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"Livestock and Climate Change": Critical Comments and Responses

by Robert Goodland

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Editor's note: "Livestock and Climate Change," which ran in our November/December 2009 issue, generated the most comment, both pro and con, of any World Watch *article in several years. Many commenters made the same arguments, so rather than printing all the letters and e-mails, we have consolidated the critiques into their main points and asked author Robert Goodland to respond.*

My co-author, Jeff Anhang, and I enjoyed seeing our article garner much coverage and little criticism in media outlets and on Internet websites. It was also gratifying that although our article proposed gaps in analysis by the United Nations Food and Agriculture Organization (cf. *Livestock's Long Shadow*, 2006), the FAO graciously invited us to participate in its consultations in Rome in December 2009 and Berlin in January 2010. The presentation that we prepared for Rome can be seen at www.wellfedworld.org.

We think some of the interest in our article derived from coincidence. Around the time of publication, besides the attention given to the approaching Copenhagen conference on climate change (known as COP15), Lord Nicholas Stern (author of the renowned U.K. government study of the economics of climate change) publicly recommended cuts in meat consumption. Also, reports began to emerge from one country after another—such as India, Argentina, Australia, Kenya, and the Philippines—on the harm to crops and livestock caused by disruptive climate events.

No major recommendations besides ours for reversing climate change emerged in the run-up to COP15. At the conference, disagreement remained on the next major steps for scaling up renewable energy and energy efficiency. So while such steps must still be made to keep emissions down over the long term, the wait goes on for new infrastructure to enable significant energy-related emissions reductions. In the meantime, however, better alternatives to livestock products can be scaled up and have a positive effect on climate quickly, through joint action by citizens/consumers, governments, industry, and investors.

Following are the main critical comments on our article along with our responses.

The justification is unclear for the article to count animal respiration as a net source of greenhouse gas (GHG) emissions, while human respiration is not counted. If forest regenerated where livestock and feed production were removed, as recommended in the article, surely wild animals would reappear and emit GHGs. It is also unclear whether the authors are including carbon from livestock respiration among the 22 billion tons of emissions that they claim have not been previously counted, and how they think 22 billion tons of emissions could have been missed in accounting of GHG forcings to date.

Many more livestock than wild animals can be reared on any given amount of land. That is a large part of the purpose of raising livestock. This is broadly factored into our article.

Our main source for counting livestock respiration was an article by Alan Calverd, who has publicly defended his original article in the period since ours was published. To summarize briefly Calverd's case and ours: Livestock respiration merits counting in part because if pasture were not grazed, in most places it could regenerate forest and absorb large amounts of carbon. Everywhere else, without being grazed, grass can keep growing higher and absorbing more carbon. When it dies, some of its carbon gets sequestered in the soil beneath rather than released to the atmosphere, as it surely does when chewed up by livestock directly or in the form of feed.

Also, carbon flowing into the atmosphere from animal respiration and soil oxidation exceeds that absorbed due to photosynthesis by 1–2 billion tons per year. In many cases, livestock drive soil oxidation, with livestock's mass weighing about eight times that of wild animals. If respiration and soil

oxidation exceed photosynthesis, then counting respiration seems necessary.

Further, we believe that counting a foregone reduction of any magnitude is valid because it has exactly the same effect as an increase in emissions of the same magnitude. Moreover, carbon reduction available from land used for livestock and feed production is the only feasible way to absorb a significant amount of today's atmospheric carbon in the near term.

For those who consider counting respiration GHGs overly controversial, they can consider respiration GHGs as a proxy for carbon absorption foregone in land set aside for livestock and feed production. Part of why our article counted respiration GHGs was that it enabled us to reference a published calculation, whereas we found no published calculation for carbon absorption foregone in land cleared for livestock and feed production.

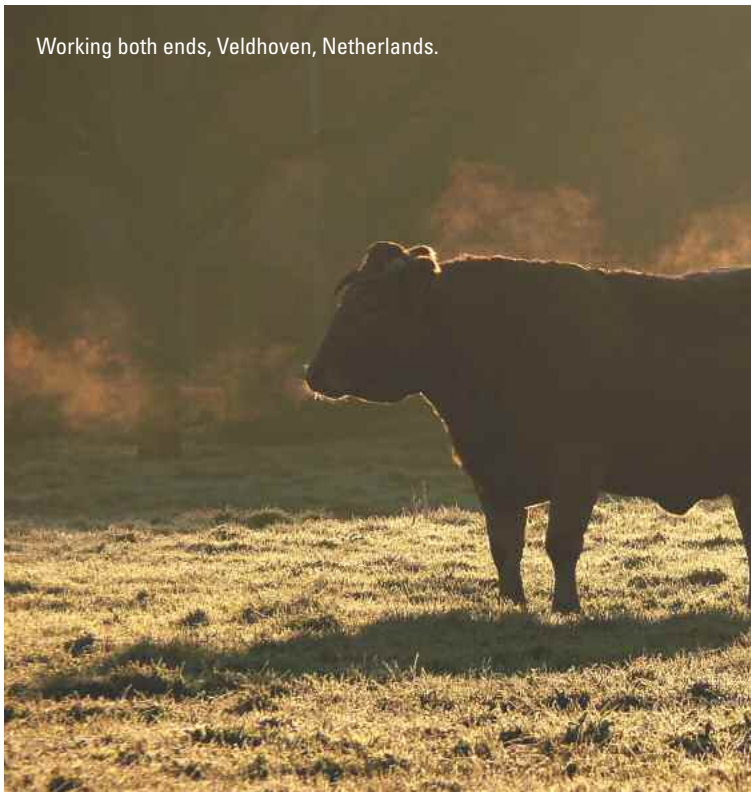
If respired GHGs are counted as a proxy for foregone carbon absorption, then most of the 22 billion tons of emissions that we claim were previously not counted can be understood as a *potential carbon sink* rather than an actual carbon source. Otherwise, the 8.8 billion tons of emissions attributable to livestock respiration have indeed been present in GHG inventories, but usually explained away by invoking the so-called "carbon cycle." Another large portion of previously uncounted GHGs results from our use of a 20-year timeframe for methane rather than the usual 100-year timeframe.

Carbon dioxide, methane, and nitrogen attributable to human exhalations and excretions can be seen as both scientifically and democratically reasonable choices of GHGs to remain uncounted, as the same order of magnitude of GHGs flows from the exhalations and excretions involved in every adult human's survival. But hundreds of millions of human adults consume little or no livestock products, and no human adult needs livestock products in order to survive. And the world's livestock mass is about double human mass. All of this makes livestock GHGs as worthy of counting as any other anthropogenic emissions.

It is difficult to understand the rationale for considering emissions attributable to land used for livestock and feed, when assessments of other amenities, such as bathrooms and opera houses, are not made in the same way. Surely if people dispensed with any amenity, that would free up land for reforestation.

The impacts of no other amenity approach those of livestock products. For example, dispensing with opera houses would free up a trivial amount of land compared to that used for livestock and feed production.

A detailed explanation of how our estimate is consistent with the widely accepted GHG protocol is on the Worldwatch Institute's Dateline: Copenhagen blog (at http://blogs.worldwatch.org/datelinecopenhagen/livestock/). To summarize, according to widely accepted protocol, most emissions counted in our article are considered direct emissions from the livestock industry. That's because these emissions derive from the physiology and activities of livestock and from feed production, all of which are components purchased or managed by livestock businesses.



Working both ends, Veldhoven, Netherlands.

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The article seems mistaken in omitting to count annual increases in non-livestock emissions, and in omitting to recalculate non-livestock methane emissions as we did for livestock methane.

We used available data from the World Resources Institute for annual increases in non-livestock emissions, as cited in our sources (at www.worldwatch.org/ww/livestock). As for recalculating non-livestock methane, we wrote that this remained to be done. Because we questioned many aspects of the FAO's work, we were reluctant to use their figures for methane, but did so anyway for livestock methane because we couldn't find a more reliable figure. Yet we remained uncomfortable using the FAO's figure for non-livestock methane. At the same time, publication proceeded without an accurate figure for the total number of livestock worldwide. We discovered after publication that the FAO's own statistical division reported 56 billion livestock worldwide in 2007. This is many more than are counted in our article, and doubtless outweighs whatever the increase would be in non-livestock methane.

The article fails to assess fully the health and environmental impacts of analog meat and dairy products.

Veggie burgers can be made by simply chopping and pressing

whole grains, legumes, and vegetables, or they can be heavily processed. Our article includes whole grains and legumes as an option. But we believe that the key challenge is for Western consumers to transition away from a diet typically heavy in meat. Most who have made such a transition have used various types of analogs to ease the process. We propose that various analogs should be marketed on a large scale, as appears necessary to reverse climate change in the short required timeframe. Inputs of grain and legumes required to produce any analog are a small fraction of those required to produce animal-based meats. So our proposal would stop today's trend of increasing conversion of forest to livestock and feed production, as already-converted land would be more than enough to produce analogs. Health and environmental improvements could and should be pursued over time.

Highly imprecise estimates are used in the final set of GHG categories in the article, covering such elements as fluorocarbons, cooking, waste, and waste product disposal; and the article doesn't provide corresponding estimates for non-livestock alternatives.

Little data are available on our article's final set of GHG categories, and we couldn't assemble new data with our limited resources. As we said, ongoing and comprehensive tracking is needed of GHGs attributable to livestock products and alternatives. Yet in the very rough estimate that we made for these categories, we indeed compared GHGs for livestock products versus alternatives. Assessing the full life cycle and supply chain of livestock products required listing these categories and analyzing them in at least the rough way that we did. Rough as it is, our intention was to provoke people to start thinking about them, which we believe is better than not considering them at all.

The article omits any discussion of problems with biofuels.

Many articles discuss such problems. Our article doesn't suggest that such problems do not exist. Rather, we thought it important to consider scenarios involving biofuels whether desired or not, in case they unfold even in the face of opposition.

The article seems at odds with official estimates of livestock GHGs in individual countries, which tend to be small. Also, reducing livestock in places where they yield relatively few GHGs could promote increases where livestock yield more GHGs.

In considering livestock emissions only within one country's borders, one may miss the important facts that livestock products and feed are global commodities—flown, shipped, and trucked all over the world—and that climate change is transboundary. So global analysis is important. And as recommended in our article, ongoing, comprehensive tracking of GHGs attributable to food and agriculture is needed. At the end of the resources posted online by the Worldwatch Institute on our article is an explanation of the relatively small variability between carbon footprints of different livestock products (at www.worldwatch.org/ww/livestock).

Surely livestock have multiple benefits, especially for poor smallholders. For the article to propose removing their livelihoods seems indefensible, especially where there are few or no alternatives. And removing livestock and feed production wouldn't guarantee reforestation; other development could surely move in.

There is no shortage of articles on livestock's benefits, often overlooking their adverse impacts. Many such articles conflate the small fraction of the world's livestock raised by poor smallholders with the vast majority that have large adverse impacts. They rarely mention that a) less than 10 percent of meat (according to the FAO) is produced entirely on pasture, and the animals providing this meat yield up to three times as much methane as intensively raised animals; b) for the second part of the life of pasture-raised livestock, most are raised intensively and fed crops, which add significantly to the carbon intensity of the resulting products; or c) even in temperate climates, grazed pasture tends to degrade over time and release significant amounts of carbon (not to mention the much higher impacts in tropical regions).

Our article proposes that pasture not be ploughed up but reforested where possible, and that can include large amounts of pasture worldwide. We propose a 25-percent reduction in livestock worldwide, which would leave room for all livestock raised by poor producers, and plenty raised by rich producers too.