

Attack of the Balloon People: How America's Food Culture and Agricultural Policies Threaten the Food Security of the Poor, Farmers, and Indigenous Peoples of the World

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I. INTRODUCTION

Any discussion of food security would, at first blush, seem to focus primarily on world hunger and other threats to the safety of the food supply, whether intentionally man-made (e.g., terrorism), inadvertently man-made (e.g., global warming), made-for-profit by industrial agriculture (referred to as “industrial food”¹ throughout this Article),² or “natural” although arguably man-abetted (such as bovine spongiform encephalopathy, or mad cow disease). And hunger is indeed a problem and likely to become more of a problem. However, this Article focuses on the long term threat to world health and world food security caused by the American way of eating; the American way of growing food without regard for its long-term impact on the environment; and, finally, the exportation of the American way of eating and farming to the rest of the world. The Article will focus on two nations with more than a billion people each, China and India, as exemplars of the problems of exporting the American food paradigm.

The central irony of my thesis is that the American way that will ultimately lead to more world hunger is currently leading to an obesity epidemic in the United States, with the resultant increase in diseases such as diabetes. And the U.S. is exporting both this lifestyle and this industrial agriculture model to the rest of the world, a world that is apparently warmly embracing it.³ The planet cannot sustainably feed more than 2.3 billion Chinese and Indians the way it feeds 300 million Americans.⁴ We need to rethink how we grow, eat, export, and subsidize agricultural products, with attention to how these products contribute to the degradation of the environment and how they consume non-renewable resources, including oil, topsoil, and water. Failure to engage in such an analysis will result in decreasing worldwide food security, with a differential negative impact on the indigenous farmers and the poor.

1. Although the term “agribusiness” once held sway as the pejorative *de jour*, I will use the term “industrial food” or “industrial agriculture” to describe the stuff we are now eating and the entities that manufacture or grow it.

2. See MICHAEL POLLAN, *THE OMNIVORE’S DILEMMA* 17 (2006) (suggesting “a pretty good start on a working definition of industrial food: Any food whose provenance is so complex or obscure that it requires expert help to ascertain”).

3. See, e.g., Geoff Dyer, *Taking the Countryside*, *FIN. TIMES*, Apr. 4, 2007, at 13 (“The expansion of industrial agriculture has been seen all over the developing world over the last two decades . . .”).

4. See John Vidal, *Meat-Eaters Soak Up the World’s Water*, *THE GUARDIAN*, Aug. 23, 2004, at 10 (“The consensus among scientists is that it will be almost impossible to feed future generations the typical diet eaten in western Europe and North America without destroying the environment.”).

The Article bases its argument regarding long-term food security on three central theses. First, the world today can comfortably feed the current population (even though it isn't doing so). Second, current food shortages are political, economic, or both, but they are not agricultural. Third, the future nevertheless looks grim for international food security for several reasons: (a) the export of the American agricultural model and eating lifestyle, (b) the anticipated unequal impact of global warming, and (c) the seeming lack of any hope for political solutions.

First, the world today can comfortably feed the current population.⁵ Why then does it not do so? This is nothing new. Two examples will suffice. First, during the Irish potato famine of 1845-47, large quantities of wheat, barley and oats were exported from Ireland to England and abroad as over a million peasants died, and over a million more peasants left the country when blight killed the potato crops upon which they depended almost entirely for food.⁶ Second, to make a point rather than a suggestion that would alienate pet lovers, the United Nations estimates that it would cost \$13 billion a year to feed the world's hungry, and the United States spends \$14.5 billion a year on dog and cat food.⁷

According to author Richard Manning, "[P]eople are hungry because they can't afford to buy food, not because there isn't food to buy."⁸ People are short of food not because there is not enough food but because they either cannot afford it or the government (theirs or somebody else's) keeps it from them.⁹ Growth in world agricultural production increased more than world population growth between 1950 and 1984, and per capita calorie consumption in less developed countries increased twenty-seven percent between 1963 and 1995.¹⁰

5. Hunger Relief Organizations—World Hunger Statistics, <http://hungerrelieforganizations.atspace.com/> [hereinafter Hunger Relief Organizations] (last visited Sept. 9, 2007).

6. The History Place—The Irish Potato Famine, <http://www.historyplace.com/worldhistory/famine/introduction.htm> (last visited Sept. 6, 2007); The History Place—The Irish Potato Famine, <http://www.historyplace.com/worldhistory/famine/hunger.htm> (last visited Sept. 6, 2007).

7. See *infra* note 27 and accompanying text.

8. RICHARD MANNING, *AGAINST THE GRAIN* 72 (2004).

9. See *id.* at 72-73 (blaming famine on "bad government").

10. WARREN BELASCO, *MEALS TO COME* 74 (2006).

Predictions of widespread famine by Thomas Malthus in 1798¹¹ and Paul Ehrlich in 1969¹² were proven inaccurate as a result of the so-called Green Revolution that dramatically improved the yields of three major crops: corn,¹³ wheat, and rice. But, as author Richard Manning points out, “from the beginning, the Green Revolution has had its critics, especially those who have suggested that its heavy reliance on high inputs of water, capital, and chemical fertilizers and pesticides are not sustainable.”¹⁴ The fact that Malthus has been wrong so far does not mean that the Green Revolution has not avoided producing “disastrous social and environmental costs,”¹⁵ or that this situation can go on forever. It simply means that at the present time, the major issues in global food security are not caused by a global shortage of food.¹⁶

In fact, a 1997 World Health Organization (WHO) report called attention to an apparent reversal of the historical tendency to view weight gain as a sign of prosperity.¹⁷ Compiled by more than 100 experts worldwide over two years, the report stated that obesity is now a problem in both developed and developing countries among children and adults, and “[i]ndeed, [obesity] is now so common that it is replacing the more traditional public health concerns, including undernutrition and infectious disease, as one of the most significant contributors to ill health.”¹⁸

Obesity can be found in conjunction with undernutrition.¹⁹ Obesity, simplistically put, results from consuming more calories of

11. See THOMAS ROBERT MALTHUS, AN ESSAY ON THE PRINCIPLE OF POPULATION AS IT AFFECTS THE FUTURE IMPROVEMENT OF SOCIETY (1798), reprinted in 1 THE WORKS OF THOMAS ROBERT MALTHUS 80 (E.A. Wrigley & David Souden eds., 1986) (“[T]he power of population is indefinitely greater than the power in the earth to produce subsistence for man.”).

12. See PAUL R. EHRLICH, THE POPULATION BOMB 17 (1969) (“Each year food production in undeveloped countries falls a bit further behind burgeoning population growth . . . [I]t now seems inevitable that [this trend] will continue to its logical conclusion: mass starvation.”).

13. What Americans call corn the rest of the world calls maize; I will sacrifice accuracy for clarity and use the term corn for *Zea mays*, just as I habitually call futbol “soccer.”

14. RICHARD MANNING, FOOD’S FRONTIER: THE NEXT GREEN REVOLUTION 5 (2000).

15. BELASCO, *supra* note 10, at 84.

16. See *id.* at 59–60 (noting that while Malthus’s predictions have not yet been realized, Malthusians still worry about the future).

17. WORLD HEALTH ORG. [WHO], WHO TECH. REP. SERIES NO. 894, OBESITY: PREVENTING AND MANAGING THE GLOBAL EPIDEMIC, (2000).

18. *Id.* at 1–2.

19. See *id.* at 4 (“In countries with developing economies, the problem of obesity is emerging at a time when undernutrition remains a significant problem.”).

food than one expends over time.²⁰ If those calories are in the form of corn or other grains, such as high fructose corn syrup (HFCS) and sugar, etc., a population can consume far more calories than are necessary and still come up short on protein, vitamins or minerals.

Second, current food shortages are political, economic, or both, but not agricultural. This is really a corollary of the first thesis. Agricultural products are subject to the most protectionist national laws of any product, be they in the form of American corn, EU wheat, or Japanese rice.²¹

Third, the future nevertheless looks grim for international food security for a number of reasons: the export of the American agricultural model and eating lifestyle, the coming unequal impact of global warming, and the seeming lack of any hope for political solutions. I will discuss the first point shortly.

As to the second point, this Article assumes for the sake of argument the truth of global warming,²² along with evolution and

20. "Obesity is often defined simply as a condition of abnormal or excessive fat accumulation in adipose tissue, to the extent that health may be impaired." There are two kinds of obesity, "adroid obesity" where excess fat is distributed in the abdomen, and "gynoid obesity" where the fat is relatively evenly distributed throughout the body. Of the two, the former represents the greater health risk. *Id.* at 6.

21. See, e.g., Michael J. Trebilcock, *Critiquing the Critics of Economic Globalization*, 1 J. INT'L L. & INT'L REL. 213, 233 n.69 ("Agriculture has been and remains the most protected bastion in the international economy."); Jeffrey Steidle, *The Problem Child of World Trade: Reform School for Agriculture*, 4 MINN. J. GLOBAL TRADE 333, 333 n.1 ("Agricultural protectionism has played hooky from global trade reforms for decades."); Carmen G. Gonzalez, *Deconstructing the Mythology of Free Trade: Critical Reflections on Comparative Advantage*, 17 BERKELEY LA RAZA L.J. 65, 75 n.55 (noting that current Northern nations' protectionism in agriculture, steel, and textiles is a continuation of colonialism); Jon G. Filipek, *Agriculture in a World of Comparative Advantage: The Prospects for Farm Trade Liberalization in the Uruguay Round of GATT Negotiations*, 30 HARV. INT'L L.J. 123, 128; Ari Afilalo, *Not in My Backyard: Power and Protectionism in U.S. Trade Policy*, 34 N.Y.U. J. INT'L L. & POL. 749, 781 (noting that historically high agricultural tariffs and subsidies have been an "especially sore topic" between the developed and developing countries); Ryan McCormick, *The African Growth and Opportunity Act: The Perils of Pursuing African Development Through U. S. Trade Law*, 41 TEX. INT'L L.J. 339, 369 n.171 (sub-Saharan Africa loses almost \$2 billion a year in agricultural income from protectionism and subsidies in developed countries).

22. Along with just about everyone else except President Bush and Michael Crichton. See generally MICHAEL CRICHTON, *STATE OF FEAR* (2004) (portraying believers in global warming as frauds throughout a footnote-laden novel). Apparently, the two may have discussed the topic in the White House. See Dave Itzkoff, *Genetic Park*, N.Y. TIMES BOOK REVIEW, Jan. 7, 2007, at 8 (reviewing NEXT, Crichton's latest polemic novel); see also Elisabeth Rosenthal & Andrew C. Revkin, *Science Panel Says Global Warming Is 'Unequivocal'*, N.Y. TIMES, Feb. 3, 2007, at A1 (citing a report issued by the Intergovernmental Panel on Climate Change, asserting with more than 90% confidence that human-caused greenhouse gases have been the major source of global warming in the past 50 years, and noting that continued warming will alter climate patterns that shape water supplies and agricultural production).

gravity, and will not devote any space herein to proofs that it is happening and will have a major impact on all aspects of our world, including food security.²³ However, I will point out that the vast majority of ink devoted to global warming focuses on rising sea levels and the devastation this will cause to many people, from those on low Pacific islands, to those in India, Florida, and Manhattan.²⁴ This will indeed be a tragedy on a vast scale and will cost many lives, particularly among the poor. But global warming will also have an enormous impact on agriculture, doing the most damage to less developed nations and indigenous farmers.

The third point, that things will get worse, is unfortunately illustrated throughout this Article, although the conclusion tries to introduce a small note of optimism.

As a final note, there is not enough space to discuss a number of topics that do have and will increasingly have a negative impact on food security, both domestic and international. These include genetically modified organisms (GMOs);²⁵ other (non-food) uses of agricultural land (such as for the production of cotton);²⁶ pet food;²⁷

23. See generally AL GORE, *AN INCONVENIENT TRUTH* (2006). Although Gore's book does not focus on agriculture, he does urge that we consider the CO₂ emissions impact of buying foods that have been grown in distant locations and transported to our local markets, noting that currently the average meal travels 1,200 miles before it reaches the table. *Id.* at 318.

24. See, e.g., Barbara Crossette, *1,190 Islands in Danger: Sea Could Drown Them*, N.Y. TIMES, Nov. 26, 1990, at A4; Andrew C. Revkin, *An Icy Riddle as Big as Greenland*, N.Y. TIMES, June 8, 2004, at F1.

25. Are genetically modified organisms a threat or a solution? The United States and Europe are divided on this issue. The United States is the world's largest grower of biotech crops and is responsible for 55% of the biotech acreage. Eric Hand, *Biotech Debate Divides Africa*, ST. LOUIS POST DISPATCH, Dec. 12, 2006, at A1.

26. It takes one third of a pound of agricultural chemicals to produce one cotton t-shirt. SCP, *Who We Are*, http://www.sustainablecotton.org/html/who_we_are.html (last visited Sept. 9, 2007) (describing current cotton growing practices as one of agriculture's most environmentally destructive activities and calling for a transition to organic cotton growing practices). The United States is the world's largest producer of cotton, with \$4.9 billion in annual sales in a world market of \$12 billion. But this success comes at a price to taxpayers of about \$2 billion in subsidies. The fact that these subsidies drive down the price of cotton for LDC producers (Africa produces \$2.1 billion in raw cotton—second to the United States) was not lost on the Doha Round negotiators. G. Pascal Zachary, *Out of Africa: Cotton and Cash*, N.Y. TIMES, Jan. 14, 2007, at 3.1.

27. America has 300 million people, but also more than 63 million dogs and more than 81 million cats to feed at a cost of \$14.3 billion dollars in 2005. The Pet Food Institute [PFI], PFI Reference Desk, http://www.petfoodinstitute.org/reference_pet_data.cfm (last visited Sept. 9, 2007). To put that amount in perspective, the United Nations estimates that it would take \$13 billion to feed the world's hungry people. Hunger Relief Organizations, *supra* note 5. Amazingly, about 5% of America's dogs are obese and another 20 to 30% are overweight, spawning a weight-loss industry for dogs,

tobacco, alcohol, other drugs;²⁸ the growing and misplaced belief that corn-based ethanol is a solution to oil dependence;²⁹ and mad cow disease and related phenomena.³⁰

including a new diet drug. Stephanie Saul, *New Diet Drug is Approved with Pudgy Dogs in Mind*, N.Y. TIMES, Jan. 6, 2007, at A9.

28. See Eric Bailey, *Pot Called Top Cash Crop in America*, CHI. TRIB., Dec. 18, 2006, at 3. (“[T]he market value of pot produced in the United States exceeds \$35 billion”); USDA ECONOMIC RESEARCH SERVICE, TABLE 13—ALL TOBACCO: ACREAGE, YIELD, AND PRODUCTION, UNITED STATES, 1965–2006, <http://ers.usda.gov/briefing/tobacco/Data/table13.pdf> (last visited Sept. 9, 2007) (reflecting that in 2006, 650,000,000 pounds of tobacco were grown on 307,000 acres of land).

29. Ethanol currently makes up 3% of the fuel used for transportation in the United States but some say it could increase to 20%. There seems to be very little discussion, however, of the true costs of corn based ethanol in terms of the fossil fuel, water and soil needed to grow the corn. One study suggests that the true cost of a gallon of ethanol is more than a gallon of gas! However, the technologically more complicated process of using agriculture waste and scrub trees and forestry byproducts instead of corn may mitigate this problem to some degree. Tim Knauss, *ESF Lands \$10M for Ethanol Facility*, SYRACUSE POST STANDARD, Dec. 20, 2006, at A1. There is very little discussion about the down-side of increased ethanol production, particularly ethanol from corn. But see Paul Krugman, Op-Ed., *The Sum Of All Ears*, N.Y. TIMES, Jan. 29, 2007, at A19. Ethanol from wood scraps, willow trees and other non-food sources (including corn stalks) may offer promise; Brazil’s efforts to make ethanol from cane may also be more feasible. *Id.* But there is a real and negative impact on food security when food is converted into a replacement for gasoline. *Id.* What ethanol from corn supporters—including President Bush—don’t seem to consider is that it takes fossil fuel to make the corn that makes the ethanol. *Id.* And don’t forget that corn is also a heavy user of two other non-renewable items in addition to oil: water and topsoil. *Id.* One estimate is that it takes four gallons of gasoline to make the ethanol that replaces one gallon of gasoline when all real costs are factored in. *Id.* And if we are providing economic support to ethanol producers who make their ethanol out of corn that is itself subsidized where are the real gains to taxpayers? *Id.* Meanwhile, in Malaysia and Indonesia attempts to make ethanol from palm oil have resulted in destroying rainforests, overuse of chemical fertilizers and burning of peatland, sending massive amounts of carbon emissions into the atmosphere and making Indonesia the third largest producer of greenhouse gasses behind the United States and China. Elizabeth Rosenthal, *Once a Dream Fuel, Palm Oil May Be an Eco-Nightmare*, N.Y. TIMES, Jan. 31, 2007, at C1.

30. See generally RICHARD RHODES, *DEADLY FEASTS* (Touchstone 1998); Organic Consumers Association, *Mad Cow Disease: Is the USDA covering up an Epidemic?*, <http://www.organicconsumers.org/madcow.cfm> (last visited Sept. 9, 2007) (collecting current articles and information on the status of Mad Cow Disease). There is still much that is not understood about the various “prion” diseases: bovine spongiform encephalopathy (“mad cow,” the brain disease first discovered in England in 1986); scrapie (a related brain disease in sheep and sometimes goats); chronic wasting disease in North American deer and elk; kuru (a human brain disease of the Papua New Guinea Highlands that is spread by cannibalism); Creutzfeldt-Jakob disease (a rare spongiform brain disease in humans). What is known, however, is that several of the prion diseases can migrate across species as a result of consumption of infected brain tissue. What is troubling therefore is, first, that our cows, pigs and chickens are made into carnivores, even cannibals, by our feedlot feeding system. The Food and Drug Administration has banned ruminant protein from feed for ruminants since 1997.

II. DOMESTIC PROBLEMS

A. *How (Much and What) America Eats*

This section explores the American lifestyle choices that have prompted the Europeans to refer to us as the “balloon people.”

1. The Balloon People

With the exception of the populations of a few small Pacific islands, Americans are the fattest people on the planet.³¹ Obesity is now at the pandemic level in the United States and is a leading threat to public health.³² About sixty-one percent of Americans are overweight enough to feel weight-related health problems, about twenty percent are obese and will have their lives shortened as a result, and about five million Americans are morbidly obese and qualify for such procedures such as stomach stapling.³³ About twenty-five percent of Americans under nineteen are either overweight or obese.³⁴ Those suffering from these diseases are not without their supporters,³⁵ and those with the opposite affliction receive much attention.³⁶

Press Release, Governor Blagojevich Announces Additional Funding for Mad Cow Disease Surveillance (Dec. 15, 2006), *available at* <http://www.illinois.gov/news/>. Many people are not aware that naturally vegetarian animals destined for our tables are given feed fortified with slaughterhouse waste, “downer” cattle (cattle that must be killed because they are too sick to walk), restaurant table scraps, road kill, even chicken feathers and former household pets. It does indeed “take a tough man to make a tender chicken.” Second, the slaughter process is such that it is possible that cow brain tissue infected with bovine spongiform encephalopathy ends up in meat. If a human form of the incurable bovine spongiform encephalopathy becomes a wide-spread epidemic—and the jury is still out on that—it will be these practices that will likely be implicated. Mad cow was first discovered in an American cow in the summer of 2003, and this had a devastating effect on American beef exports. Japan, once America’s largest beef importer, imported 200,000 tons of beef worth \$1.4 billion in 2003 but only 3,241 tons worth \$20 million in 2006. Hiroko Tabuchi, *Japanese Restaurants to Call for More U.S. Beef Imports*, ASSOCIATED PRESS, Dec. 19, 2006.

31. GREG CRITSER, *FAT LAND* 4 (2003); Sam Roberts, *Fatter, Taller and Thirstier Americans*, N.Y. TIMES, Dec. 15, 2006, at A27.

32. MANNING, *supra* note 8, at 183.

33. CRITSER, *supra* note 31, at 4.

34. *Id.*

35. This is not the place for an extensive analysis of the emerging discipline of “fat studies” or fat rights. *See, e.g.*, Abby Ellin, *Big People on Campus*, N.Y. TIMES, Nov. 26, 2006, at D1 (discussing fat studies as a new area of interest on campuses nationwide). The article notes that the state of Michigan plus the cities of Santa Cruz, San Francisco and Washington D.C. have enacted laws making it illegal to discriminate on the basis of weight, and that at least one law professor, Sondra Solway at the New College of California School of Law, talks about weightism in her torts

The average American eats 23 pounds of pizza a year.³⁷ The U.S. is even fattening up its detainees in Guantanamo Bay with meals totaling 4,200 calories a day, instead of the recommended 2000-3000 calories.³⁸ On a recent drive from Kansas City, Missouri, to Lawrence, Kansas, I was struck by the number of “Beef: It’s What’s for Dinner” signs posted along the interstate. As Warren Belasco puts it, “Mindful that deep-seated food values can influence how we see the world, I am struck by how much of Anglo-American discussion of our future prospects has really been about our right and ability to eat meat, especially beef.”³⁹ Fatty meats from cattle fattened on corn in feedlots as opposed to fed on the range are a major factor in the seven hundred thousand annual deaths from heart disease in the United States.⁴⁰ And feedlot-fattened cows are about the worst ecological disaster in the world’s entire food cornucopia; it takes about seven pounds of grain to grow one pound of beef.⁴¹

Many believe the biggest culprit, both in terms of obesity and ecological agricultural practices, is HFCS.⁴² Unfortunately, this is another topic that this Article cannot delve into fully.

Doctor Arthur Agatston, the extremely popular author of the South Beach diet series of books, titled one chapter of his first book, “Is It Diabetes Yet?”⁴³ Obesity-related diseases currently cost the health care system approximately \$90 billion a year.⁴⁴ Diabetics

class. *Id.* I have the New York Times article in its original hardcopy, and in a bit of irony I note that a seven by thirteen inch Gucci advertisement on the same page features three bikini models who just might collectively tip the scales at, say, 315 pounds. *Id.* I also note that “weightism,” mentioned above, is not yet recognized as a word by Microsoft’s spell check feature, although it apparently passed muster with the Times’ editors.

36. We worry a great deal about anorexia and bulimia. *See generally* GREG CRITSER, *FAT LAND* 124–25 (2003) (discussing the obsession over anorexia). Anorexia gets a lot of attention despite the fact that there are 1.6 anorexics per 100,000 people (as opposed to 61,000 overweight people) because most anorexics are upper middle class, according to Cornell University’s Joan Jacobs Brumberg. *Id.* at 123.

37. Margaret McCormick, *But Isn’t Every Month Pizza Month?*, SYRACUSE POST STANDARD, Oct. 11, 2006, at E1 (commenting on October being designated as “Pizza Month”).

38. One detainee nearly doubled his weight and is now over 400 pounds. Of course we also short them on the other side of the equation and deny them sufficient exercise. Most detainees were underweight when captured, according to American weight charts, and have gained an average of 20 pounds. Michael Melia, *High-Calorie Diets Weigh Down Gitmo Detainees*, CHI. SUN-TIMES, Oct. 4, 2006, at A5.

39. BELASCO, *supra* note 10, at 3.

40. MANNING, *supra* note 8, at 136.

41. MANNING, *supra* note 14, at 7.

42. *See generally* Roberts, *supra* note 31 (noting Americans consumed twice as much high fructose corn syrup in 2004 than they did in 1980).

43. ARTHUR AGATSTON, *THE SOUTH BEACH DIET* 75 (2003).

44. POLLAN, *supra* note 2, at 101–02.

alone cost the system \$100 billion a year, equal to ten percent of all health care expenditures.⁴⁵ More than sixty-one percent of Type II diabetes cases can be attributed to being overweight.⁴⁶

In 1970 Americans spent \$6 billion on fast food; by 2000 that number had grown to \$110 billion.⁴⁷ Soft drink consumption has risen 400% in the past fifty years, some of it drunk out of baby bottles.⁴⁸

2. A Brief History of (Dinner) Time

The hominid evolutionary line diverged from that of the great apes about 7.5 million years ago,⁴⁹ and creatures we would call “human” have been on earth about 2.5 million years.⁵⁰ That date also marks the beginning of the Paleolithic or Old Stone Age, when the use of stone tools arose in Africa.⁵¹ By contrast, the Agricultural Revolution began about ten thousand years ago⁵² in several loci.⁵³ DNA evidence suggests that humans have changed less than 0.02% genetically over the last forty thousand years.⁵⁴ There is no proof of alcoholic beverage consumption in the Paleolithic era, but natural fermentation of honey (resulting in mead) or of berries (resulting in wines) would have been a possibility.⁵⁵ Beer- and wine-making began after the Agricultural Revolution, and hard liquor came onto the scene at about 800 A.D.⁵⁶ The “Green Revolution” came along in the 1970s, and with it plants that required more water, fertilizer, pesticides and agricultural implements.⁵⁷ HFCS was invented in 1971.⁵⁸

Why is this brief anthropological diversion important? Because it demonstrates that we are hardwired to do things that are

45. CRITSER, *supra* note 31, at 147.

46. *Id.* at 107.

47. MANNING, *supra* note 8, at 180.

48. *Id.* at 183.

49. This has been the generally accepted figure for some time.

50. LOREN CORDAIN, *THE PALEO DIET* 5 (2002).

51. *Id.* at 37.

52. However, a recent discovery in the Middle East may push the date back a bit. Evidence of 11,400 year old domesticated figs was found near the city of Jericho, Israel. The figs were a mutation that produced sweeter but sterile fruit and, thus, would have had to be propagated by ancient arborists, as reported in *Science*. John Noble Wilford, *On This Old McDonald's Farm, A First Hint of Agriculture: Figs*, N.Y. TIMES, June 2, 2006, at A10.

53. CORDAIN, *supra* note 51, at 5.

54. *Id.* at 9.

55. *Id.* at 94.

56. *Id.*

57. BELASCO, *supra* note 10, at 195.

58. CRITSER, *supra* note 31, at 10.

inappropriate in our current society. We are programmed to seek out sweets and fats and to eat as if preparing for the next famine. Thus, we are also hardwired to respond to industrial agriculture's relentless promotion of junk food.

B. *Gone is the Family Farm: How America Raises and Grows Its Food*

According to the General Accounting Office (GAO), there has been an incredible concentration of food supplies in the hands of a very few industrial agriculture concerns.⁵⁹ The GAO report indicated that eighty percent of America's beef is slaughtered by four firms, seventy-five percent of pre-cut salads are processed by two firms, and thirty percent of milk is processed by one firm.⁶⁰ Hundreds of small regional slaughterhouses have had to shut down because they are subject to the same expensive United States Department of Agriculture (USDA) regulations that govern slaughterhouses that process four hundred cattle per hour.⁶¹ The smaller slaughterhouses cannot comply without the economies of scale the mega-firms realize.⁶² According to author Michael Pollan, this is because the USDA operates on a "scale neutral" system, which imposes the same regulatory requirements on all slaughterhouses, regardless of size.⁶³ This is not a new trend; author Harvey Levenstein described how food safety regulations and other factors such as public demand, modes of financing, and changes in technology caused growth in the size of food businesses from 1890 to 1930.⁶⁴

Fish farming has often been touted as a solution to many problems; indeed, fish farming yields doubled between 1986 and 1996, mainly in the form of salmon and shrimp.⁶⁵ But when fish are farmed they have to be fed. Salmon have been trained to eat corn meal,⁶⁶ the same as feedlot cattle; take a close look at farmed salmon in the supermarket and you will note that these Frankenfish have been "color enhanced" because a cornmeal diet does not yield a salmon-colored fish without the aid of artificial coloring. Further,

59. Michael Pollan, *The Vegetable-Industrial Complex*, N.Y. TIMES MAG., Oct. 15, 2006, at 17.

60. *Id.*

61. *Id.*

62. *Id.*

63. *Id.*

64. Daniel Akst, *Big Farms Will Keep Spinach on the Table*, N.Y. TIMES, Oct. 15, 2006, at 3.4.

65. MANNING, *supra* note 8, at 117.

66. POLLAN, *supra* note 2, at 67.

with respect to the world's poor and food security, it takes three pounds of vegetable protein to produce one pound of salmon.

Hybrid corn consumes more fertilizer than any other crop.⁶⁷ It also takes about fifty gallons of oil to grow an acre of industrial corn.⁶⁸ As early as 1949, all American corn crop land was planted with hybrid seed.⁶⁹

Corn fed meat and fish are not as healthful as range-fed counterparts because they are higher in saturated fat.⁷⁰ They also have fewer of the healthful omega-3 fatty acids and more of the harmful omega-6 fatty acids.⁷¹

C. *The Farm Lobby: How America Regulates Agriculture*

According to one author, "The [United States Department of Agriculture] had two charges: expanding markets for farm products and attending to nutrition. These roles were at odds with each other. . . . Repeatedly, the USDA settled this conflict by ignoring nutrition."⁷² As Professor Abdalla puts it, "[t]he federal approach to addressing environmental problems attributable to animal agricultural [*sic*] has been largely piecemeal, decentralized and typically reactive."⁷³

For example, under the Clean Water Act,⁷⁴ a concentrated animal feeding operation (CAFO) does not need a permit to discharge waste into surface water unless it has more than one thousand "animal unit equivalents."⁷⁵ But by 1995 fewer than one third of the more than six thousand operations had gone through the permitting process.⁷⁶

67. *Id.* at 41.

68. *Id.* at 45.

69. See BELASCO, *supra* note 10, at 46 (referring specifically to corn belt acreage).

70. POLLAN, *supra* note 2, at 75.

71. *Id.*

72. MANNING, *supra* note 8, at 170–71.

73. Charles Abdalla, *The Industrialization of Agriculture: Implications for Public Concern and Environmental Consequences of Intensive Livestock Operations*, 10 PENN ST. ENVTL. L. REV. 175, 187 (2002).

74. Clean Water Act, 33 U.S.C. §§ 1251–1387 (2002).

75. Abdalla, *supra* note 73, at 187 (citing National Pollution Discharge Elimination System Permit Regulation and Effluent Limitations Guidelines and Standards for Concentrated Animal Feeding Operations, 66 Fed. Reg. 2960, 2962 (Jan. 12, 2001) (to be codified at 40 C.F.R. pts. 122 & 412)).

76. *Id.*

D. *Free Cheese: How America Subsidizes Agriculture*

Authors Greg Critser,⁷⁷ Michael Pollan,⁷⁸ and Warren Belasco⁷⁹ cast former Secretary of Agriculture Earl Butz as the lead villain in America's obesity epidemic.⁸⁰ Most remember Butz best for his racist, sexist, and otherwise offensive joke that cost him his job during the 1976 election.⁸¹ He should, however, be remembered for dramatically increasing corn production and international sales in the mid-1970s.⁸²

Before giving specific examples of how American agriculture is so heavily subsidized, I would like to briefly discuss some facts about agricultural subsidies. It is important to remember that as the number of family farms dwindles ever downward, subsidies do not support Mom and Pop, but rather industrial agriculture. Organizations as disparate as Oxfam and the Heritage Foundation have condemned American and Western farm subsidies, albeit for different reasons.⁸³ The Heritage Foundation report notes that twelve Fortune-500 companies received farm aid in 2001.⁸⁴ Individuals receiving farm aid included David Rockefeller, basketball star Scottie Pippen (for *not* growing crops), Ted Turner, and former Enron CEO Ken Lay.⁸⁵

There are multiple examples of how American agriculture is so heavily subsidized: Colorado is thought of as one of the great agricultural states, but somewhere in the neighborhood of three quarters of Colorado's farms would lose money if not for federal subsidies; Montana would have zero net farm income without

77. CRITSER, *supra* note 31, at 19 ("Butz had delivered . . . [a] new plentitude of cheap, abundant, and tasty calories . . .").

78. POLLAN, *supra* note 2, at 51 ("Butz . . . probably did more than any other single individual to orchestrate [the] plague of cheap corn.").

79. BLEASCO, *supra* note 10, at 53 ("Butz's infamous call on American farmers to plant 'from fencerow to fencerow' . . . eventually led to . . . fatter consumers.").

80. CRITSER, *supra* note 31, at 19; BLEASCO, *supra* note 10, at 53; POLLAN, *supra* note 2, at 51.

81. POLLAN, *supra* note 2, at 51.

82. *See id.* at 51–53 (discussing Butz's push for corn production).

83. *Compare* OXFAM, DUMPING WITHOUT BORDERS (2003), *available at* http://www.oxfam.org.uk/what_we_do/issues/trade/downloads/bp50_corn.pdf (criticizing U.S. subsidies for two reasons: (1) they destroy the livelihood of small farmers in developing countries, and (2) they go disproportionately to very large farmers rather than the small farmers that need them), *with* Brian M. Riedl & John E. Frydenlund, *At the Federal Trough: Farm Subsidies for the Rich and Famous*, THE HERITAGE SOCIETY BACKGROUND, Nov. 26, 2001, *available at* <http://www.heritage.org/Research/Agriculture/BG1505.cfm> (criticizing U.S. subsidies because they disproportionately benefit farmers who have large farms and high net worth).

84. Riedl, *supra* note 83.

85. *Id.*

subsidies; half of North Dakota's federal income tax dollars come back to the state in the form of farm subsidies, which go to only 9.5% of the state's population.⁸⁶

E. *The Biggest Polluter: How Industrial Agriculture Impacts our Environment*

Agriculture is the biggest source of water pollution in the United States.⁸⁷ Industrial agriculture produces more than a billion tons of manure a year.⁸⁸ Ironically, in the "good old days" of the family farm, manure was a bonus byproduct of raising cattle and was used to fertilize crops.⁸⁹ Now manure is a pollutant to be dealt with while crops are fertilized chemically.⁹⁰

There is no better example of the effects of agricultural water pollution than the "Dead Zone" of the Gulf of Mexico, which is caused by excessive nitrogen from farm fertilizer run-off in the Mississippi River.⁹¹ This zone where no fish or shrimp can live has now reached twenty thousand square kilometers.⁹² The reason so much nitrogen finds its way into the water system is that fifty percent or more of the nitrogen applied as fertilizer runs off.⁹³ But there is no reason for farmers to conserve or carefully husband nitrogen because government subsidies make nitrogen too cheap to worry about.⁹⁴

Water itself is being depleted at an alarming rate. The Colorado River no longer has any water left by the time it gets to the Sea of Cortez; this lack of water is responsible for the decline of marine life in the bay.⁹⁵ Americans use four hundred to six hundred liters of water per person per day, twice that of Europeans and more than anyone else in the world.⁹⁶

86. MANNING, *supra* note 8, at 127–28.

87. Christopher B. Connard, Note, *Sustaining Agriculture: An Examination of Current Legislation Promoting Sustainable Agriculture as an Alternative to Conventional Farming Practices*, 13 PENN ST. ENVTL. L. REV. 125, 125 (2004).

88. Pollan, *supra* note 59, at 18.

89. Abdalla, *supra* note 73, at 177 ("One of the more important developments related to animal agriculture is the trend toward increasing separation of crop and livestock production.").

90. *Id.*

91. MANNING, *supra* note 8, at 98–99.

92. *Id.* Manning states, "It is becoming clear that human-produced nitrogen, largely from fertilizers, is altering the conditions of life on the planet." *Id.* at 100.

93. *Id.* at 10.

94. *Id.* at 110.

95. *Id.* at 102.

96. Michael Specter, *The Last Drop: Confronting the Possibility of a Global Catastrophe*, NEW YORKER, Oct. 23, 2006, at 61.

Intensive agriculture also depletes soil. True topsoil takes centuries to form and can be washed into the ocean by careless or over-intensive agricultural practices in a day. Put simply, from a historical perspective “civilizations that abuse their soil eventually collapse.”⁹⁷

Oil consumption can manifest itself in some unusual ways. Because the average American weighs twenty-five pounds more today than he or she did in 1960, the impact on driving this extra weight around in our cars costs America \$2.2 billion a year in gasoline.⁹⁸ Remember when the space saver spare tire was introduced and touted as a gas saver? We have, pun intended, replaced one spare tire with another. The same effect is felt by airlines, where each additional pound of passenger weight requires 39 million additional gallons per year of jet fuel.⁹⁹

F. *What are We Really Exporting?*

Corn and other grain exports, and to an even greater extent beef and other meat exports, are really exports of fresh water, oil, and topsoil. The water component of this transfer is referred to as “virtual water.”¹⁰⁰ This concept cuts both ways: when you drink a cup of coffee you are consuming one hundred and forty liters of Columbian water.¹⁰¹

One fifth of America’s oil is used to produce and transport food.¹⁰² To put that in more manageable terms, one corn-fed steer will have indirectly consumed thirty-five gallons of oil before being slaughtered.¹⁰³

III. INTERNATIONAL PROBLEMS

According to the WHO, “The global epidemic of obesity is a reflection of the massive social, economic and cultural problems currently facing developing and newly industrialized countries, as well as the ethnic minorities and disadvantaged in developing countries.”¹⁰⁴ As noted above, obesity and undernutrition can co-exist

97. POLLAN, *supra* note 2, at 151 (citing JARED DIAMOND, *COLLAPSE: HOW SOCIETIES CHOOSE TO FAIL OR SUCCEED* 364–65 (Penguin Books 2005)).

98. Lindsey Tanner, *All That Weight You’re Hauling Around Costs You at Pump, Study Finds*, ORLANDO SENTINEL, Oct. 26, 2006, at A2.

99. *Id.*

100. Specter, *supra* note 96, at 70–71.

101. *Id.* at 71.

102. POLLAN, *supra* note 2, at 83.

103. *Id.* at 84.

104. WHO, *supra* note 17, at 4.

and there are many individuals in developing countries that are both obese and undernourished.¹⁰⁵ Obesity is growing even in sub-Saharan Africa.¹⁰⁶ According to a 1990 WHO study, forty-four percent of the women living in the Cape Peninsula, South Africa, were obese.¹⁰⁷

Here is a headline that is typical and could represent any day (although it happens to be from July 25, 2006): “Trade Talks Fail Over An Impasse On Farm Tariffs.”¹⁰⁸ Meanwhile, for every two malnourished people worldwide, there are three people who are overweight or obese.¹⁰⁹

A. Global Warming

As stated in the introduction, this Article assumes the truth of global warming.¹¹⁰ The relationship between agriculture and global warming is a two-way street. As much as one third of greenhouse gasses contributing to global warming are the result of agriculture and harvesting trees.¹¹¹ Agriculture, especially wasteful American-style agriculture, is a major contributor to global warming. “In terms of energy, U.S. agriculture is the least efficient in the world. . . . [I]f the entire world population were fed a U.S. diet and foodstuffs produced under conditions identical to those in the United States, total world oil reserves would run out in only thirteen years when used for agricultural purposes alone.”¹¹² Additionally, global warming and changing weather patterns, both in terms of temperatures and rainfall, will have a major impact on agriculture globally.¹¹³ Ironically, America may come up a winner. Two economists have looked at the effects of global warming from 2070 to

105. *Id.* at 16.

106. *Id.* at 20–21.

107. *Id.* at 21.

108. Tom Wright & Steven R. Weisman, *Trade Talks Fail Over an Impasse on Farm Tariffs*, N.Y. TIMES, July 25, 2006, at A1.

109. William Saletan, *Please Don't Feed the People*, WASH. POST, Sept. 17, 2006, at B2 (citing data from the World Health Organization and from the United Nations Food and Agriculture Organization).

110. See CRICHTON, *supra* note 22; Itzkoff, *supra* note 22, at 8 (reviewing NEXT, Crichton's latest polemic novel).

111. POLLAN, *supra* note 2, at 198.

112. ARTURO WARMAN, *CORN AND CAPITALISM: HOW A BOTANICAL BASTARD GREW TO GLOBAL DOMINATION* 194 (Nancy L. Westrate trans., Univ. of N.C. Press 2003) (1988) (citing David Pimentel & Marsha Pimentel, *Counting the Kilocalories*, *Ceres* 10, no. 5 (Sept.-Oct. 1977) at 17–21).

113. Stephen J. Dubner & Steven D. Levitt, *The Price of Climate Change: What Global Warming Might Do to Us*, N.Y. TIMES MAG., Nov. 5, 2006, at 26 (discussing an as yet unpublished paper by Oliver Deschenes, University of California Santa Barbara, and Michael Greenstone, Massachusetts Institute of Technology).

2099 and predicted that increases in temperature and rainfall will actually increase agricultural production in the United States, resulting in profit increases of four percent or \$1.3 billion.¹¹⁴ I am not a futurist, but one can certainly speculate that the American grain belt might expand northward into Canada, and, of course, that low-lying agricultural areas will be under water and useless.

Another problem likely to be caused by the weather pattern shifts of global warming will be that, even if there is no net decline in the amount of land suitable for agriculture, there will be shifts in the areas where specific crops can be grown¹¹⁵ based on changes in overall temperatures, shifts in rainfall patterns, and shifts in seasons.¹¹⁶ As a result, much indigenous knowledge of successful agricultural practices acquired over decades or centuries will no longer be valid. For example, as I pointed out in an earlier article,¹¹⁷ Mexico's indigenous farmers have been growing corn by traditional methods for thousands of years and have developed varieties suitable for Mexico's climate.¹¹⁸ With global warming, everything they have learned may become obsolete. Exacerbating this problem, indigenous farmers living on the margin are those least likely to have the resources to successfully adapt to the changes; for example, they would lack resources to construct irrigation systems that may be necessitated by climate change.

B. *Exporting Diabetes: The American Lifestyle Abroad*

The real problem to be faced in the longer term is not so much the American lifestyle, but rather the exportation of the American lifestyle, particularly to the two enormous population centers with the kind of growing economies that allow them to mimic America's conspicuous consumption: India and China. Coca-Cola is sold in over two hundred countries, and more than half of McDonalds' sales are outside the United States.¹¹⁹ McDonalds is in the process of adding

114. *Id.*

115. As Jared Diamond puts it, "global climate change is producing both winners and losers." JARED DIAMOND, *COLLAPSE: HOW SOCIETIES CHOOSE TO FAIL OR SUCCEED* 385 (Penguin Books 2005) (citing Australia, which already suffers agriculturally from poor soils and a lack of water, as a likely loser).

116. *Id.*

117. Keith Sealing, *Indigenous Peoples, Indigenous Farmers: NAFTA's Threat to Mexican Teosinte Farmers and What Can Be Done About It*, 18 AM. U. INT'L L. REV. 1383 (2003).

118. *Id.* at 1396.

119. Saletan, *supra* note 109.

two hundred and thirty restaurants in China by 2008.¹²⁰ As of October 17, 2006, America's population hit 300 million.¹²¹ India's population is over 1 billion and China's is 1.3 billion.¹²² Of those 1.3 billion Chinese, about 26 million are too heavy, and Chinese children are now twenty-eight times more likely to be overweight than they were twenty years ago.¹²³ In a not-unrelated development, Chinese animal fat intake has tripled in the same time frame.¹²⁴ At least 24 million acres of agricultural land in China is now polluted.¹²⁵ Many rivers are polluted, most drinking water is contaminated with bacteria, and excessive nitrogen is showing up in well water.¹²⁶

In the past twenty years, the number of people afflicted with diabetes has increased from 30 million to 230 million.¹²⁷ Once again, China and India are a problem. China now has 39 million people over the age of twenty with diabetes, the highest number of any country.¹²⁸ India is not far behind with about 30 million people with diabetes.¹²⁹ According to a report by the American Diabetes Association, the number of diabetics worldwide could grow to 350 million in twenty years.¹³⁰ Picture a worldwide group of diabetics more numerous than the population of the United States. Picture not only the human costs—currently three million deaths a year and an expected twenty-five percent rise in the death rate over the next decade, in addition to blindness, amputations, etc.—but also the health care costs of diabetes management. Of course, where health care is unavailable, diabetics may only live one year after onset.¹³¹

120. Derrick Z. Jackson, *Diabetes: the Silent Killer Among Us*, BOSTON GLOBE, Sept. 30, 2006 at A11.

121. At 7:46 a.m. to be precise. It took 39 years—from 1967 to 2006—to go from 200,000,000 to 300,000,000 and 52 years—from 1917 to 1967—to go from 100,000,000 to 200,000,000. *Pop: 300,000,000*, SYRACUSE POST STANDARD, Oct. 17, 2006, at A1. It took 139 years to hit 100,000,000. *Id.*

122. Central Intelligence Agency World Factbook, <https://www.cia.gov/library/publications/the-world-factbook/index.html> (last visited Sept. 18, 2007).

123. Saletan, *supra* note 109.

124. *Id.*

125. Thomas Friedman, Op-Ed, *Bring in the Green Cat*, N.Y. TIMES, Nov. 15, 2006, at A27.

126. *Id.*; see also Jim Yardley, Jake Hoover, & Lin Yang, *China's Path to Modernity, Mirrored in a Troubled River*, N.Y. TIMES, Nov. 19, 2006, at 11 (reporting that the Yellow River, the source of water for 140 million people and already one of the most polluted rivers in the world, is in danger of drying up).

127. Marc Santora, *Concern Grows Over Increase in Diabetes Around World*, N.Y. TIMES, June 11, 2006, at 1.27.

128. *Id.*

129. *Id.*

130. *Diabetes Cases Rise from 30 Million to 230 Million in 20 Years*, MEDICAL NEWS TODAY, June 11, 2006, available at <http://www.medicalnewstoday.com/articles/44967.php>.

131. Santora, *supra* note 126, at 1.27.

India demonstrates several of my points. Despite tremendous economic growth, “India’s share of malnourished children remains among the worst in the world,” with one in three children under the age of three clinically underweight.¹³² Yet India is a net exporter of grains and is suffering from “alarming levels of childhood obesity,” with numbers of nearly twenty percent overweight or obese.¹³³ In Dehli, teenage obesity has gone from sixteen percent to almost twenty-nine percent in the last two years.¹³⁴ India is simultaneously experiencing a dramatic increase in food prices caused by inflation in its rapidly growing economy.¹³⁵ One of the factors contributing to this increase in prices is the growing use of food crops to produce ethanol.¹³⁶

There is a clear correlation between increases in income and greater consumption of meat. As noted previously, it takes about seven pounds of grain to produce a single pound of beef,¹³⁷ and worse yet, 21.4 pounds of feed grain protein to produce one pound of beef protein.¹³⁸ As a result, there has been a worldwide shift from grain consumption by people to grain consumption by animals.¹³⁹ In 1900, ten percent of the world’s grain went to animals and ninety percent to people; by 1950 twenty percent of the world’s grain went to animals and eighty percent to people; and by 1990 forty-five percent of the world’s grain went to animals and fifty-five percent to people.¹⁴⁰ By contrast, as early as 1971, America fed almost eighty percent of its grain to animals.¹⁴¹ World meat production doubled between 1965 and 1985.¹⁴²

This switch to an American (or Western if you prefer) lifestyle is not something that has recently surfaced. As early as 1941, M. K.

132. Somini Sengupta, *India Prosperity Creates Paradox; Many Children Are Fat, Even More Are Famished*, N.Y. TIMES, Dec. 31, 2006, at 1.8 [hereinafter Sengupta, *India Prosperity Creates Paradox*]; see also Somini Sengupta, *Even Amid Its Wealth, India Finds, Half Its Small Children Are Malnourished*, N.Y. TIMES, Jan. 10, 2007, at A7 (noting that among children under three, nearly half are clinically underweight).

133. See Sengupta, *India Prosperity Creates Paradox*, *supra* note 132, at 1.8 (stating that India has long had a surplus of food grains).

134. *Id.*

135. Keith Bradsher, *India Finds Its Economy on the Verge of Overheating*, N.Y. TIMES, Feb. 10, 2007, at C1.

136. *Id.*

137. MANNING, *supra* note 14, at 7.

138. See BELASCO, *supra* note 10, at 4 (citing FRANCIS MOORE LAPPÉ, *DIET FOR A SMALL PLANET* (Random House 1971)).

139. *Id.*

140. See *id.* (citing VACLAV SMIL, *FEEDING THE WORLD: A CHALLENGE FOR THE TWENTY-FIRST CENTURY* (2000)).

141. See *id.* at 4 (citing FRANCIS MOORE LAPPÉ, *DIET FOR A SMALL PLANET* (Random House 1971)).

142. *Id.* at 55.

Bennett announced “Bennett’s Law,” which states that as countries become more industrialized, their populations eat more meat, dairy, and processed foods, and drink more alcohol.¹⁴³

C. American-Style Ecological Catastrophe Abroad

Only three percent of the planet’s water is even theoretically available to drink.¹⁴⁴ As noted above, Americans use four hundred to six hundred liters of water per person per day, twice that of Europeans and more than anyone else in the world; by comparison, many Indians get by on forty liters a day.¹⁴⁵ India, with twenty percent of the world’s population, has four percent of its water, and China has less water than Canada but forty times the number of people.¹⁴⁶ As Michael Specter points out, half the people in the world today don’t have the quality of water that was available to the citizens of ancient Rome two centuries ago.¹⁴⁷ Agriculture, consuming two-thirds of the world’s fresh water, is clearly a major part of the problem and any solution.¹⁴⁸

I discussed the “dead zone” in the Gulf of Mexico above. New United Nations research indicates that the number of such zones worldwide has increased by one-third over the last two years.¹⁴⁹ There are now about two hundred of these zones, where fertilizer runoff and other nutrient sources have led to algal blooms that starve fish and the plants they feed upon of oxygen.¹⁵⁰ New zones include the Mersey estuary in England, the Archipelago Sea in Finland, and the Pearl River estuary in China.¹⁵¹

As the world switches to America’s beefy lifestyle, it is important to realize that while it takes a thousand tons of water to grow a ton of grain, it takes fifteen thousand tons to grow a ton of beef—thirteen hundred gallons to grow one hamburger.¹⁵²

143. *Id.* at 12. Adam Drewnowski and Lester Brown have concurred. *Id.* (citing Adam Drewnowski, *Fat and Sugar in the Global Diet: Dietary Diversity in the Nutritional Transition*, in *FOOD IN GLOBAL HISTORY* (Raymond Grew ed., 1999) and LESTER R. BROWN, *WHO WILL FEED CHINA? WAKE-UP CALL FOR A SMALL PLANET* (W.W. Norton & Co. 1995)).

144. Most of it, of course, is in the ocean, but much of it is frozen in ice caps and glaciers or deep in rock. Specter, *supra* note 96, at 64.

145. *Id.* at 61.

146. *Id.* at 62.

147. *Id.* at 63.

148. *Id.*

149. Henry Fountain, *Observatory*, N.Y. TIMES, Oct. 24, 2006, at F3.

150. *Id.*

151. *Id.*

152. Specter, *supra* note 96, at 64.

D. *Exporting Oil, Water, and Topsoil: The True Costs of Agricultural Exports*

As detailed above,¹⁵³ agricultural exports represent exports not just of the agricultural products themselves, but also of oil, water, and topsoil. China, for example, has suffered erosion on nineteen percent of its land and is losing five billion tons of soil a year; it is suffering a net loss of crop land as demand for meat increases the strain on its agricultural system.¹⁵⁴

E. *David v. Goliath: Competing Against American Industrial Agriculture*

One author has claimed that “U.S. grain, free or otherwise, puts Third World farmers out of business.”¹⁵⁵ Subsidized American agricultural exports affect local farmers, especially indigenous farmers. I have previously explored this issue in the context of the North American Free Trade Agreement’s (NAFTA) impact on poor and indigenous corn farmers in Mexico.¹⁵⁶ The World Bank agrees with my analysis, predicting that NAFTA will displace three hundred thousand Mexican farmers, pushing them out of the farming business and marginalizing them into the already overcrowded cities.¹⁵⁷

F. *A Final Note: Agro-Terrorists and Frankenfoods?*

This final section looks briefly at two topics I do not have the space to explore in depth: (1) how American-style industrial agriculture lends itself to terrorist attacks, and (2) how GMOs and other modern marvels affect various points in the analysis above.

In 2004, the outgoing Director of the Department of Health and Human Services left with this parting shot: “For the life of me, I cannot understand why the terrorists have not attacked our food supply, because it is so easy to do.”¹⁵⁸ According to the GAO, this is because of the incredible concentration of food supplies in the hands of a very few industrial agriculture businesses.¹⁵⁹ The report indicated that eighty percent of America’s beef is slaughtered by four

153. See *supra* Part II.G (discussing what the U.S. is actually exporting).

154. DIAMOND, *supra* note 115, at 364–65.

155. MANNING, *supra* note 8, at 134.

156. Sealing, *supra* note 117, at 1383.

157. MANNING, *supra* note 8, at 133.

158. Pollan, *supra* note 59, at 18.

159. *Id.*

firms, seventy-five percent of pre-cut salads and processed by two firms, and thirty percent of milk is processed by one firm.¹⁶⁰

I have to admit that, like the Europeans, I am intrinsically nervous about GMOs, but I do not think that necessarily makes me a Luddite. Seldom discussed in the GMO debate is that the primary, if not exclusive, thrust of GMO research is achieving either greater productivity per acre or greater productivity per dollar of input, or both.¹⁶¹ The inevitable consequence is that those parties who, for whatever reason, don't participate in the GMO revolution are placed at a competitive disadvantage to the American GMO producers. In addition, a traditional farming method is to keep some of the seed from each year's crop for next year's planting, a method that is not without cost to the farmer, but which does not involve any expenditure of cash.¹⁶² But GMOs and hybrids destroy this cycle, and require the farmer to annually pay cash for seed at the start of every growing season.¹⁶³

IV. CONCLUSION

Organic agriculture is the fastest growing segment of agriculture despite a lack of federal subsidization.¹⁶⁴ Although I am not a vegetarian myself, I cannot help but note that much of what I have written above suggests that vegetarianism—or at least reduced meat consumption—would have a direct impact on global warming and food security.¹⁶⁵

160. *Id.* at 18–19.

161. Apparently, nobody is trying to make the food taste better.

162. Toward a Sustainable Agriculture, Module II, Introduction, http://www.cias.wisc.edu/curriculum/modII/sece/modii_sece.htm (last visited Sept. 24, 2007) (“Farmers traded some seeds and bought some in times of shortage or to gain new varieties, but most of the time they saved their own from the previous year's crop. This process resulted in an incredibly wide range of crop varieties in traditional agriculture.”).

163. MANNING, *supra* note 8, at 91 (“Because hybrid vigor does not pass to progeny, farmers could no longer save some of last year's crop to seed next year's.”).

164. *Id.* at 193.

165. See Meredith Knight, *The Other Greenhouse Gas: An Often Ignored Greenhouse Gas Makes Predicting Climate Even More Uncertain*, SCIENCELINE, Mar. 23, 2007, http://scienceline.org/2007/03/23/env_knight_ipccows/ (noting that methane gas is the second most significant greenhouse gas and cows are one of the greatest methane producers); NOAM MOHR, EARTHSAVE INT'L, A NEW GLOBAL WARMING STRATEGY: HOW ENVIRONMENTALISTS ARE OVERLOOKING VEGETARIANISM AS THE MOST EFFECTIVE TOOL AGAINST CLIMATE CHANGE IN OUR LIFETIME (2005) (noting that the average American diet produces one and one-half tons more greenhouse gasses per year than a vegan diet); Sierra Club—Atlantic Chapter, Biodiversity and Vegetarian Outreach Committee, www.newyork.sierraclub.org/conservation/biodiversity/biodiversity.html (last visited Sept. 18, 2007) (listing vegan recipes).

On an optimistic note, there is a growing interest in the concept of eating foods grown close to home, even if they cost more.¹⁶⁶ The United States uses less water today than it did twenty-five years ago.¹⁶⁷ It now takes 1.6 gallons of water instead of 6.0 gallons to flush a toilet.¹⁶⁸

There are always unexpected positive consequences, and global climate change generates no exceptions. Two economists have looked at the effects of global warming from 2070 to 2099 and predicted that increases in temperature and rainfall will actually increase agricultural production in the United States, resulting in profit increases of four percent or \$1.3 billion.¹⁶⁹ Even Starbucks, the world's largest seller of coffee and an icon of American cultural imperialism, is removing trans-fats from its muffins and other treats.¹⁷⁰

At the risk of sounding partisan, the new Democratically-controlled Congress and the new Democratic President in 2008 (unless the Democrats bungle the election very badly) are likely to take global warming more seriously.¹⁷¹ This is an important step because global warming will have a major impact on farm production throughout the world, and particularly in developing countries and among indigenous farmers.

166. Kim Severson, *Why Roots Matter More*, N.Y. TIMES, Nov. 15, 2006, at G1.

167. Specter, *supra* note 96, at 69.

168. *Id.* at 70.

169. See Dubner & Levitt, *supra* note 113 (quoting an as yet unpublished paper by Oliver Deschenes, University of California Santa Barbara, and Michael Greenstone, Massachusetts Institute of Technology).

170. Curt Woodward, *Starbucks Starts Cutting Trans Fats Pastries in Half of U.S. Stores Targeted*, PITTSBURGH POST-GAZETTE, Jan. 3, 2007, at A2.

171. See Felicity Barringer & Andrew C. Revkin, *Measures on Global Warming Move to Spotlight in New Congress*, N.Y. TIMES, Jan. 18, 2007, at A1 (predicting that Democrat-initiated legislation on greenhouse gas emissions has a good chance of passage).