

Stewards of Our Industry

As I sit here contemplating how to begin this essay, the driving rhythm of Sonny and Cher's hit "The De - Beat Goes On," is stuck in my head. The debate goes on - with precious little communication. In an excellent article by Kayla Sargent ("Forget Counting Carbs, Count CarbON Footprint," Western Ag Reporter, Vol 12, No. 18, January 30, 2020), Kayla focuses on exposing a marketing effort by a manufacturer of fake meat, which uses suspect data to claim that their product is more carbon friendly than real beef.

In her article, Ms. Sargent enlists the work of Dr. Alan Roetz, whose recalculations show that the amounts of greenhouse gas attributed to livestock has been highly over estimated. However, Dr. Roetz ultimately concludes that "Everybody is coming up with their meaningless numbers and trying to compare everybody else's meaningless numbers." What I think he means is that everyone who has entered this controversy is out to prove their particular point of view, and ends up measuring greenhouse gas emissions in a way that promotes their own conclusions. Apples are not being compared to apples.

The genesis of this argument is a report, "Livestock's Long Shadow," published by the Food and Agriculture Organization (FAO) in 2006. Dr. Roetz complains that this report's original calculations are flawed and points out that the report was never peer reviewed. I am not sure that "Livestock's Long Shadow" was ever written to be an academic paper. It is more of a synthesis paper to be used by economic development professionals in their work to improve livestock production practices in underdeveloped areas of the world. The report contrasts developed countries' livestock production with that which is happening in the less economically developed areas. It explores both realities, and contrasts both their good and bad aspects.

Coincidentally I was actually provided an advance copy by FAO and asked to informally comment. At the time I was on an assignment in Djibouti and preoccupied with trying to salvage a livestock marketing project for the United States Agency for International Development (USAID). As such, I did not give the report much attention but remember that there were things with which I agreed and others that I thought were questionable. In my wildest imagination I would never have dreamed that "Livestock's Long Shadow," would become some kind of a bible for extremists bent on destroying animal agriculture in the United States.

The misuse of this report comes from two distinct groups, who probably also have considerable ideological differences with each other. The extreme Vegans want to prove that their diet is more environmentally "holy" than that which we carnivores inflict on the world. Then we have the people who are obsessed with replacing livestock on public lands with even more wildlife. They read in the report a vindication that livestock, especially cows, are the cause of global warming. Apparently, they do not realize that wildlife also emits greenhouse gases. Both of these anti-cow factions exhibit a singular ignorance of basic biology.

The big tit for tat debate between the anti-cow people and the US livestock industry comes because each side is trying to determine the exact level of carbon dioxide (CO₂) and methane that is being emitted by cows. These numbers are then compared to other sources of greenhouse gases and the conclusion either looks worse for cows or conversely not quite so bad. Dr Roetz makes a good stab at

coming up with an accurate figure, but as discussed above, he suspects that apples are not being compared to apples.

I would, however, pose another question. Does it really matter if livestock's contribution of anthropogenic greenhouse emissions is as high as 14% or as low as 5%, if there is little we can do about it either way? There are, in my way of thinking, more important questions that both sides in this argument are ignoring. The irony is that the authors of "Livestock's Long Shadow," were trying to get people to think about these exact issues.

Middle School Earth Science

We need to back up here a little and review why cows emit greenhouse gases. We all remember the term *photosynthesis* from middle school earth science. Through the process of photosynthesis, green plants use the energy from the sun to take carbon dioxide from the atmosphere and water from the ground and combine them into molecules of sugar. In this bio-chemical reaction, oxygen is released into the atmosphere. Within the plant, the sugar is bonded into chains, either as starch or as cellulose. Starch is highly digestible and forms the basis of many of our favorite foods, such as the bun in a hamburger and the French fries that go with it.

Cellulose, however, is not very digestible and its main function is to provide the plant a skeleton. In simple stomach omnivorous animals, such as humans, pigs, and bears, cellulose once consumed pretty much goes out the other end. Nutritionists remind us that most of us need more fiber in our diets because it keeps us regular, but cellulose itself does little to meet our metabolic needs. However, there are a whole host of herbivorous animals which are adapted to consuming cellulose. Their digestive systems break the chains back to sugar, and the sugar into smaller molecules, which in turns enters their cells to fuel their metabolism.

Foremost among these animals are ruminants. In animals with this type of digestive system there are four stomachs in a row; the biggest one - the rumen - is a fermentation vat. Ruminant animals consume grass and other types of plants, grind it up with their teeth, and swallow it into their rumens where microbes go to work digesting the disgusting looking and smelling mash into its component chemicals. The key here is that the animal may consume the grass but microbes do the digestion.

Digestion of cellulose (and starch) is the reverse of photosynthesis. The tough chains of cellulose are broken down into their component parts of sugar, which is ultimately broken down to carbon dioxide and water. The energy released by this process is captured to fuel the animal's metabolic needs. Oxygen is required for all of this to happen and that oxygen comes from what is breathed in. On the exhalation, however, animals release carbon dioxide. Carbon dioxide is a greenhouse gas.

Ruminants are a numerous class of animals that includes cows, sheep, and goats, and also includes elk, deer, antelopes, and bison. All of these consume cellulose and exhale carbon dioxide. Ruminants are, however, not the only class of animals that consume cellulose. Among the higher order, who have yet a different type of digestive system, are rabbits, horses, and elephants. There are even smaller organisms, such as grasshoppers, termites, and dung beetles all of whom consume cellulose, but in all cases, it is actually microbes that do the work of digestion. Finally, we should not forget that, the fungi and microbes residing in the soil, totally on their own without the benefit of a host animal, are also busily working away to reduce cellulose to its component parts of water and carbon dioxide.

Over most of the terrestrial world, plants are growing, and each one has a cellulose body. Over each yearly cycle, most, of that cellulose is degraded back to carbon dioxide and water. If cows and other livestock were somehow made to disappear from the grasslands, something would inevitably consume that grass all the same. The amount of carbon dioxide from cellulose degradation would not be changed.

There are, however, some complicating factors because nothing is ever just that neat. Methane is also produced and emitted during the digestion of cellulose. Methane is also a byproduct of cellulose digestion but by a different type of microbe, which also lives in the guts of all of these plant eating animals. According to climate scientists, methane is a much stronger greenhouse gas, although after ten or twelve years in the atmosphere the methane too, degrades to carbon dioxide.

Different animals have different propensities to produce methane, and ruminants are among those that produce the most. Cows as we have learned are ruminants but so are deer and bison. Other major methane producers include grasshoppers, cockroaches, dung beetles, and termites. Many people in North America think of termites as insidious little creatures that will eat your house from the inside out. However, in much of the world, Africa for instance, termites are major consumers of plant materials. On the plains of East Africa, termite mounds are as big as elephants with multiple chimneys that can reach up to fifteen feet.

Billions of these hard-working blind critters spread out underground from each of these mounds to consume all of the vegetation they can manage. Following each rainy season, it is a race between the terrestrial animals to get to the grass and shrubs before the termites finishes it off. But termites are not the only insect competitors. This year, as you might have heard on the news, swarms of desert locusts are rampaging across East Africa consuming everything upon which they land. Swarming grasshoppers leave behind a totally barren landscape, starving people, and a plume of methane.

In a simplistic world, one could eliminate cows, and the threat of global warming would go away. Unfortunately, it does not work that way. We have focused, here, on just the methane produced directly by animals but even more methane comes from the mud in swamps, rice paddies, and manure lagoons. Livestock, concentrated in confined animal feeding operations (CAFOs) put a lot of manure into those lagoons but so do six or seven billion people.

Grass, Trees, Crops, and Soils.

One focus in the quest to slow the amount of greenhouse gases in the atmosphere is to arrest the degradation of cellulose by either conserving it in living trees or as humus in the soil. Both of these approaches have promise but also face considerable challenges in implementation.

Plant growth is accelerated in conditions of warmth and moisture. Global warming provides warmth and also provides more moisture, too often in the form of violent rainfall. Warmth and moisture also accelerates the process of degradation of cellulose back to carbon dioxide. Ultimately this results in a net zero balance, because as much carbon dioxide is being returned to the atmosphere as is being removed.

Consider the ten-point eight percent (10.8%) of the world in crop land. If the soil humus could be doubled (by an increase from just one percent to two percent) that would be a lot of carbon dioxide stored in soil. However, it would be not really be stored, it would be cycled but at a slower rate. One could imagine that soil carbon could then be doubled again to 4% -ad infinitum. However, things usually

don't work that way. Each incremental increase in soil carbon sequestration would be more and more difficult to attain.

Remember too, that this is crop land we are talking about, because at the same time as we are storing carbon in the soil, we are harvesting edible food upon which humanity depends. The two are not opposed to each other, after all better soils yield better crops, but this all needs doing within the reality of the current economic system. If the farmer does not have the economic ability to worry about building soil fertility, it won't get done. Purists might want to believe that good food comes only from natural farming methods, but the plain fact is that fertilizers, herbicides, and pesticides work.

Now consider the thirty-point five percent (30.5%) of the world in forests. It is quite clear that as a tree grows larger, more and more cellulose is locked up in its bulk. Some species of trees can live a really really long time. But the work of centuries can be destroyed in just one day, as many people in the Rocky Mountains and Pacific Coasts (and Australia) have learned over the past few years.

Strong emotions and wishful thinking stopped logging over a vast area of the western United States. Citing the protection of old growth forests, saving the Spotted Owl, the unsightliness of clear cuts, and that logging disturbance may allow silt runoff into streams to harm spawning fish – timber harvests have been effectively stopped on US Forest Service lands. The ultimate result of this effort to preserve the forests has been the worst fires that people have witnessed in modern times. The counter argument has been made that if nature had been allowed to function as nature is supposed to, little fires would have cleaned forests of excess fuel. The assumption is that a healthy forest may not burn with the intensities we have recently witnessed.

But there is an element of hypocrisy within these arguments. Much of that thinking comes from within the comfortable confines of a home built of wood. There is the rub. People are living here and many are living within the forests. Some might argue that there are too many people, but nonetheless they cannot all be ignored. Forests provide practical needs such as shelter, and emotional needs such as a place for peaceful contemplation. They can also help mitigate global warming. The three are not incompatible but to do all of it in a sustainable manner requires careful management. Just letting forests run wild, as has been the *de facto* policy, has been shown to not work. Forestry management based on hysteria, wishful thinking, and an incomplete understanding of the biological forces at work, is destined to fail.

The FAO tells us that twenty-six-point six percent (26.6%) of the world are grasslands, the natural habitat of most of the herbivore species, including livestock. In the past, a good bit of what we now classify as crop land used to be grasslands, and over much of that land, particularly in the temperate zone, thousands of years of soil accumulation resulted in very deep soil profiles.

Farming in essence mines that accumulated top soil when less carbon is returned to the soil than what naturally degrades. Poor farming practices also wastes soil to wind and water erosion. In developed countries, this is mostly a problem of the past, but again adverse economic realities push farmers to cut corners. If this disincentive is to change, then consumers too must take ownership of an agricultural market system that is rigged against farmers.

These are very complex social and ecological issues. Prevention and mitigation of soil loss is by no means clear or simple. We are told that the Sahara Desert was once a vast mixed acacia and grass savannah,

but the climate changed. No one is responsible for having caused that, but cultures do not always adapt to changing circumstances in constructive ways.

Ironically, I have been party to some of the recent ecological degradation of the Horn of Africa (HOA). My job over a fifty-year period was to advance a market system for livestock within the HOA and to foster an export demand in the Middle East. For thousands of years, pastoral nomads in Africa subsisted from their livestock. There was no market. People lived or died from what they raised. Over those thousands of years, the pastoral people of the Horn of Africa came to a rough equilibrium between themselves, their livestock, the wildlife, and the limitations that their corner of the world had to offer.

By introducing a cash market, people could for the first time buy necessary items from the outside – like soap powder. A nomad woman can sell a goat, and buy a large carton of soap powder, which she can divide and sell to her friends and family – just like Amway. With those proceeds she is able to buy two goats, which she can sell after transporting them to a larger market. With that money, she not only can buy another carton of soap powder and also a dozen plastic flip flops, which she can sell at a gathering of her clan at the water hole.

Now this mother has a small amount of money put aside, that when her child is sick, she can purchase medication from the rudimentary pharmacy that has opened in a nearby village. The shop is there because there is now enough money in circulation to allow a shop keeper to offer medicine to the nomadic people.

You might think that I am exaggerating, but this is exactly the economic transition that I have witnessed over the half a century that I have intermittently worked in Africa. Without the development of a market economy this is not possible. But other things, out of mine or anyone's control also happened.

Populations grew. Civil strife exacerbated by drought, also increased. Hundreds of thousands of people have been displaced, disrupting the relative stability that centuries of tradition had imposed on these people. No traditional internal order, no external order because of remote non-responsive corrupt government – people are left to survive as best they can. Criminals and religious extremists take over.

Somali's have a gift with words, and a friend once made this poignant observation: "Poor people eat trees." What he meant is that women in refugee camps by necessity must gather firewood to cook the commodity food donated by the international relief agencies. Hundreds of thousands of refugee families, have stripped the land bare of all trees in wide circles around their tent refugee cities.

Meanwhile their men, having lost their livestock to theft or drought, resort to the only income generating occupation available to them – the production of charcoal. The acacia trees are cut down, converted to charcoal in pits in the ground, and the bags of charcoal accompany the sheep and goats on their export trips to Saudi Arabia. The Princes get both their meat and their cooking fires from the Horn of Africa, and in the process the land is destroyed. Poor people eat trees!

If you take from this narrative that it was a mistake to create the cash market for livestock, then you are missing the point. Environmental degradation comes from poverty and bad government. Toss in an increasingly unstable climate and we have a disaster unfolding before our eyes. The humble cow and her gaseous bowels is a factor, but by no means the most important.

Culpability

Before we get too self-congratulatory, we, livestock producers should examine our own culpability. So far, I have focused on those who are misusing this FAO report to condemn animal agriculture, but what about those of us who raise livestock? Are we as innocent as we like to think we are? There are things happening in US agriculture that are just plain wrong.

Consider the depletion of the Ogallala aquifer which stretches from South Dakota to Texas, or the diversion of the Colorado River into the desert of Arizona. Farmers are pumping the Ogallala dry to raise corn that no one needs. Stopping the flow of the Colorado to irrigate the desert in the hottest place in the United States is another waste of a precious resource.

We, in the cow/calf part of the cattle business are happy when corn prices go down and worried when they go up. Cheap corn, as the conventional wisdom goes, means higher prices for feeder calves. That may be true during the brief period when corn prices are in transition down, but we tend to ignore the fact that cheap corn means cheap grass. Ranchers are in the grass selling business, and when corn prices are chronically below the cost of production, the market pushes us to raise more cows in order to sell more calves because our grass is also undervalued.

But consider what would happen if corn prices were high, as they were ten years back. There was an incentive to keep calves to sell as yearlings because our grass was worth more. More yearlings meant fewer mama cows which meant higher prices for calves. Cheap corn means more chickens, more pigs, and cheap cattle.

So what does draining the Ogallala Aquifer mean to us as a consequence of growing more corn? It means a beef packing cartel, the disappearance of independent feedlots, and a non-competitive dysfunctional market. Ultimately it means the loss of independence on our ranches while our rural communities, along with the schools and services, just dry up and blow away like tumble weeds.

What are the consequences for the rest of the nation? It means the disappearance of a precious water resource on a crop that is already in surplus. It means larger and larger feedlots, with more and more manure to be managed. It means social instability as chicken, hog, and packing plant workers struggle to survive on starvation wages. And, when they can't work anymore, these people are kicked out in the streets for the taxpayers to pick up the bill.

What does drying up the Colorado mean? It means that water is sprinkled over the desert to grow alfalfa to feed milk cows which produce more surplus milk. It was not enough that dairies concentrate five thousand cows, they are building new dairies that milk one hundred thousand head. Consider this, for every one hundred thousand head dairy, four hundred family dairies go broke. Instead of dispersing the manure that dairy cows make over the entire country, each mega-dairy concentrates it all into an unmanageable mess. My aunt would have said that this is all "bass-ackwards."

The family farm dairies of Wisconsin are in crisis because the price of milk is untenably low because, we are told, there is a surplus of milk. We are also told to rejoice that the recently re-negotiated NAFTA treaty will allow the export of milk to Canada. But will that export save the Wisconsin dairies? More likely milk will be shipped from Arizona and will result in the demise of dairy farmers in Ontario and Quebec. Who profits? Certainly not the Wisconsin dairy farmers, or the rural communities where they live, or the family dairy farmers of Canada.

And that is the point, who profits from what we now take as normal in the market structure of American agriculture? In beef packing it is a pair of Brazilian criminals. For pork it is the Communist Government of China. It is also hedge fund managers in Wall Street. Do you think that anyone of them wastes even one second thinking about the consequences of their policies on Grass Range, Montana, or for any of the other small cow towns?

Everyone that I know with a ranch, takes seriously their obligation as stewards of the land. As I drive down the highway, it all looks good. The quality of the calves in the market is amazing. The mama cows lined up behind the guy unrolling bales are in great shape and ready to drop new calves. We are exceptional stewards of the land and animals under our care. However, we are total failures as stewards of our industry.

Gilles Stockton
Grass Range, Montana
February 9, 2020

March 4, 2019

Dear Editor,

Thank you for publishing the article, "The True Environmental Impact of Beef Cattle Production" (WAR Feb. 28, 2019) highlighting the work of Dr. Alan Rotz. This article makes clear how cattle have been mistakenly targeted as a major source of atmospheric methane. The amount of methane resulting from cattle was grossly over estimated in a book published in 2006 by the United Nations Food and Agriculture Organization, titled "Livestock's Long Shadow."

From that initial mistaken calculation, environmental extremists and even those of a less extremist point of view have heard the message that cattle are somehow unique in their ability to produce methane. This is a profound mis-understanding of some basic biology that everyone should have learned in Freshman Biology 101.

Methane is a by-product of the digestion of cellulose by microorganisms. Cattle, other ruminants, elephants, horses, rabbits, prairie dogs, mice, grasshoppers, and termites all ingest cellulose (i.e. grass and wood) but microorganisms digest it. When I studied Ruminant Nutrition in the 1970's I learned that in order to evaluate a feed source as to its nutritional value, you have to deduct the energy lost in the form of methane. That energy loss runs between 5% and 9% depending upon the cellulose source.

The implication is that if you remove cattle from the landscape, as some more extremists demand, nothing would be done to reduce the amount of methane being produced. One of Charles Darwin's insights is that if there exists a food source, some type of living organism will consume it. Since 41% of the terrestrial world is covered in grass lands, and another 31% in forests, there is a lot of cellulose being produced every year to be digested by microorganisms which will in turn result in a lot of methane.

The good news, as Dr Rotz points out, is that methane only persists for about 12 years in the atmosphere. The bad news is that each molecule of methane eventually results in four molecule of carbon dioxide, which persists a lot longer. I really have no idea what we can do about it. It might be

possible to attach balloons to the rear ends of all of the cattle, but putting balloons on all those grasshoppers would be really tough.

Sincerely yours,

Gilles Stockton

January 23, 2019

Dear State Administration Committee:

My name is Gilles Stockton, I ranch in Grass Range, MT, and I am writing to urge the committee to approve HR2 and send it forward to the full House. Over the course of my career raising cattle, four corporations have come to dominate the market for cattle. These corporations now control and slaughter up to eighty five percent (85%) of the cattle in the United States. In addition, they import cattle and beef amounting to another twenty percent (20%) of the total beef consumption in the United States.

Over the past 5 years, cattle producers across this nation have experienced disastrous prices. We are currently receiving less than half the gross income for our feeder calves as we did in 2014. Cattlemen are told that this is simply the effects of supply and demand. If that is the case, we are importing the excess supply, and if the demand has fallen off, it has not been reflected in the price of beef at the retail meat case. These low prices are plainly the result of excess economic and political power by mammoth corporations, that in the case of cattle, hold monopoly power over the cattle industry.

Besides HR2 I am extremely interested in a bill (LC1273) for the restoration of Country of Origin Labeling (COOL). Montana passed a COOL bill in 2005. That bill sunsetted in 2009 when national COOL was implemented. The beef packers hated COOL and did everything possible to delay and derail it. Their tactics failed in the Federal Courts but ultimately succeeded in the WTO, which declared that the labeling of beef and pork was "trade illegal." In 2015 Congress rescinded COOL even though the WTO appeal process was not yet complete.

It was corporations who wrote the rules for NAFTA and the WTO, while the input and opinions of the citizens of the United States were systematically excluded from the trade negotiations. It was the influence of corporations that drove the Congressional vote that rescinded COOL. And note, all imported items and foods by law carry a country of origin label except for beef and pork. One would think that if COOL is "trade illegal" for beef and pork than it would also not be allowed for lamb, seafood, tee shirts, and base ball caps.

To bring it all back to Montana. Since the vote to rescind COOL, cattle prices have fallen by half of what they were in 2014. That is one billion dollars per year that has not entered the state. This is money that ranchers do not have to pay for new trucks or machinery, to spend on every main street across Montana, or to take the family on a needed getaway such at Chico Hot Springs. The most difficult struggle that you, as legislators, have had these past two sessions is finding enough money to fund the

services that Montana citizens need. The suspension of COOL is one major reason why you do not have enough tax revenues.

It is patently absurd that corporations are treated as persons under the law. Corporations are a very needed and useful construct for the conduct of business, but they are not persons and should not be granted the rights of citizens. The corporate structure is an artifice that should serve the needs of the nation. The nation is not here to exclusively serve the needs of corporations.

Perhaps it would be a useful reminder to consider the role of anti-trust laws. The Sherman, Clayton, and Packers and Stockyards Acts do not exist to punish corporations for doing well, instead anti-trust laws set the rules for market competition. Without fair and transparent market competition, incentive and innovation is stymied. The anti-trust laws are no longer vigorously enforced and as a result, the economy, the nation, and the people suffer. It is high time to limit the role of corporations and restore democracy and the supremacy of citizens, as was originally enshrined in the Constitution.

Sincerely yours,

Gilles Stockton