Land use and industrial animal agriculture:
changing the paradigm towards a sustainable future

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Abstract

This paper explores the intricate interactions among land use, water, biodiversity, climate, infectious disease, and industrial animal agriculture. It asks: How can we utilise land resources in a safer and more sustainable manner that supports human health and the viability of the planet in the years to come? The paper argues that, since the mid-1960s, the rise of an industrial complex geared to producing ever-increasing quantities of animal products – meat, diary, and eggs – has adversely impacted land, water, wild species, climate, and human health.

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The Issues

The historically unprecedented rate of meat and dairy consumption in upper and middle income countries today—and the "factory farms" and the vast agricultural systems that feed them—is devastating local communities in the poorest countries, aggravating global food inequality, and spewing over half the planet's greenhouse gases.[1]

In 1950, when the U.S. population stood at slightly over 150 million, 100 million farm animals were slaughtered—approximately 1.5 farm animals per American per year.[2] Today that ratio stands at 32:1. Some 25 million farm animals are killed every day in the United States, for human consumption, and globally, demand is only growing, as developing countries emulate the wealthy and America exports its lucrative factory farm system abroad.[3]

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[1] Robert Goodland, lead environmental adviser at the World Bank Group (retired) and Jeff Anhang, research officer and environmental specialist at the World Bank Group's International Finance Corporation, *Livestock and Climate Change*, World Watch, November/December 2009. In its 2006 publication, *Livestock's Long Shadow*, the United Nations Food and Agriculture Organization (FAO) estimated that livestock accounted for 18 percent of global GHG emissions, and Chatham House's 2014 publication, *Livestock – Climate Change's Forgotten Sector,* put that figure at 14.5 percent, citing FOA data. The lower figures cited by Chatham House and the FAO easily qualify livestock as significant contributors to climate change. In *Livestock and Climate Change*, World Bank environmental specialists Goodland and Anhang argue that the FOA under-counted or overlooked 25,048 million tons of carbon dioxide attributable to livestock, and estimate livestock's contribution to global GHG emissions be at least 51 percent. For details see www.worldwatch.org/ww/livestock

[2] USDA National Agricultural Statistics Service.

[3] Global demand for meat and milk is projected to expand by 2050 by 73 and 58 percent, respectively, from 2010 levels. Rob Bailey, Antony Froggatt and Laura Wellesley, *Livestock* –

Across East Africa and Latin America, communities that were previously food-sufficient have seen their land purchased, leased or expropriated by big businesses, their woodlands and rainforests cleared and converted to pasture to graze cattle whose flesh feeds the wealthy, or expanded into vast monocultures of wheat and soy that are shipped to wealthy countries, where their bounty is fed to cows, pigs and chickens, who are slaughtered for consumption by the rich.

This system devastates the poor. Eighty-two percent of the world's malnourished children live in countries where locally-grown food is fed to animals who are then are killed and sold to consumers in wealthy countries.[4] A quarter of all crops grown globally is fed to animals—half of all protein and over one-third of all calories produced[5]—pushing food prices upwards and eroding the ability of poor people everywhere to feed themselves.[6]

The massive agricultural system that supports meat and dairy production, and the Concentrated Animal Feeding Operations—"CAFOs" or "factory farms" where over 90% of farm animals today are born, raised, and sent to their deaths, puts an untenable strain on natural resources, sucking up water aquifers at phenomenal rates—on a per kilogram basis, beef production requires nine times the water of cereals[7]—decimating fragile eco-systems, driving deforestation, eradicating indigenous species, contaminating rivers and oceans, driving zoonotic diseases, and producing more greenhouse gas emissions than all cars, planes, trains and ships combined.[8]

Cutting forests to grow animal feed and provide pasture for farm animals drives carbon dioxide emissions and is the largest global source of methane[9] and nitrous oxide—potent green house gasses[10] produced by enteric fermentation, manure and fertilizers for growing animal feed.[11] In the United States, factory farms produce 500 million tons of

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Climate Change's Forgotten Sector, Chatham House, The Royal Institute of International Affairs, December 2014. The World Resources Institute projects an 82 percent increase in meat consumption between 2006 and 2050. World Resources Institute, *Creating a Sustainable Food Future: a menu of solutions to sustainably feed more than 9 billion people by 2050*, World Resources Report 2013-14 Interim Findings.

[4] Oppenlander, Richard, *Food Choice and Sustainability*, Langdon Street Press, 2013. p. 174.

[5] Ravilious, K., 'Cutting Meat Consumption Could Feed 10 Billion,' Environmental Research Web, 27 September 2013, at http://environmentalresearchweb.org/cws/article/news/54791/.

[6] Rosegrant, M.W., Tokgoz, S., Bhandary, P. and Msangi, S., 'Looking Ahead: Scenarios for the Future of Food,' IFPRI (International Food Policy Research Institute), Ch. 8, pp. 89–101, in *2012 Global Food Policy Report*, at http://www.ifpri.org/sites/default/files/publications/gfpr2012_ch08.pdf

[7] Jalava, M., Kummu, M., Porkka, M., Siebert, S. and Varis, O., 'Diet Change – A Solution to Reduce Water Use?,' *Environmental Research Letters*, 9, 2014, doi:10.1088/1748-9326/9/7/074016.

[8] Rob Bailey, Antony Froggatt and Laura Wellesley, *Livestock – Climate Change's Forgotten Sector*, Chatham House, The Royal Institute of International Affairs, December 2014.

[9] Enteric fermentation is a digestive process of ruminant animals such as cows, goats and sheep.

[10] Rob Bailey, Antony Froggatt and Laura Wellesley, *Livestock – Climate Change's Forgotten Sector*, Chatham House, The Royal Institute of International Affairs, December 2014.

[11] A 2013 report from the United Nation's Food and Agriculture Organisation estimated that livestock accounts for 53 percent of all nitrous oxide emissions. Nitrous oxide is 296 times more destructive than carbon dioxide and stays in the atmosphere longer—for 150 years. See Food and Agriculture Organization, *Tackling Climate Change through Livestock: A global assessment*

manure each year—more than three times the sewage from the entire U.S. human population.[12] Fifty-five percent of water consumed in the United States goes to animal agriculture, straining surface and ground waters resources and contaminating rivers and oceans. Deforestation, land conversion, degradation of grasslands, and desertification due to animal agriculture accounts for 30 percent of global biodiversity loss.[13]

The Response

It has been forty years since Francis Moore Lappé's seminal book, *Diet for a Small Planet*, argued that: "As long as the poor and hungry cannot pay, grain and soy-bean growers will find it more profitable to sell to the rich countries, where food will be called 'feed' and reduced to a tiny fraction of its real potential."[14] Echoing Lappé's argument, scientists today argue that the use of crops and arable land for livestock production is a staggeringly inefficient use of resources,[15] and point out that consumption of animal products "places rich meat and dairy consumers in competition for calories with poor crop consumers."[16]

Yet, the political response to date has been anemic. As noted in a report from Chatham House: "Given the importance of shifting consumption of meat and dairy products to the objective of avoiding dangerous climate change, there is remarkably little research on how best to do so."[17] Global environmental groups have delivered high-profile campaigns on energy, transport, biofuels and palm oil—despite the greater environmental impact of animal agriculture,[18] and animal agriculture is not on the agenda for the Global Climate Conferences. In the United States, responses to California's draught focused on lawns and showers—residential water consumption accounts for 4 percent of California's water footprint, or on targeting almond growers—almonds use under two million acres feet of California's water per year, while animal feed and inputs suck up over 20 million acres feet per year, nearly half of California's water footprint.[19]

Attention to animal rights also remains conspicuously absent from global development discussions and programming. As a result, development and human rights programs

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of emissions and mitigation opportunities, 2013; and Food and Agriculture Organization, *Livestock's Long Shadow: Environmental Issues and Options,* 2006.

[12] Pew Commission on Industrial Farm Animal Production, *Putting meat on the table: industrial farm animal production in America*, April 2008

[13] Westhoek, H., Rood, T., Van Den Berg, M., Janse, J., Nijdam, D., Reudink, M. and Stehfest, E., *The Protein Puzzle: The Consumption and Production of Meat, Dairy and Fish in the European Union,* The Hague: PBL Netherlands Environmental Assessment Agency, 2011.

[14] Frances Moore Lappé, *Diet for a Small Planet*, Revised Edition, Ballantine Books, 1975, p. xix

[15] Bajželj, B., Richards, K.S., Allwood, J.M., Smith, P., Dennis, J.S., Curmi, E. and Gilligan C.A., 'Importance of Food-Demand Management for Climate Mitigation,' *Nature Climate Change*, 31 August 2014, pp. 1–6.

[16] Rob Bailey, Antony Froggatt and Laura Wellesley, *Livestock – Climate Change's Forgotten Sector*, Chatham House, The Royal Institute of International Affairs, December 2014, p. 13.

[17] Rob Bailey, Antony Froggatt and Laura Wellesley, Chatham House, *Livestock – Climate Change's Forgotten Sector,* Chatham House, 2014, p. 23.

[18] Palm oil plantations have cost the loss of 26 million acres of rain forest, compared with 126 million acres lost to date to animal agriculture. *Cowspiracy*, documentary film 2014.

[19] Julian Fulton, Heather Cooley, and Peter H. Gleik, *California's Water Footprint*, The Pacific Institute, December 2012.

supported by organisations such as the United Nations Development Programme and the World Food Program, continue to support developing countries to expand animal agriculture and encourage and promote the consumption of animal products. In the area of health, the World Health Organisation published a series of reports in 2016-17 on the deleterious effects of processed and "red" meat consumption on human health, but then backed down from this stance, under intense industry and political pressures. Human rights organisations also pay little head to animal agriculture and tend to view human and animal rights as a zero-sum game in which supporting animal rights *de-facto* entails de-prioritising human rights. Some actively support animal exploitation and the sale and transport of live animals for human consumption, with a view to alleviating human suffering and poverty.

Way Forward

High-level reports from the Intergovernmental Panel on Climate Change (IPCC),[20] Chatham House at the Royal Institute of International Affairs,[21] and the World Resources Institute[22] have concluded that ambitious supply-side action to reduce the emissions intensity of animal production—finding ways to make industrial animal agriculture "cleaner"—cannot deliver the results needed to meet internationally agreed climate change goals.[23] Demand reduction is urgently needed.[24]

However, despite over four decades of research and warnings about the devastating consequences of escalating animal industry, the profound social justice and environmental consequences of modern-day meat and dairy consumption in wealthy nations have elicited little of no response from governments, international organizations, human rights activists, or environmentalists. As a result, little is known about how to go about reducing demand for meat and dairy, no plans are in place at national or international levels to address the problem, awareness of the issues is low, and funding and research to improve awareness and identify solutions is virtually non-existent.

Going forward, the world needs a more nuanced understanding of the multi-facetted impact of industrial animal agriculture on strategies to meet the Sustainable Development Goals.

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[20] IPCC, *Climate Change 2014 Synthesis Report*, November 2014. www.ipcc.ch

[21] Rob Bailey, Antony Froggatt and Laura Wellesley, *Livestock – Climate Change's Forgotten Sector*, Chatham House, The Royal Institute of International Affairs, December 2014.

[22] World Resources Institute, *Creating a Sustainable Food Future: a menu of solutions to sustainably feed more than 9 billion people by 2050*, World Resources Report 2013-14 Interim Findings.

[23] International goals limits the rise in global temperatures to two degrees Celsius. UNFCCC, 'Report of the Conference of the Parties on its fifteenth session, held in Copenhagen from 7 to 19 December 2009,' 30 March 2010, at http://unfccc.int/resource/docs/2009/cop15/eng/11a01.pdf.

[24] In addition to the IPCC, Chatham House and WRI Report, the following two studies argue that demand reduction is required to meet climate change goals: Bajželj, B., Richards, K.S., Allwood, J.M., Smith, P., Dennis, J.S., Curmi, E. and Gilligan C.A., 'Importance of Food-Demand Management for Climate Mitigation,' *Nature Climate Change*, 31 August 2014, pp. 1–6; and Hedenus, F., Wirsenius, S. and Johansson, D.J.A., 'The Importance of Reduced Meat and Dairy Consumption for Meeting Stringent Climate Change Targets,' *Climatic Change*, Issue 124, 2014, pp. 79–91.