons of CO_2 per acre across corn and soybeans. At a price of $20 per ton of CO_2, this amounts to $2.85 per acre.

To dry a bushel of corn from 19 percent moisture to 15 percent moisture uses about 0.088 gallons of propane. With a yield of 180 bushels per acre, this amounts to 15.84 gallons of propane per acre for corn drying costs. Emission of CO_2 from burning a gallon of propane is 5.525 kilograms. Thus, at a CO_2 price of $20 per ton, propane costs would increase by $1.75 per acre of corn, or by $0.87 per acre across corn and soybeans (assuming no drying costs for soybeans).

Read the entire article at
http://www.card.iastate.edu/iowa_ag_review/summer_09/article1.aspx

4) *Excerpt from* **Impact of Manure on Costs, Returns, and Energy Use on Corn Fields in Iowa,** by Michael Duffy, Leopold Center for Sustainable Agriculture.

(*This article is about manure use but is included here because of its conclusion that growing corn is a net energy loser.*)

Table 4 presents a comparison of the energy differences based on the crop and whether or not manure is used. Energy produced is based on the calories of energy in corn when used as animal feed. The energy used refers to the energy contained in the fertilizer and pesticides and the energy for the machinery operations that were used. For comparison, all the energy is converted to British thermal units and then converted to gallons of diesel fuel.

For pesticide energy, a simple conversion factor of one gallon of diesel fuel equivalent per one pound of active ingredient is assumed. The actual energy use will vary by formulation but such refinements are not pursued here. Fertilizer energy use is assumed to be 5.01 pounds per gallon for nitrogen, 22.42 pounds per gallon for P_2O_5, and 26.53 pounds per gallon for K_2O. Energy use in fertilizer production is the subject of much debate and there have been several alternative estimates proposed. These estimates are the most recent ones available from a U.S. Department of Energy study (*Energy in Synthetic Fertilizers and Pesticides: Revisited* by M.G. Bhat, et al., Oak Ridge National Laboratory, ORNL/Sub/90-99732/2, January, 1994).

Table 4: Energy Summary Comparison for Corn with and without Manure

Corn After Corn **Gallons of Diesel Fuel Equivalent per Acre**	**With Manure**	**Without Manure**
Produced	29.23	27.07
Used	34.63	38.67
Balance	-5.40	-11.60
Corn After Soybeans **Gallons of Diesel Fuel Equivalent per Acre**	**With Manure**	**Without Manure**
Produced	29.60	29.16
Used	33.92	36.71
Balance	-4.32	-7.55

Read the entire article at http://www.p2pays.org/ref/21/20995.htm.

5) *Excerpted from* **Ethanol Fuel from Corn Faulted as 'Unsustainable Subsidized Food Burning'** by Roger Segelken <hrs2@cornell.edu>

(Included here because corn fed to ruminants is similarly energy inefficient because of high energy inputs.)

David Pimental, a leading Cornell University agricultural expert, has calculated that powering the average U.S. automobile for one year on ethanol (blended with gasoline) derived from corn would require 11 acres of farmland, the same space needed to grow a year's supply of food for seven people. Adding up the energy costs of corn production and its conversion into ethanol, 131,000 BTUs are needed to make one gallon of ethanol. One gallon of ethanol has an energy value of only 77,000 BTUS. Thus, 70 percent more energy is required to produce ethanol than the energy that actually is in it. Every time you make one gallon of ethanol, there is a net energy loss of 54,000 BTUs.

Mr. Pimentel concluded that "abusing our precious croplands to grow corn for an energy-inefficient process that yields low-grade automobile fuels amounts to unsustainable subsidized food burning."

* * *

Among his findings are:

- An acre of U.S. corn yields about 7,110 pounds of corn for processing into 328 gallons of ethanol. But planting, growing and harvesting that much corn requires about 140 gallons of fossil fuels and costs $347 per acre, according to Pimentel's analysis. Thus, even before corn is converted to ethanol, the feedstock costs $1.05 per gallon of ethanol.

- Most economic analyses of corn-to-ethanol production overlook the costs of environmental damages, which Pimentel says should add another 23 cents per gallon. "Corn production in the U.S. erodes soil about 12 times faster than the soil can be reformed, and irrigating corn mines groundwater 25 percent faster than the natural recharge rate of ground water. The environmental system in which corn is being produced is being rapidly degraded. Corn should not be considered a renewable resource for ethanol energy production, especially when human food is being converted into ethanol."

Read the entire article at **http://healthandenergy.com/ethanol.htm**

6) **Natural Protection from E. coli** from the Rotokawa Cattle Company *Newsletter*

This past October the nation was shocked to hear about a young Minnesota woman who was nearly killed and perhaps permanently disabled by a home-cooked hamburger tainted with E. coli.

It's no surprise that the burger was not made with grass-fed beef. The chances of contracting this dangerous strain of bacteria from grass-fed beef are slim to none.

News stories about E. coli always make me think of a conversation I had with someone who used to run a feedlot. He told me about the tractor-trailers of baking soda that made regular deliveries to unload vast quantities of sodium bicarbonate that was fed to the cattle confined in the facility.

Why do feedlot cattle need so much baking soda? And what does baking soda have to do with the E coli tragedy? Baking soda did not cause the illness, but there is a connection.

Corn — or any grain — is not healthy for ruminants. Nevertheless, feedlot cattle are given large quantities of this inexpensive feed, and often endure a condition known as *acidosis,* or "acid indigestion." Baking soda is fed to them to counter this chronic feedlot condition. While E.coli is a normal bacterium found in humans as well as cattle, in the unnaturally acidic environment of the stomachs of feedlot cattle an acid-resistant strain of E.coli has developed. It can survive in the grain-fed bovine, and if passed on, it can also survive the acid of the human stomach and cause illness, paralysis and death.

Cornell University suggests there is a way to reduce this threat. As the time for slaughter draws near, switch the cattle feed from grain to grass and hay.

http://www.news.cornell.edu/releases/Sept98/acid.relief.hrs.html

Of course it makes much more sense to give cattle food that is natural for them their entire lives. Cattle that live in pastures eating grass and hay are likely to have ph-balanced guts and little — if any —of the dangerous acid-resistant E. coli. When the bovine digestive system, which has evolved to process grass, is allowed to function naturally, it is very unlikely to cause an E.coli problem and compromise human health.

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