The Case for a Global Treaty on Soil Conservation, Sustainable Farming, and the Preservation of Agrarian Culture

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Soil is the foundation of life, yet the international community has all but ignored it in conservation efforts and legal reforms. Right under our feet we are losing topsoil at rates that far outpace nature's ability to keep up. Erosion, salinization, desertification, nutrient depletion, contamination—these and other threats have conspired to take away the land that feeds us. But they have done so largely at our own command. Like most environmental crises, human decisions have played a critical role in the degradation of Earth's soils.

To remedy this situation—or at least generate change that moves us in the right direction—I argue that we need a new global treaty specifically designed to address the soil crisis. After explaining the nature of the threat and its causes, I canvass the social and legal responses that have been launched to address the problem. Through this discussion, we see that the international community has failed to meet the soil crisis with the construction of an adequate legal regime.

As an extension of this failure, the international community has also failed to recognize the other problem that comes along with land degradation: cultural erosion. As we convert valuable farmland to urban sprawl and lose fertile spaces to expanding deserts, we also witness the loss of small-scale farming and the communities it supports. I reveal the link between these two crises by emphasizing a common cause: the rise of industrial agriculture. With its emphasis on short-term profit margins, mechanization, product specialization, division of labor and capital, and economies of scale, industrial agriculture profits at the expense of ecology and rural communities. To save our soils and the communities that work them, I argue that a global treaty addressing soils should also address agrarian culture and—in the way of

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responding to both issues—should implement reforms in support of sustainable farming.

INTRODUCTION

The earth beneath our feet has a tough lot in life. We ask it to feed us, to support our buildings and roads, and to filter our water, but we treat it like, well, dirt.

The story of the human race is the story of soil. As we unlocked the secrets of agriculture, we were able to build grand civilizations.[1] Surplus food allowed us to spend time pursuing other endeavors—the arts, science and medicine, philosophy, and higher forms of government.[2] There was a time when we respected the farmer and the land he worked for all they brought us. It seems that time may be behind us. Although the need for soil conservation and sustainable agriculture is more pressing than ever, these concerns have largely failed to capture the public's attention. They have certainly failed to generate the kind of national and international legislation that has sprung forth from the threats of climate change, water shortage, air pollution, and disappearance of species.[3]

But soil loss is a serious matter. A single inch of topsoil[4] may take anywhere from half a century to several thousand years to form.[5] Stripped of its natural cover and worked carelessly, this same inch of topsoil can be lost to erosion in less than twenty-five years.[6] Though one would imagine this reality would prompt responsible stewardship, we are in fact using and abusing our soils with reckless abandon (e.g., salinization through careless irrigation, nutrient depletion and biodiversity loss through monoculture, and the conversion of valuable farmland to urban sprawl). Despite the very real fact that soil is a nonrenewable natural resource, "[e]ach year an additional 20 million hectares of agricultural land either becomes too degraded for crop production or becomes lost to urban sprawl."[7] Overall, humans have subjected an area the size of the United States and Canada combined to some degree of

1. *See* TIM PALMER, THE HEART OF AMERICA 98 (1999) ("Anthropologists . . . credit grasslands on the plains and mountainsides of the Old World as the birthplace of agriculture and civilization.").

2. BRIAN BRETT, TRAUMA FARM: A REBEL HISTORY OF RURAL LIFE 154–55 (2009).

3. *See* Alfred E. Hartemink & Alex McBratney, *A Soil Science Renaissance*, 148 GEODERMA 123, 127 (2008).

4. Topsoil is defined as "surface soil usually including the organic layer in which plants have most of their roots and which the farmer turns over in plowing." MERRIAM-WEBSTER'S COLLEGIATE DICTIONARY (10th ed. 1998).

5. Peter M. Lacy, Note, *Our Sedimentation Boxes Runneth Over: Public Lands Soil Law as the Missing Link in Holistic Natural Resource Protection*, 31 ENVTL. L. 433, 437 (2001); *see also* Alexandra M. Wyatt, Note, *The Dirt on International Environmental Law Regarding Soils: Is the Existing Regime Adequate?*, 19 DUKE ENVTL. L. & POL'Y F. 165, 172 (2008) ("Formation of soil is slow and complex. An inch of soil can take centuries or even millennia to form, depending on the location and conditions.").

6. ANTHONY TOBY O'GEEN & LAWRENCE J. SCHWANKL, UNDERSTANDING SOIL EROSION IN IRRIGATED AGRICULTURE 4 (2006), *available at* http://anrcatalog.ucdavis.edu/pdf/8196.pdf.

7. U.N. ENV'T PROGRAMME, UNEP'S STRATEGY ON LAND USE MANAGEMENT & SOIL CONSERVATION 9–11 (2004) [hereinafter "UNEP'S STRATEGY"], *available at* http://www.unep.org/pdf/UNEP-strategy-land-soil-03-2004.pdf (quoting KOFI A. ANNAN, WE, THE PEOPLES: THE ROLE OF THE UNITED NATIONS IN THE TWENTY-FIRST CENTURY 61 (2000)); *see also* O'GEEN & SCHWANKL, *supra* note 6, at 4 ("In all instances, we must consider soil to be a non-renewable resource.").

soil degradation.[8] Some of these lands can be restored (though only through much effort over a long period of time), but many of them are ruined forever.[9]

Physical erosion is not the only danger. As we convert our agriculturally rich lands to suburbs and concentrate food production and distribution in the hands of big business, we also erode the family farm and the culture that comes with it. Far too often the conversation about soil conservation and sustainable agriculture ignores the human element. Or, if the conversation takes this element into account, it only does so in the way of fears of a starving planet. Food security is certainly a major concern—one that must be addressed in any analysis of soil and agricultural policy—but *how* we feed the global population is equally important. If we are content to call small-scale farming a thing of the past, then we should continue on course. But if we believe that the *campesino* way of life matters—that it is too rich in tradition, history, and ongoing contributions to simply shelve away for good—then we should take a second look.[10] When we do so, we find that preserving rural culture is in fact a key component to promoting sustainable agricultural and healthy soils. To put it differently, sustainability involves not just an ecological component but also a cultural component.

In this Article, I argue that the value of soil, sustainable farming, and agrarian culture, and the threats they face merit protection through a global treaty. Though the issues of soil conservation and sustainable agriculture may be treated separately, they are so closely bound that it makes more sense to approach them as one. We cannot save our soils without significant reforms to global agricultural practices. And while we might be able to achieve ecologically sustainable agriculture, including responsible use of soil, without preserving the *campesino* way of life, the result would offend notions of economic and cultural justice. To achieve this truly holistic goal—global soil practices that foster ecologically sound agriculture and recognize the value of the small-scale farmer—we need a new legal regime. Comprehensive enough to recognize the complexities of the issue, yet specific enough to usher in real change, this treaty would demand practices consistent with soil conservation, responsible farming, and preserving agrarian culture. In the absence of binding international law, individual states lack both the power and the incentives to make these changes.[11]

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8. UNEP'S STRATEGY, *supra* note 7, at 9–10.

9. This is especially true in the case of urban sprawl. *See* RICHARD K. OLSON & THOMAS A. LYSON, UNDER THE BLADE: THE CONVERSION OF AGRICULTURAL LANDSCAPES 3–5 (1999).

10. "Campesino" is a Spanish word meaning "peasant" or "farmer." *See* MARIA L. LAGOS, AUTONOMY AND POWER: THE DYNAMICS OF CLASS AND CULTURE IN RURAL BOLIVIA 181 (1994). Throughout this paper, I use the word *campesino* as shorthand for family farmers and other members of traditional rural communities.

11. One of the main reasons for this, discussed below, is the presence of negative externalities in industrial agriculture. For the most part, the global food market fails to reflect the social and environmental costs imposed by factory farming. *See* Jill Hobbs, *Incentives for the Adoption of Good Agricultural Practices*, FOOD AND AGRICULTURAL ORGANIZATION OF THE UNITED NATIONS 5 (2007),

To show why such a treaty is necessary, I devote Part I to explaining the physical functions of soil and the benefits that inhere when our soils are healthy and abundant. These functions and benefits include food security and food sovereignty; a clean water supply; biodiversity; buttressing the gains made through other, nonsoil conservation efforts; ensuring that agricultural activity is not pushed onto marginal lands; mitigation of climate change through storage of carbon dioxide; and aesthetic value.

Having established the more obvious benefits of healthy and plentiful soils, I turn in Part II to the more nuanced topic of agrarian culture. I use Part II to explain the value of family farms from a cultural, ecological, and economic perspective. I show the connections between the continued existence of the family farm and agrarian culture on the one hand and sound soil and agricultural policy on the other. Exploring these connections, I identify a symbiotic relationship between rural culture, the preservation of the small farm, promotion of sustainable agriculture, and conservation of global soils.

With an appreciation for the functions of soil and the value of agrarian culture and their mutually beneficial relationship, I turn in Part III to the threats they face. Here, the connection between agrarian cultural and soil conservation becomes all the more obvious. With few exceptions, a threat to the family farm is a threat to the soil, and vice versa. Industrial agriculture and the short-sighted practices that accompany it—"free" trade, erosion, salinization, contamination, nutrient depletion, urban sprawl, and other threats—are discussed in detail, leaving the reader with the unfortunately accurate impression that the situation is indeed serious.

In Part IV, I turn to the task of problem solving. I argue that the indispensable role of soil and the critical status of the world's agrarian communities demand international attention. After canvassing current laws, including a review of their benefits and their shortcomings, I offer a basic sketch of a new treaty. Although a nonbinding resolution or declaration could embody the main points of the treaty, binding law is needed to effect real change.[12] A nonbinding resolution may be a reasonable first step, but it cannot be the endpoint.

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available at http://www.fao.org/prods/gap/Docs/PDF/3-IncentiveAdoptionGoodAgrEXTERNAL.pdf. Following the market, nation-states hesitate to impose stricter rules that would, at least in the short term, render them less competitive. A classic example is the "race to the bottom" that has been witnessed in the area of labor law and environmental regulations as corporations seek out the nations offering the cheapest cost of business. *See* ALAN TONELSON, THE RACE TO THE BOTTOM: WHY A WORLDWIDE WORKER SURPLUS AND UNCONTROLLED FREE TRADE ARE SINKING AMERICAN LIVING STANDARDS 70 (2000) ("Why bother with unions, regulations, and other hassles of doing business in the industrialized world if you can get low pay and high productivity without them in the third world? Why, in other words, not race to the bottom even faster?").

12. DONALD K. ANTON & DINAH L. SHELTON, ENVIRONMENTAL PROTECTION AND HUMAN RIGHTS 869 (2011) (explaining that soft law often "amounts to ineffectual hortatory declarations") (internal quotation marks omitted).

Finally, in Part V, I address the barriers to a global treaty. From soil's low international profile to the prejudice against rural causes, the obstacles standing in the way of change are substantial. These forces notwithstanding, I conclude that a global treaty is not only feasible, but that it would be hailed as a great victory by the overwhelming majority of the world's population.

I. THE IMPORTANCE OF ABUNDANT AND HEALTHY SOIL

Soil must surely rank as the most underappreciated natural resource.[13] We marvel at the oceans,[14] write odes to our rivers,[15] obtain gas and minerals not easily retrievable,[16] organize global campaigns to curb the destruction of rainforest,[17] and enact strict legislation to protect endangered species.[18] At best, we view soil as little more than a vehicle for crop production. In so doing, we fail to appreciate one of the world's true natural treasures.

13. *See* Tim Radford, *Soil Erosion as Big a Problem as Global Warming, Say Scientists*, GUARDIAN, Feb. 14, 2004, http://www.guardian.co.uk/world/2004/feb/14/science.environment (explaining that "the media focuse[s] on fossil fuel problems, climate change, biodiversity, logging and forest fires, but not on the soil because it [i]s less spectacular"); Lacy, *supra* note 5, at 433 ("For a variety of reasons—perhaps because the soil resource is less glamorous than endangered species, less conspicuous than toxically polluted waters or clearcut forests, or less politically divisive than 'cowburnt' rangelands—it has never received the same degree of political or grassroots attention as other natural resources and land uses.").

14. *See, e.g.*, H.P. LOVECRAFT, *The White Ship*, *in* WAKING UP SCREAMING: HAUNTING TALES OF TERROR 224 (2003) ("But more wonderful than the lore of old men and the lore of books is the secret lore of the ocean."); John F. Kennedy, Remarks in Newport, R.I. at a Dinner for America's Cup Crews (Sept. 14, 1962), *available at* http://www.jfklibrary.org/Research/Ready-Reference/JFK-Quotations.aspx ("We are tied to the ocean. And when we go back to the sea, whether it is to sail or to watch—we are going back from whence we came.").

15. From the Kabul (for example, Rudyard Kipling's "Ford O' Kabul River") to the Columbia (for example, Woodie Guthrie's "Roll On, Columbia, Roll On") rivers have inspired poets and songwriters the world over. For me, some of the most memorable lines on moving water come from Langston Hughes. *See* LANGSTON HUGHES, *The Negro Speaks of Rivers*, *in* THE COLLECTED POEMS OF LANGSTON HUGHES 23 (Arnold Rampersao & David Roessel, eds., 1994) ("I've known rivers: I've known rivers ancient as the world and older than the flow of human blood in human veins. My soul has grown deep like the rivers.").

16. The Alaska Pipeline crosses three mountain ranges and over 800 rivers and streams in its 800-mile journey from Prudhoe Bay to Valdez. *Pipeline Facts*, ALYESKA PIPELINE SERVICE GROUP, http://www.alyeska-pipe.com/pipelinefacts.html (last visited July 6, 2011). And, in 2005, nearly 6,000 coal miners lost their lives in industrial accidents in China alone. *Deconstructing Deadly Details from China's Coal Mine Safety Statistics*, CHINA LABOR BULLETIN, Jan. 6, 2006, http://www.clb.org.hk/en/node/19316 (last visited July 6, 2011). These are but a few examples of the incredible sacrifices we make to obtain gas and minerals.

17. *See, e.g.*, The Rainforest Alliance, http://www.rainforest-alliance.org/ (last visited Aug. 25, 2011).

18. Endangered Species Act, 16 U.S.C. §§ 1531–1544 (2006) (requiring federal agencies to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or destroy critical habitat).

A. Understanding Soil: The Basics

Soil is a complicated substance. As with the ocean, we are just beginning to understand the intricacy that lies hidden beneath the surface.[19] Depending as soil does upon numerous variables—parent material, topography, and climate ranking chief among them—experts have identified over 19,000 "soil series."[20] A handful of dirt also can contain more organisms than the world has people.[21] Simply put, soil is "one of the most diverse habitats on earth."[22]

But how exactly is soil formed? Dr. Hans Jenny's formula may provide the best explanation: soil is a function of climate, organisms, topography, parent material, and time.[23] The identity of these factors varies dramatically from place to place, producing an almost limitless variety of soil permutations. When we add human activity to the list, the universe of soil conditions expands even further. An alpine meadow in the Cascades—child of basalt, mountain hemlock, and massive amounts of rain—will have very different characteristics than the soil anchoring a Nebraska cornfield.[24] Some soils are fine grained, while others are coarse grained.[25] Some are full of organic material, while some are little more than pulverized rock. Some soils—like those of the Amazon rainforest—appear to be rich in nutrients but actually lack them due to rapid uptake by plants and leaching.[26] In the desert, the topsoil is often thin, lacking organic material, and highly susceptible to erosion.[27] And of course

19. Actually, we may know even less about soil than we do the ocean. *See* Beth Py-Lieberman, *A New Exhibition Gets All the Dirt on Soil*, AROUND THE MALL (July 31, 2008), http://blogs.smithsonianmag.com/aroundthemall/2008/07/a-new-exhibition-gets-all-the-dirt-on-soil/ ("After all, who knew that it takes 500 years to create just one inch of topsoil, or that a handful of soil contains more organisms than there are people on this Earth, or that scientists know even less about soil than they do about the world's oceans . . ."). And that's saying something—according to experts, we know more about space than we do our own oceans. *See, e.g.*, Frank Pope, *Forget Space Travel, the Ocean Is Our Final Frontier*, TIMES (London), July 30, 2008, *available at* http://www.cambridge.org/servlet/file/store6/item6511651/version1/9780521739917_excerpt2.pdf.

20. NATURAL RESOURCE CONSERVATION SERVICE, SOIL TAXONOMY: A BASIC SYSTEM OF SOIL CLASSIFICATION FOR MAKING AND INTERPRETING SOIL SURVEYS 119–24 (2d ed. 1999).

21. Py-Lieberman, *supra* note 19.

22. *Soil Biodiversity Portal: Conservation and Management of Soil Biodiversity and Its Role in Sustainable Agriculture*, FOOD & AGRIC. ORG. OF THE UNITED NATIONS, http://www.fao.org/ag/AGL/agll/soilbiod/fao.stm (last updated Nov. 3, 2003) (citations omitted).

23. HANS JENNY, FACTORS OF SOIL FORMATION 15–17 (1941).

24. *Compare Cascade Ecological Province*, ECOLOGICAL PROVINCES OF OR., http://oregonstate.edu/dept/range/sites/default/files/EcologicalProvincesOfOregon/cascade.htm (last visited Aug. 25, 2011), *with Holdredge Soil, Nebraska's State Soil*, UNIVERSITY OF NEB.–LINCOLN SCH. OF NATURAL RES., http://snr.unl.edu/data/publications/HoldregeSoil.asp (last visited Aug. 25, 2011).

25. *See* S. ELLIS & A. MELLOR, SOILS AND ENVIRONMENT 36 (1995).

26. *Tropical Soils*, RAINFOREST CONSERVATION FUND, http://www.rainforestconservation.org/rainforest-primer/rainforest-primer-table-of-contents/l-tropical-soils (last visited Jan. 22, 2012).

27. NATHANIEL HARRIS, ATLAS OF THE WORLD'S DESERTS 44 (2003).

some soils are more suited to crop production, while others lack the nutrients and water to grow much more than sagebrush.[28]

Soil, in any form, is comprised of several layers or "horizons."[29] These include the O horizon (organic top layer), the A horizon (surface mineral-organic mix, or "topsoil"), the E horizon (a mineral horizon, generally lighter in color, in which the main feature is leaching of silicate clay, iron, aluminum, or some combination of these, leaving a concentration of sand and silt particles), the B horizon (subsoil), the C horizon (weathered rock), and finally the R horizon (underlying bedrock).[30]

I discuss the various physical, economic, and social functions of soil in more detail below, but for now I point out the following summary from the United States Department of Agriculture: soil regulates water, sustains plant and animal life, filters potential pollutants, cycles nutrients, and provides support for structures.[31] As I explain below, this list of soil functions is far from comprehensive.

B. Food Security and Food Sovereignty

The most obvious function of soil is food production. All plants need soil to grow, with only a few exceptions, and animals in turn owe their existence to plant life.[32] Therefore, almost every organism—whether a blade of grass or a modern city dweller—requires soil to feed itself. However, around the world, the lack of healthy and abundant soils presents concerns over security and sovereignty.

Food security is the degree to which a person or nation has access to food,[33] and is "directly related to the ability of land to support its populations."[34] Advances in agriculture and technology have gone a long way

28. *See* S. ELLIS & A. MELLOR, *supra* note 25, at 211–16 (describing various soil types and their suitability for agriculture); STUART CHASE, RICH LAND, POOR LAND: A STUDY OF WASTE IN THE NATURAL RESOURCES OF AMERICA 14 (1936) (discussing rainfall in "sagebrush country").

29. *Id.* at 1.

30. *Master Horizons and Layers*, USDA SOIL SURVEY MANUAL (1993), *available at* http://soils.usda.gov/technical/manual/contents/chapter3.html.

31. *Soil Quality Concepts*, USDA NATURAL RES. CONSERVATION SERV., *available at* http://soils.usda.gov/sqi/concepts/concepts.html.

32. *See* ROSE ANNE DEVLIN & R. QUENTIN GRAFTON, ECONOMIC RIGHTS AND ENVIRONMENTAL WRONGS: PROPERTY RIGHTS FOR THE COMMON GOOD 4 (1999) ("The crops which feed us, or the animals we husband, all require soils. . . . . Without soil, life as we know it would not exist."); *cf.* NICHOLAS POLUNIN, INTRODUCTION TO PLANT GEOGRAPHY AND SOME RELATED SCIENCES 32 (1960) (discussing aquatic algae that "do not need (or have) roots").

33. The World Health Organization has provided a more comprehensive definition, stating that food security exists "when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life." *Food Security*, WORLD HEALTH ORG., http://www.who.int/trade/glossary/story028/en/ (last visited Oct. 31, 2011).

34. HANS VAN GINKEL ET AL., HUMAN DEVELOPMENT AND THE ENVIRONMENT: CHALLENGES FOR THE UNITED NATIONS IN THE NEW MILLENNIUM 246 (2002).

to pump more production out of each cultivated acre,[35] but at some point that will not be enough. In many parts of the world, that is already the case. Many of us read with horror the tales of the devastating famine that struck the Horn of Africa in the summer of 2011.[36] That was not an isolated event. In Madagascar, nearly 50 percent of citizens suffer from chronic malnutrition.[37] The situation is equally grim all across sub-Saharan Africa and the Indian Subcontinent.[38] From where I write in Bolivia, over half of all municipalities have a "high" or "very high" vulnerability to food insecurity.[39] Meanwhile, the country lost 100,000 hectares of cultivated land in agricultural year 2009–10.[40] World hunger is far from defeated—in fact, it has worsened in recent years[41]—and the situation is not likely to improve. "Current estimates predict that food production in the developing world will have to double in the next 30 years to meet the needs of growing populations."[42]

Even in the "developed" world, food supplies are not secure. For the last thirty years "evidence has been mounting that hunger and food insecurity remain critical global issues, not just in the countries of the South but also in the advanced welfare states of the North, such as Australia, Canada, New Zealand, the United Kingdom, and the United States."[43]

Where do we go to find this food? That is where soil becomes critical. Without sufficient quantities of fertile land, we lack the ability to keep up with a growing population. Enter "peak soil." Borrowing from the petroleum-based concept ("peak oil"), the term "peak soil" describes the situation where global food production "peaks"—with no more room to grow—but our food needs continue to climb.[44] This scenario is not as far fetched as it seems. With the global population predicted to hit 9.5 billion by 2050, we will have to produce

35. John Ikerd, Sustaining Rural Communities Through Rural Agriculture, Presented at Southern Rural Sociology Association Annual Meeting, Fort Worth, TX (Jan. 29, 2001), *available at* http://web.missouri.edu/~ikerdj/papers/SustainableCommunities.htm.

36. *See Famine Stricken African Horn: On the Threshold of Catastrophe*, NAT'L TURK, Aug. 11, 2011, *available at* http://www.nationalturk.com/en/famine-ridden-african-horn-on-the-threshold-of-catastrophe-13406.

37. Scott Baldouf, *Hunger and Food Security: Is Africa Selling the Farm?*, CHRISTIAN SCI. MONITOR, Feb. 7, 2011.

38. Lester R. Brown, *Rethinking Food Production for a World of Eight Billion*, HUNGER NOTES, July 22, 2009, http://www.worldhunger.org/articles/09/editorials/brown.htm.

39. PROGRAMA DE LAS NACIONES UNIDAS PARA EL DESARROLLO [UNITED NATIONS DEVELOPMENT PROGRAM], TRAS LAS HUELLAS DEL CAMBIO CLIMACTICO EN BOLIVIA [IN THE FOOTSTEPS OF CLIMATE CHANGE IN BOLIVIA] 63 (2011).

40. Editorial, *Creciente Inseguridad Alimentaria,* LOS TIEMPOS, Aug. 8, 2011, at A9.

41. *See* Brown, *supra* note 38 ("While hunger has been disappearing in China, it has been spreading throughout much of the developing world, notably sub-Saharan Africa and parts of the Indian subcontinent. As a result, the number of people in developing countries who are hungry has increased from a recent historical low of 800 million in 1996 to over 1 billion today.").

42. VAN GINKEL ET AL., *supra* note 34, at 246.

43. MUSTAFA KOC ET AL., FOR HUNGER PROOF CITIES: SUSTAINABLE URBAN FOOD SYSTEMS 204 (1999).

44. *See* Mathew Wilder, *Peak Soil: It's Like Peak Oil, Only Worse*, PEAK GENERATION (May 12, 2010) http://peakgeneration.blogspot.com/2010/05/peak-soil-its-like-peak-oil-only-worse.html.

more food within the next half-century than during the last 10,000 years combined.[45] In many parts of the world, obtaining food "will become a crisis of rapidly growing proportions."[46]

But, even assuming we can achieve global food security, there is still the issue of food sovereignty. The concept of food sovereignty arises from the distinction between (1) a nation having the ability to feed its people through whatever means and (2) a nation being able to feed its people using its *own* resources. There is a general notion that every nation should be able to feed itself; even if it chooses not to do so, a country that can feed its own people when pressed will also have the wherewithal to act with a greater degree of independence on the world stage.[47] A state that cannot meet the rudimentary needs of its people—physical security, basic goods and services, and nourishment—is subject to bullying and coercion from abroad.[48]

Some nations suffer from a lack of food security and food sovereignty. Returning to the topic of Madagascar, then-President Marc Ravalomanana was ousted in 2009 when he tried to lease nearly half the country's arable land to the South Korean company Daewoo for a term of ninety-nine years.[49] Despite the fact that half the population was suffering from chronic malnutrition, the government was prepared to trade its land for six billion dollars.[50] While not an entirely irrational plan, it is disturbing that a starving nation would trade away the very soil that grows its food. Viewed from another angle, this incident shows how desperate wealthier nations are for arable land. There is just not enough of it to go around.

More than just a concern for national governments, food sovereignty is also important at the community, family, and individual levels. In calling for a shift in the way we think about food—from a tradable and sellable commodity to a public good—advocates recognize that "the core of food sovereignty is reclaiming public decision-making power in the food system."[51] It is not enough that a nation or community has sufficient food; the people must control

45. *See* Stephen Leahy, *Peak Soil: The Silent Global Crisis*, EARTH ISLAND J., Spring 2008, *available at* http://www.earthisland.org/journal/index.php/eij/article/peak_soil/.

46. *Id.* (quoting Andres Arnalds, assistant director of the Icelandic Soil Conservation Service) (internal quotation marks omitted).

47. *See, e.g.*, George Kent, *Trade Successes and Human Rights Failures*, UN CHRONICLE, Vol. 43, Issue 3, P. 30, 31 (2006) (discussing the impact of NAFTA on Mexican sovereignty, while declaring that "[a]n essential component of national sovereignty is food sovereignty").

48. I am not suggesting that self-sufficiency is to be lauded in all of its possible applications. North Korea, for instance, has pursued a policy of self-sufficiency and isolation to rather destructive ends. *See, e.g.*, *New Report from Food First: Famine and the Future of Food Security in North Korea*, FOOD FIRST INST. FOR FOOD AND DEV. POL'Y (May 2, 2005), http://www.foodfirst.org/node/1222. Food sovereignty and can enable some degree of political independence, but it is then up to the state to use that independence in a responsible manner.

49. Baldouf, *supra* note 37.

50. *Id.*

51. PEOPLE'S FOOD POLICY PROJECT, RESETTING THE TABLE: A PEOPLE'S FOOD POLICY FOR CANADA 9 (2011).

how the need for food is met. "The language of food sovereignty, as opposed to food security, is explicit about food citizenship: it emphasizes that people must have a say in how their food is produced and where it comes from."[52]

Concern with food sovereignty is not a fad. Although the term itself was coined in recent years by global peasant movements,[53] the idea of food sovereignty, at least at the individual level, can be traced back to Thomas Jefferson.[54] The ability to feed oneself is key to independence; if you can feed yourself, you have the power to say "no." As the concept of food sovereignty has gained currency in recent years—spurred on by the commoditization of food in the global economy—it has found its way into constitutions and national legislation.[55] Bolivia, Ecuador, Mali, Nepal, Nicaragua, Senegal, Uruguay, and Venezuela have all deemed the issue important enough to merit legal reference.[56]

C. The Soil-Water Relationship

Water isn't itself without soil, and soil cannot support life in the absence of water. Soil is nature's water filter,[57] cleansing it of toxins that would otherwise pose serious health threats. Aquifers, one of the most important sources of potable water, only function as a source of potable water by virtue of soil's filtering properties.[58] In addition, the sponge-like properties of many

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52. *Id.*

53. *Id.*

54. Jefferson was particularly concerned about food sovereignty at the individual level. He viewed self-sufficiency as critical to independence and virtue:

> Those who labor in the earth are the chosen people of God, if ever He had a chosen people, whose breasts He has made His peculiar deposit for substantial and genuine virtue. Iris the focus in which he keeps alive that sacred fire, which otherwise might escape from the face of the earth. Corruption of morals in the mass of cultivators is a phenomenon of which no age nor nation has furnished an example. It is the mark set on those, who, not looking up to heaven, to their own soil and industry, as does the husbandman, for their subsistence, depend for it on casualties and caprice of customers. Dependence begets subservience and venality, suffocates the germ of virtue, and prepares fit tools for the designs of ambition.

THOMAS JEFFERSON, NOTES ON VIRGINIA 678 (1781–85); *see also* Lisa Krall, *Thomas Jefferson's Agrarian Vision and the Changing Nature of Property*, 36 J. ECON. ISSUES 131 (2002) ("Historians generally agree that this passage offers a vision of a nation of independent farmers who would provide the bedrock on which to build our republic. Agriculture would assure virtue, morality, and independence of its citizenry, the necessary ingredients for a sound democracy.").

55. SADIE BEAUREGARD, FOOD POLICY FOR PEOPLE: INCORPORATING FOOD SOVEREIGNTY PRINCIPLES INTO STATE GOVERNANCE 26 (2009), *available at* http://departments.oxy.edu/uepi/uep/live/studentwork/09comps/Food%20Policy%20for%20People.pdf.

56. *Id.*

57. Fans of the show *Survivorman* will recall Les Stroud taking advantage of the natural filtering properties of soil by digging a shallow hole next to a contaminated pond. After the rancid water from the pond passed through the buffer of dirt and stone, Les was good to go. *Survivorman: Australian Outback* (Discovery Channel television broadcast Dec. 12, 2008).

58. Daryl Buchholz et al., *Aquifers and Soil Filter Effect*, UNIV. OF MO. EXTENSION (Oct. 1993), *available at* http://extension.missouri.edu/p/WQ24.

soils serve as our best defense against devastating floods, soaking up excess rainfall.[59]

Of course, the relationship between soil and water does not only benefit water. Without sufficient water, soil cannot fulfill its role as the foundation of plant life. Although plants can be grown in the absence of soil—think hydroponics—they fail without water. Most plants grow in soil for the very fact that soil retains water, allowing the plants to take it up gradually. Indirectly, the water content of soil impacts plant life "through its effect on aeration, temperature, and nutrient transport, uptake and transformation."[60] In turn, this plant life enriches the soil, providing it with nutrients as the plants die and decay. Further, as will be discussed in the next Part, soil supports a dizzying array of bacteria, insects, and small animals, all of which would be homeless but for the presence of water.

In short, if we care about water and the life it supports, we must also care about the state of our soil. We ignore one at the expense of the other.

D. Biodiversity

What lies in a handful of dirt? In a single gram of soil taken from a beech grove, scientists identified 6000 species of bacteria.[61] In the forests of the Pacific Northwest, a square foot of soil may contain up to 250 species of invertebrates.[62] All told, the number of organisms living underneath the earth is far greater than the number that exists on top of it.[63] Beyond sheer numbers, the range of species contained in soil is mind boggling: "The soil biota contains representatives of all groups of micro-organisms, fungi, bacteria, algae and viruses, as well as the microfauna, such as protozoa and nematodes. The total diversity is equal to or greater than any rainforest or coral reef."[64] Simply put, "[s]oil is by far the most biologically diverse part of Earth."[65]

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59. George R. Phillips & Bernard Frank, *To Help Control Floods*, LIBRARY 4 SCIENCE, http://science-in-farming.library4farming.org/Trees-Private-Wildlife/FORESTS-AND-MEN-part-2/Forests-and-Water/CONTROL-FLOODS.html (last visited Aug. 11, 2011) ("Watershed lands influence flood flows and sedimentation by the manner in which they dispose of rain and snow melt. Flood runoff from the land occurs when rain falls or snow melts faster than the soil can absorb it. The ability of the soil to take in and hold back water is affected in turn by the kind and condition of the vegetative cover, as well as by the structure and depth of the soil. Surface runoff is the most destructive. It is a highly important factor in sheet and gully erosion and in the rapid formation of flood peaks.").

60. DOROTA Z. HAMAN & FORREST T. IZUNO, UNIV. OF FLA.–IFAS EXTENSION, SOIL PLANT WATER RELATIONSHIPS (2003), *available at* http://edis.ifas.ufl.edu/pdffiles/AE/AE02100.pdf.

61. TIM PALMER, THE HEART OF AMERICA 58 (1999).

62. *Id.*

63. BRETT, *supra* note 2, at 80; NAT'L SOIL SURVEY CTR., U.S. DEP'T OF AGRIC., SOIL QUALITY RESOURCE CONCERNS: SOIL BIODIVERSITY (1998), *available at* http://soils.usda.gov/sqi/publications/files/biodivers.pdf.

64. SCOTTISH NATURAL HERITAGE, INFORMATION AND ADVISORY NOTE: SOIL BIODIVERSITY, NO. 151 (Feb. 2002), *available at* http://www.snh.org.uk/pdfs/scottish/soils2.pdf.

65. NATURAL RES. CONSERVATION SERV., U.S. DEP'T OF AGRIC., SOIL QUALITY RESOURCE CONCERNS: SOIL BIODIVERSITY (1998), *available at* http://soils.usda.gov/sqi/publications/files/biodivers.pdf.

Like life in the ocean, however, we know very little about the communities that inhabit our soils.[66] Some of these species may be of lesser importance to the broader ecosystem, but do we really want to take our chances with extinction? With many antibiotics derived from soil-based organisms,[67] the potential loss to the healthcare sector alone should make us think twice about loss of soil biodiversity. And that's to say nothing of the fact that soil relies on these organisms to perform its own critical functions. "These organisms improve the entry and storage of water, resistance to erosion, plant nutrition, and breakdown of organic matter."[68] A diverse range of organisms "provides checks and balances to the soil food web through population control, mobility, and survival from season to season."[69] In sum, soil biodiversity is key for the species that make up the soil food chain and for soil's continued ability to serve as the foundation of the broader global food chain.

E. Soil and Climate Change

According to the European Environment Agency (EEA), "soil is a major factor in our response to tackling climate change as it is the second largest carbon pool after the oceans."[70] Global warming is caused by "greenhouse gases," chief among them carbon dioxide. Carbon accumulates in plants, which "fix" the carbon dioxide in the atmosphere.[71] As these plants decay, they pass their carbon on to the soil. In Europe alone, some 75 billion tons of carbon are stored in the soil.[72] To put this number in perspective, it is estimated that the European Union nations emitted 1.5 billion tons of carbon in 2006.[73] There is a lot more carbon underground than we spew into the atmosphere every year.

Reducing carbon emissions should be our top priority in the fight against climate change, but this will not occur overnight. In the meantime, we need to deal with the excess carbon. This is where soil comes in. Though we have to approach the idea with caution, soil's capacity to store carbon could be an important weapon in the climate-change arsenal. As the EEA explains: "Soil carbon sequestration cannot be alone the solution due to the limited magnitude of its effects and its potential reversibility. Nevertheless, it could play an important role in climate mitigation in the short term together with other

66. *See* SCOTTISH NATURAL HERITAGE, *supra* note 64 ("It is now widely apparent that little is known about soil biodiversity compared to other environments, even though terrestrial ecosystems cannot function without it.").

67. Elaine R. Ingham, *Chapter 3: Bacteria*, *in* THE SOIL BIOLOGY PRIMER (2000), *available at* soils.usda.gov/sqi/concepts/soil_biology/bacteria.html.

68. *Id.*

69. *Id.*

70. *Soil and Climate Change*, EUROPEAN ENV'T AGENCY, http://www.eea.europa.eu/themes/soil/climate/soil-and-climate-change (last modified July 16, 2009).

71. *Photosynthesis-Photolysis and Carbon Fixation*, BIOLOGY ONLINE, http://www.biology-online.org/1/4_photosynthesis.htm (last updated Jan. 1, 2000).

72. EUROPEAN ENV'T AGENCY, *supra* note 70.

73. *Id.*

measures, especially because of its immediate availability and the relatively low cost."[74]

On the other hand, this same carbon-storing aspect of soil also points to a major risk: the release of stored carbon into the atmosphere through careless land-use practices. When we drain wetlands or convert forests and grasslands into agricultural zones, we release massive amounts of carbon—previously stored in the soil—directly into the atmosphere.[75] This is not an insignificant phenomenon. In the United Kingdom, soil carbon losses are estimated at 13 million tons since 1990.[76] This storage loss "corresponds to about 10% of the annual UK industrial carbon emissions (2006), which is approximately the same as the reduction of industrial CO_2 emissions in the period 1990-2006."[77] Soil's character as a carbon sink presents great opportunity, but it also presents great risk—that the CO_2 may still eventually escape.

F. The Aesthetic and Sentimental Value of Soil

In environmental ethics, conservationists generally subscribe to one of two schools of thought: "wise use" or "intrinsic value."[78] "Wise use" refers to an outlook that values nature according to how it serves human needs.[79] In contrast, "intrinsic value"—a philosophy championed by John Muir—posits that nature is to be cherished regardless of its utility to mankind.[80] Of course, there is nothing preventing one from appreciating a natural resource for both its utility *and* its inherent value. We respect the ocean for what it provides (food, shipping lanes, the water cycle, et cetera), but we also admire it for its sheer aesthetic value. We have a similar attitude toward the forest, mountains, rivers, and so on. Yet, for some reason, most of us don't think this way about soil.[81]

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74. *Id.* Soil carbon sequestration is "carbon dioxide from the atmosphere into the soil through crop residues and other organic solids, and in a form that is not immediately reemitted." ALAN SUNDERMEIER, RANDALL REEDER, & RATTAN LAL, SOIL CARBON SEQUESTRATION—FUNDAMENTALS 1 (2010), *available at* http://ohioline.osu.edu/aex-fact/pdf/0510.pdf. Sequestration can be achieved "by management systems that add high amounts of biomass to the soil, cause minimal soil disturbance, conserve soil and water, improve soil structure, and enhance soil fauna activity. Continuous no-till crop production is a prime example." *Id.*

75. *Id.*

76. *Id.*

77. *Id.*

78. *See* PAUL B. THOMPSON, THE SPIRIT OF THE SOIL: AGRICULTURE AND ENVIRONMENTAL ETHICS 7 (1995) ("The intervening decades have seen that debate become institutionalized. Cadres of resource economists, foresters, and resource managers have developed increasingly sophisticated theoretical tools for assessing the difficult trade-offs between pecuniary uses of lakes, rivers, forests, and streams and their aesthetic, recreational, or indirect uses. Philosophers such as Holmes Rolston and J. Baird Callicott have taken up the banner for Muir, producing more sophisticated accounts of the value of wild nature.").

79. *See id.* at 7–8.

80. *Id.*

81. *See* Radford, *supra* note 13 ("[T]he media focuse[s] on fossil fuel problems, climate change, biodiversity, logging and forest fires, but not on the soil because it [i]s less spectacular."); Lacy, *supra* note 5, at 433 ("For a variety of reasons—perhaps because the soil resource is less glamorous than

Even if we recognize the important functions it performs, we don't find it all that inspiring.

There are, however, some very notable exceptions. Dr. Hans Jenny, the father of soil science, waxes poetic:

> Soil appeals to my senses. I like to dig in it and work it with my hands. I enjoy doing the soil texture field test with my fingers or kneading a clay soil, which is a short step from ceramics or sculpture.
>
> Soil has a pleasant smell. I like to sit on bare, sun-drenched ground and take in the fragrance of soil. As yet, neither smell nor touch sensations have been accorded aesthetic recognition, but colors delight painters, photographers, and writers, as well as you and me.
>
> In loess country, plowed fields on slopes show wide bands of attractive color gradations from dark browns to light yellows, caused by erosion of the surface soil. Warm brownish colors characterize fields and roofs in Cezanne's landscape paintings of southern France, and radiant red soils of the tropics dominate canvasses of Gauguin and Portinari. Soil profiles viewed in pits may reveal vivid color and structure patterns of layers or horizons. I have seen so many delicate shapes, forms, and colors in soil profiles that, to me, soils are beautiful.[82]

If we could all channel Jenny's spirit, we might have a stronger appreciation for soil and fight harder to protect it. Aesthetic appreciation and conservation movements often go hand in hand,[83] and the same could certainly be true for soil.

G. Soil Left Unprotected Diminishes the Gains of Other Conservation Efforts

In concluding this Part,[84] I want to stress once again the critical role of soil in the broader ecosystem. Just about everything we cherish in the natural world—forests, rivers, wildlife—somehow depends on and is affected by soil. We have made significant gains in enacting legislation to protect these gems,

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endangered species, less conspicuous than toxically polluted waters or clearcut forests, or less politically divisive than 'cowburnt' rangelands—it has never received the same degree of political or grassroots attention as other natural resources and land uses.").

82. Interview by Kevin Stuart with Hans Jenny (1984), *reprinted in* Pw, *My Friend, the Soil—Conservationist Hans Jenny—Interview*, WHOLE EARTH (Spring 1999), *available at* http://findarticles.com/p/articles/mi_m0GER/is_1999_Spring/ai_54321347/.

83. *See, e.g.*, Zygmunt J.B. Plater, *The Embattled Social Utilities of the Endangered Species Act—a Noah Presumption and Caution Against Putting Gasmasks on the Canaries in the Coalmine*, 27 ENVTL. L. 845, 848 (1997) (stating that "aesthetic appreciation" is part of the reason we protect endangered species).

84. This Article does not discuss the archeological value of soil. For an interesting discussion on this topic, see Keith Wilkinson, *Quantifying the Threat to Archeological Sites from the Erosion of Cultivated Soil*, ANTIQUITY (Sep. 1, 2006).

but if we fail to include soil in the mix, our efforts could be for naught.[85] What good do we accomplish by designating the John Day as a "Wild and Scenic River"[86] if erosion on surrounding agricultural land clouds it with sediment, destroying precious steelhead habitat? Why is there so much outcry over the BP disaster in the Gulf of Mexico but so little about the "dead zone"—an oxygen-depleted area where no little to no life can exist—6000 square miles in size that was created by dumping hundreds of thousands of tons of fertilizer-laden soil into the Gulf every year?[87] Even if soil issues seem dull or uninspiring, they must command our attention if for no other reason than their importance to related environmental concerns.

II. THE VALUE OF AGRARIAN CULTURE AND SUSTAINABLE FARMING

A. Farming as the Foundation of Society

Before farming—including both raising crops and animal husbandry—complex societies did not exist.[88] Hunting and gathering simply did not provide enough surplus food for humans to focus on nonessential activities.[89]

Nearly every advanced society, including that of the United States,[90] progressed on the basis of developments in agriculture.[91] European civilizations only developed after agricultural techniques were imported from Africa.[92] It was not until the Mesopotamians were able to master irrigation that

85. *See* Lacy, *supra* note 5, at 433 ("[B]ecause soils are critically important building blocks for nearly every ecosystem on earth, a holistic approach to natural resources protection requires that soils be protected to avoid undermining much of the legal protection afforded to other natural resources.").

86. *Designated Wild and Scenic Rivers*, NAT'L WILD AND SCENIC RIVERS, http://www.rivers.gov/wildriverslist.html (last updated Aug. 18, 2011).

87. William Neuman, *High Prices Sow Seeds of Erosion*, N.Y. TIMES, Apr. 5, 2011, at B1; Monica Bruckner, *The Gulf of Mexico Dead Zone*, MICROBIAL LIFE EDUC. RES., http://serc.carleton.edu/microbelife/topics/deadzone/ (last modified March 12, 2011); Truman Lewis, *Corn Belt Fertilizers Blamed for Gulf of Mexico "Dead Zone,"* CONSUMERAFFAIRS.COM (Aug. 9, 2011), http://www.consumeraffairs.com/news04/2011/08/corn-belt-fertilizers-blamed-for-gulf-of-mexico-dead-zone.html.

88. BRETT, *supra* note 2, at 154.

89. *See* Robert Guisepi, *Agriculture and the Origins of Civilization: The Neolithic Revolution*, HISTORY WORLD INT'L, http://history-world.org/agriculture.htm (last visited Aug. 13, 2011) ("By 3500 B.C., agricultural peoples in the Middle East could support sufficient numbers of non-cultivating specialists to give rise to the first civilizations.").

90. Ikerd, *supra* note 35.

91. Though some peoples held on to their hunting-and-gathering ways and made astonishing contributions to human culture and history, the bigger, more complex societies—those that gave way to our modern civilization—depended on agriculture. *See* Guisepi, *supra* note 89 ("Even after sedentary agriculture became the basis for the livelihood of the majority of humans, hunters and gatherers and shifting cultivators held out in many areas of the globe.").

92. C.F.C. HAWKES, PREHISTORIC FOUNDATIONS OF EUROPE TO THE MYCENAEAN AGE (1940) ("Thither we must now turn, looking back on a civilization in the West created first by the introduction of the Neolithic arts on village-life, handicraft, and agriculture from North Africa, ultimately perhaps from Egypt . . . .").

their society flourished.[93] The Mayans built a network of canals to sustain their cultivation of maize during the dry season; the Incans established a vast network of crops on the slopes of the Andes using terracing and unique drainage techniques; camel herders played a critical role in the rise of Islamic civilization.[94] The list goes on. If we appreciate anything about human civilization, we owe a debt of gratitude to our agricultural ancestors.

B. The Campesino *Way of Life Is Worth Preserving from a Sociocultural Perspective*

Traditional, small-scale farming is much more than a vocation—it is a way of life. The primary motivation for a farmer to sow and harvest crops may be economic, but the results are far more profound. Agrarian culture is just that: an entire culture whose identity is tied to working the land. Through song, dance, food, visual art, and religious traditions, agrarian communities celebrate their connection with the earth in unique and invaluable ways.

The precise contours of agrarian culture vary from place to place, but the common denominator is a relationship between people and land that is something to behold. Take the case of Mexico:

> More than a way of earning a living, the campo (land) is a way of life for many Mexican campesinos. It is an ideology with roots in the pre-Columbian past that has been sustained by the agrarian reforms and rhetoric of the revolution. Being a campesino is different from having a job. It is a way of relating to land and community. It is a sense of place and identity not easily shaken. The campo is the heart and soul of Mexico—all readily discovered in the deep melancholy and joy for life tapped by its ranchera music, the instinctive hospitality of its people, the resonance of its rituals, and the easy acceptance of life's natural rhythms.[95]

Much the same could be said about the *campesinos* in Bolivia. Though they have different customs—and in fact the customs range far and wide even within the country—Bolivian *campesinos* possess a soulfulness that seems lacking in modern city life. When they build home, they mark the occasion with an offering to *Pachamama* (Mother Earth), usually burning some incense and pouring out beer in her honor.[96] They often drink *chicha* on Sundays, a home-made alcoholic beverage brewed with fermented maize or quinoa.[97]

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93. CHARLES KEITH MAISELS, THE EMERGENCE OF CIVILIZATION: FROM HUNTING AND GATHERING TO AGRICULTURE, CITIES, AND THE STATE IN THE NEAR EAST 213 (1993). "Master" may not be the best word. Lack of proper drainage techniques contributed to the Mesopotamians' downfall. *See* JARED DIAMOND, COLLAPSE: HOW SOCIETIES CHOOSE TO FAIL OR SUCCEED 48 (2005).

94. GUISEPI, *supra* note 89.

95. TOM BARRY, ZAPATA'S REVENGE: FREE TRADE AND THE FARM CRISIS IN MEXICO 1–6 (1995).

96. Carolyn Dean, *The Inka Married the Earth: Integrated Outcrops and the Making of Place*, 89 THE ART BULLETIN 502 (2007).

97. HAROLD OSBORNE, BOLIVIA: A LAND DIVIDED 100 (1955).

They dance *tinku*[98] and speak Quechua or Aymara in addition to Spanish[99]—a lingual diversity not nearly so common in the city—and many of them seek the aid of *kallawayas*, shamans whose ancestors healed the Incan nobility.[100] Land is frequently held and worked in common, with all partaking in the labor and fruits of the *ayllu*, the traditional community unit.[101]

Farther north, Canadian author Brian Brett explores the traditions and customs that prevail on small, mixed-use farms in British Columbia.[102] The owner of a small farm himself, Brett waxes poetic about the "glory and joy and terror of living on the land."[103] From the tradition of discussing prices and weather at the local café[104] to pig roasts[105] and sharing meals prepared with food fresh from the backyard[106] to the childhood joy of thieving fruits from neighboring orchards[107] or searching out unpasteurized milk,[108] life on and among small farms in the Pacific Northwest is unique. Even though these farms may not have "an ice cube's chance in hell" when stacked up against their large-scale industrial counterparts, their owners push on just the same.[109] Perhaps it is obstinacy. Or perhaps there is something of real value there—something that cannot be found in the city or working as a specialized day-laborer, performing the same task over and over. Mandatory waving on the local roads, a fall fair that brings the whole community together, tool-sharing and mutual aid as the norm—such have become increasingly rare as the small farm becomes a thing of the past.[110] In pockets, though, these ways still exist.

These are just three examples of how the work and environment of the family farm lead to cultural differentiation.[111] The specific customs and

98. Daniel M. Goldstein, *Performing National Culture in a Bolivian Migrant Community*, 37 ETHNOLOGY 117 (1998).

99. HENRY STOBART, KNOWLEDGE AND LEARNING IN THE ANDES: ETHNOGRAPHIC PERSPECTIVES 141 (2002).

100. DAVID J. WILSON, INDIGENOUS SOUTH AMERICANS OF THE PAST AND PRESENT: AN ECOLOGICAL PERSPECTIVE 318 (1999).

101. TIMOTHY K. EARLE & ALLEN W. JOHNSON, THE EVOLUTION OF HUMAN SOCIETIES: FROM FORAGING GROUP TO AGRARIAN STATE 263 (1987).

102. *See generally* BRETT, *supra* note 2.

103. *Id.* at 8.

104. *Id.*

105. *Id.* at 286.

106. *Id.* at 152.

107. *Id.* at 147-50.

108. *Id.* at 115.

109. *Id.* at 8–9

110. *See id.* at 320–23.

111. In the United States, we see equally intriguing examples of rural culture in our own countryside. The following passage describes the traditional rhythm of life in the Corn Belt:

> From the time the frost was out of the ground until the corn was laid by and the hay and small grain were harvested, there was a rising crescendo of work: during March, April, and early May, the seeding and planting of annual field crops and the care of newly born livestock dominated all activities; June was almost entirely devoted to cultivating corn; and in July there were haying and the harvesting of small grain. Then during August there was generally a "breathing spell," which was often taken up with family picnics, trips, fairs, and

traditions vary around the world, but the constant in this: country life is different than city life, and that difference holds value.

The United Nations agrees. In its Declaration on Cultural Diversity, UNESCO has determined that "cultural rights are an integral part of human rights."[112] According to UNESCO, "all persons have the right to participate in the cultural life of their choice and conduct their own cultural practices, subject to respect for human rights and fundamental freedoms."[113] Underlying this position is the belief that cultural heritage is the wellspring of creativity and that, in all its forms, "it must be preserved, enhanced and handed on to future generations as a record of human experience and aspirations, so as to foster creativity in all its diversity and to inspire genuine dialogue among cultures."[114] This dialogue and interchange of ideas has been shown to have economic benefits[115] and, in the case of agriculture, can lead to the adoption of more sustainable practices.[116] If cultural diversity, including the diversity that exists within and among agrarian communities, is not preserved, then the marketplace of ideas suffers.[117]

C. The Campesino *Way of Life Can be Preserved, but Sustainable Agriculture and Soil Protection Are Necessary Predicates*

Rather than proposing three separate treaties—one each regarding soil conservation, sustainable farming, and the preservation of agrarian culture—I propose one, all-encompassing treaty. The reason for this is that all three concerns are bound together in fundamental ways; addressing them separately would be inefficient at best and court futility at worst. Analyzing them as one allows us to recognize the fundamental connections and apply solutions to shared problems.

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revival meetings. Another period of driving work came in the fall—"to get the corn out of the field before snow falls.

CARL C. TAYLOR, RURAL LIFE IN THE UNITED STATES 367 (1949). The impact this schedule had on daily life was far-reaching. "The fact that all the farm families, and all their members, participated in these drives helps considerably in explaining the attitudes of the typical corn belter, not only toward work and play, but also toward many other activities of life." *Id.*

112. UNESCO, *Universal Declaration on Cultural* Diversity, Art. 5 (Nov. 2, 2001), *available at* http://portal.unesco.org/en/ev.phpURL_ID=13179&URL_DO=DO_TOPIC&URL_SECTION=201.html (last visited March 30, 2012).

113. *Id.*

114. *Id.* at Art. 7.

115. Gianmarco I.P. Ottaviano & Giovanni Peri, *The Economic Value of Cultural Diversity: Evidence from US Cities* 9–44 (Nat'l Bureau of Econ. Research, Working Paper No. 10904, 2004), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=618586.

116. *See* MIGUEL A. ALTIERI, AGROECOLOGY: THE SCIENCE OF SUSTAINABLE AGRICULTURE 1 (1995).

117. *See* Associated Press v. United States, 326 U.S. 1, 20 (1945) (extolling the marketplace of ideas and characterizing it as the "widest possible dissemination of information from diverse and antagonistic sources").

To illustrate my point, take the case of agrarian culture. Without secure soil resources and a legal regime that promotes sustainable and just farming, efforts to preserve agrarian culture will be largely meaningless. Agrarian culture is based on earning a living from the land. As the land collapses and family farmers are out-competed by industrial agriculture, the culture growing out of small-scale farming also finds itself in jeopardy.[118] This is not to suggest that cultural preservation will flow naturally from improved soil conservation and sustainable farming—they are necessary but not sufficient conditions.[119]

Just as the effects of climate change will be felt most intensely by the poor in "undeveloped" and "developing" nations,[120] so too do the effects of soil degradation most gravely impact the small-scale farmer. Benefiting as they do from economies of scale, large industrial farms are better positioned to survive productivity losses resulting from soil degradation.[121] If a 10,000-acre farm loses one hundred acres to erosion, profit margins may suffer, but the farm is not likely to go out of business. If a two hundred acre farm loses the same amount of land, the story is entirely different.[122] Soil conservation, in other

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118. *See* Ikerd, *supra* note 35. Discussing the relationship between the preservation of rural communities and sustainable farming, Professor Ikerd wrote:

> Even by mid-1990s, a new model or paradigm of agriculture clearly was emerging under the conceptual umbrella of sustainable agriculture. And that new way of farming was supportive of rural communities. A sustainable agriculture, like sustainable development, must meet the needs of all in the present, while leaving equal or better opportunities for those of the future. It must be ecologically sound, economically viable, and socially responsible. The industrial model of agriculture is failing on all three fronts. The specialized, standardized, large-scale systems of farming are polluting the environment with pesticides, fertilizers, and manure from confinement animal feeding operations. Industrialization is driving independent farmers out of business and replacing them with corporate contractors—who turn out to be little more than tractor drivers or livestock building supervisors. And industrial agriculture is ripping the social fabric of rural areas by destroying family farms and rural communities. An industrial agriculture quite simply is not sustainable.

Id.

119. *See id.* ("[C]laiming [not] that rural communities could once again depend entirely on agriculture, only that a sustainable agriculture could provide a solid foundation upon which a sustainable rural economy could be built.").

120. *See* AFR. DEV. BANK ET AL., POVERTY AND CLIMATE CHANGE: REDUCING THE VULNERABILITY OF THE POOR THROUGH ADAPTATION v (2003), *available at* http://www.unpei.depiweb.org/PDF/Poverty-and-Climate-Change.pdf ("While climate change is a global phenomenon, its negative impacts are more severely felt by poor people and poor countries. They are more vulnerable because of their high dependence on natural resources, and their limited capacity to cope with climate variability and extremes.").

121. FRANK W. ELWELL, INDUSTRIALIZING AMERICA: UNDERSTANDING CONTEMPORARY SOCIETY THROUGH CLASSICAL SOCIOLOGICAL ANALYSIS 112 (1999) ("[I]ndustrial agriculture promotes the concentration of farmland in order to achieve economies of scale."). *But see* Willis L. Peterson, *Are Large Farms More Efficient?* (Univ. of Minn. Staff Paper P97-2, 1997), *available at* http://ageconsearch.umn.edu/bitstream/13411/1/p97-02.pdf ("Small family and part-time farms are at least as efficient as larger commercial operations. There is evidence of diseconomies of scale as farm size increases.").

122. Extreme losses like these can happen surprisingly quickly. In May 2007, a severe rainstorm caused sixty-nine Iowa townships to suffer average estimated soil losses of more than ten tons per acre. William Neuman, *High Prices Sow Seeds of Erosion*, N.Y. TIMES, Apr. 13, 2011, at B1.

words, is a more pressing issue for the small-scale farmer than it is for industrial agriculture.

In a similar way, a legal regime that imposed strict rules promoting sustainable farming would do more for the family farmer than it would for "Big Ag."[123] As it stands, it is extremely difficult for family farmers to compete against their industrial counterparts.[124] Strict rules on sustainable farming would level the playing field. For example, if every poultry farmer were forced to raise free-range chickens, if rBGH were banned from all dairy farms,[125] or if monoculture were prohibited, the competitive advantage of industrial agriculture would be diminished and we would have healthier food and ecosystems to boot.[126]

D. Economic Justice and Community Welfare Demand a Place for the Small-Scale Farmer

Preserving rural culture is a worthy cause in and of itself, but this is not the only reason to favor small-scale farming over industrial agriculture. For a large portion of the world's population, family and community farming present an opportunity to earn a living in a more dignified way, all while enhancing community welfare.

In absolute economic terms, industrial agriculture may outperform small-scale farming because it produces more with less, at least in the short term. Of course, that says nothing of wealth distribution, and that is where industrial agriculture loses its stride. Like most corporations, Big Ag companies produce much for the few, little for the many.[127] The chances of a family farmer

123. "Big Ag" is a common name for large, industrial-scale agriculture. *See, e.g.*, Tom Philipott, *Big Ag Won't Feed the World*, MOTHER JONES (June 15, 2011 2:00 AM), http://motherjones.com/tom-philpott/2011/06/vilsack-usda-big-ag.

124. *See* BRETT, *supra* note 2, at 133 (explaining that government agencies are "regulating orchardists out of existence by demanding that we pasteurize our juice, which can't be done economically on such a small scale").

125. *See* FOOD AND WATER WATCH, RBGH: HOW ARTIFICIAL HORMONES DAMAGE THE DAIRY INDUSTRY AND ENDANGER PUBLIC HEALTH 6 (June 2009), *available at* http://documents.foodandwaterwatch.org/rBGH.pdf ("Despite all of the health problems that result for cows treated with rBGH, the artificial hormone does generally increase the amount of milk that cows produce, typically by 11–15.6 percent. Dairy producers have been under tremendous pressure to 'get big or get out'—in other words, to scale up their production or exit the industry—and rBGH was aggressively marketed to them as a scaling-up tool.").

126. Despite the FDA's claim that "[n]o conclusive evidence shows that organic food is more nutritious than is conventionally grown food," a study supported by the French Agency for Food Safety found otherwise. *See* Denis Lairon, *Nutritional Quality and Safety of Organic Food*, 30 AGRONOMY 33 (2009) (reporting that (1) organic plant products contain more dry matter and minerals and more anti-oxidants; (2) organic animal products contain more polyunsaturated fatty acids; (3) data on carbohydrate, protein and vitamin levels are insufficiently documented; (4) 94–100 percent of organic food does not contain any pesticide residues; (5) organic vegetables contain far less nitrates; and (6) organic cereals contain overall similar levels of mycotoxins as conventional ones).

127. Kirsten Schwind, *Growing Local Food into Quality Green Jobs in Agriculture*, RACE, POVERTY, AND THE ENVIRONMENT 66 (Spring 2007), *available at* http://urbanhabitat.org/files/RPE14-

striking it rich are perhaps equally slim, but her chances of earning a decent living are much higher than her counterpart picking strawberries on a 10,000-acre Big Ag farm.

This is not just abstract theory. To give a concrete example, a study by Iowa State University shows that "[s]mall hog farms are better for rural economies, producing more jobs and more local tax revenue than larger operations[.]"[128] In comparison to a single operation with 3400 sows, twenty-three farms with 150 sows each would create twenty-one more jobs and generate $35,000 more in tax revenues.[129]

Apart from the distributive advantages of small-scale farming, there is also the issue of community well-being. Professor Walter Goldschmidt's classic study of two California towns[130] shows "that large scale, industrial agriculture can have a dampening effect on community welfare."[131] Goldschmidt compared the quality-of-life and standard-of-living factors in Arvin and Dinuba, two small farm communities in central California.[132] The two towns were similar in type and size of agriculture, the key difference being that Dinuba was comprised of family farms while Arvin was "dominated by a single large agribusiness firm."[133] Examining the well-being of each community, Goldschmidt found that (1) Arvin had more wage laborers than Dinuba, whereas Dinuba had more entrepreneurs; (2) Arvin had a lower standard of living; (3) Arvin's population was more unstable; (4) Arvin's physical appearance was worse; (5) Arvin had less impressive schools, parks, and social services; (6) Dinuba had more religious institutions; (7) Dinuba displayed a higher degree of community loyalty; (8) decisions affecting the community were more frequently made by community residents in Dinuba than in Arvin; (9) Arvin had a higher degree of social segregation; and (10) Dinuba had more retail trade.[134] Based on these observations, Goldschmidt concluded "that quality of social conditions is associated with scale of operations[,] that farm size is in fact an important causal factor in the creation of such differences[,] and that it is reasonable to believe that farm size is the most important cause of those differences."[135]

1_Schwind-s.pdf ("Today, 75 percent of farmworkers in the United States were born in Mexico. Crop workers earn an average of between $10,000 and $12,499 a year. Among the major occupational groupings, only private household employees earn less. Not surprisingly, 30 percent of all farmworker families fall below the federal poverty line, and only 23 percent are covered by health insurance.").

128. J. Anderson, *Report: Small Hog Farms Aid Economy*, OMAHA WORLD HERALD, Jan. 17, 1998, at 23, 30.

129. *Id.*

130. WALTER GOLDSCHMIDT, AS YOU SOW (1946).

131. OLSON & LYSON, *supra* note 9, at 196.

132. GOLDSCHMIDT, *supra* note 130 (1946).

133. *Id.*

134. *Id.*

135. *Id.*

E. Farmers as Stewards, Farmers as Profiteers

Farmers, as a class, have done more than their share to damage the environment.[136] Use of dangerous pesticides, slash-and-burn to free up more land, monoculture, thoughtless irrigation practices—farmers, and not just those operating mega-farms, have been guilty of all this and more. At the same time, however, many farmers have embraced an ecological philosophy: they take from the land, yes, but they also recognize that the long-term health of the land requires prudent stewardship and not just maximization of short-term profits.

So what drives some farmers to operate more like stewards of the land and others as profiteers? Certainly there are many factors, including ethical values obtained through upbringing and education, the short-term financial security necessary to sacrifice on behalf of the land, and simple environmental awareness. These are all important, but one factor makes—or can make—a bigger difference still: a "sense of place."

As I use the term, a "sense of place" is a bond felt by a person or community toward a particular piece of land.[137] The person associates the place with memories (good and bad), family or community well-being, and hope for the future.[138] The person cannot think upon her past without thinking of this place, much less envision a future in its absence.[139]

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136. *See generally* Erik Lichtenberg, *Some Hard Truths About Agriculture and the Environment*, 33 AGRIC. & RES. ECON. REVIEW 24 (2004).

137. *See* BRYAN G. NORTON, SEARCHING FOR SUSTAINABILITY: INTERDISCIPLINARY ESSAYS IN THE PHILOSOPHY OF CONSERVATION BIOLOGY 356 (2002) ("Sense of place values emerge at the local level and are highly dependent on the context at that level; they represent the positive sense of community that, in best cases, arises between a people and the place in which their culture has been defined."); *see also* Lelia Scannel & Robert Gifford, *Defining Place Attachment: A Tripartite Organizing Framework*, 30 J. ENVTL. PSYCHOL. 1, 1 (2010) ("Humanistic geographers argue that a bond with a meaningful space or 'sense of place' is a universal affective tie that fulfills fundamental human needs . . .").

138. This phenomenon occurs the world over. *See* William R. Ferris, *A Sense of Place*, 19 HUMANITIES 6, 8 (1998) ("I have traveled to New England, the Midwest, the West, the Southwest, and to the Gorky Institute of World Literature in Moscow to assist colleagues at sister institutions who have developed academic programs that focus on their own regional cultures. They, like we, recognize that people everywhere define themselves through the places where they are born and grow up. This relationship, which Eudora Welty calls the 'sense of place,' shapes each of us in deep and lasting ways.").

139. *See* NORTON, *supra* note 137, at 354 ("Development by a person of a local sense of place is an important part of developing a sense of personal identity."). Many environmentalists value the idea of a sense of place because they recognize that humans are motivated by localism. Envisioning environmental crises as global crises can be helpful, but it can also be overwhelming to the point of paralysis. Global problems are abstract and insurmountable; local problems (or global problems with local manifestations) are approachable and more likely to spur us into action. *See id.* at 69. Of course, the tension between "thinking globally" and "acting locally" has not been lost on many environmentalists. *See id.* at 348 ("Deep ecologists have advocated more attention to the concept of place, but in our view they have not successfully resolved the apparent conflict between the localism implied by emphasis on place and the centralist, universalist, and Eurocentrist implications of their theory that all life has equal intrinsic value.").

Family farmers, and rural communities in general, are much more likely to have a sense of place than the barons of agribusiness or the hands they hire.[140] First, there is the ancestral bond. When a son works land tended by his parents, he is more apt to think of the land as an integral part of the family itself.[141] The family's story is bound up with the history of the family farm. Treating the land with respect comes naturally; the thought of selling it off to developers produces feelings of guilt and shame.

The flip-side of the ancestral bond is the idea of legacy and patrimony. Just as the son inherited the land from his parents, he will continue the tradition by passing it on to his own children. Again, responsible stewardship is the more likely result because the farmer working the land wants to ensure that the land endures for the benefit of his offspring.

Finally, there is the fact that family and other small-scale farmers are more likely to have daily contact with the land.[142] They know what's happening with the soil in a visceral way; they perceive healthy and damaged soil through direct, sensual interaction, not as statistics on a spreadsheet.[143] In industrial agriculture, there is a division between labor and ownership: laborers work the land but they have no investment in its long-term success; the owners, despite their stake, rarely tend to the land or do so only from a bird's-eye

140. To the extent they stay put in one place generation over generation, family farms buck the trend. As others have noted, "development of a deep sense of place has been interrupted by the tremendous mobility of populations in the United States." NORTON, *supra* note 137, at 271.

141. The following example illustrates the sense of place that may occur on a family farm and the ways in which this sentiment transcends economic considerations:

> Consider the plight of a fourth-generation farm family who learns that an adjacent property is to be purchased under eminent domain provisions and provided as the site for a toxic waste treatment facility under a contract with the local municipality. Our family is offered a choice. If they wish to stay, they will be compensated for the decrease in their residential property value resulting from the siting or, if they prefer to move, they will be bought out at the estimated market value of their property before the siting. Does fair market value capture all the values that are lost if the family decides that, while they do not want to move, they cannot accept the new risk and disruption and decide to leave? Apparently not. If the family accepts fair market compensation and then uses the money to purchase a farm elsewhere, they will be compensated for their economic loss, but they will not be compensated for the loss of their "home." Place-relative information such as how to avoid poison ivy on the way to the pond, what time of day to catch the largest fish, and a plethora of other practical and aesthetic details will not be transmitted with the deed to the property and cannot be carried to a new site.

Id. at 351–52.

142. *See Family Farms*, SUSTAINABLE TABLE, http://www.sustainabletable.org/issues/familyfarms/ (last visited Aug. 24, 2011) ("Perhaps most importantly, family farmers serve as responsible stewards of the land. Unlike industrial agriculture operations, which pollute communities with chemical pesticides, noxious fumes and excess manure, small family farmers *live on or near their farms* and strive to preserve the surrounding environment for future generations. Since these farmers have a *vested interest in their communities*, they are more likely to use sustainable farming techniques to protect natural resources and human health." (emphasis added)).

143. *See id.*

perspective.[144] This leads to information asymmetry, with soil conservation paying the price. Those who care enough to modify practices—the owners—do not know or cannot appreciate the situation in a meaningful way. Those who possess this information—the workers—have no reason to care, fear retaliation for critiquing the status quo, or simply feel that they lack the power to make change.[145]

In sum, small-scale farming, and the agrarian communities it supports, finds added value from a conservation perspective through a sense of place. The family farmer's relationship to the land fosters the worldview necessary to practice sustainable agriculture.[146]

III. THE STATE OF THE WORLD'S SOIL AND THREATS TO AGRARIAN CULTURE

A. Then and Now

I have suggested that soil is effectively a nonrenewable resource. Although nature does reform soil over time, the rate of reformation is so slow—and the rate of exhaustion so rapid—that we have to think of it as a finite resource. Soil cannot be grouped along with solar and wind energy in terms of renewability, nor can it even be grouped with timber. It is more akin to a fossil fuel; the process of reformation is constantly occurring, but it takes so long that we make a mockery of renewability if we apply the label in such an indiscriminating fashion.

The ancient Mesopotamians would be quick to agree. Their empire in the Fertile Crescent was at the forefront of world agriculture, but they lost it all to overuse, poor irrigation, and salinization.[147] Thanks in large part to these practices, it "would be a cruel joke" to use the term "Fertile Crescent" today in reference to Iraq and Syria, the modern nations that occupy this once-productive territory.[148] As Jared Diamond explains in his book *Collapse*, soil

144. WILLIAM CONLOGUE, WORKING THE GARDEN: AMERICAN WRITERS AND THE INDUSTRIALIZATION OF AGRICULTURE 16 (2001).

145. *See* Kenneth A. Bamberger, *Technologies of Compliance: Risk and Regulation in a Digital Age*, 88 TEX. L. REV. 669, 696 (2010) (discussing the "traditional problems of information asymmetry that result from specialization and division of labor," including the challenge of "ensuring that information about risk, in particular, gets from those who possess it to those who might act on it").

146. Another factor to consider is the value of traditional methods. Though we tend to think that the next scientific breakthrough will always be better than the last—and certainly far superior to techniques developed centuries past—this is often not the case. Traditional farming methods are often ecologically superior, as many have come to learn over the last few decades. *See, e.g.*, GERALD G. MARTEN, HUMAN ECOLOGY: BASIC CONCEPTS FOR SUSTAINABLE DEVELOPMENT xiv (2001). Preserving small farming communities around the world will also help to ensure the survival of these techniques, some of which may turn out to be of critical importance.

147. Tamsyn Jones, *The Scoop on Dirt: Why We Should All Worship the Ground We Walk on*, 17-5 E MAG. 26, Sept. 2006, *available at* http://www.emagazine.com/archive/3344.

148. DIAMOND, *supra* note 93, at 48.

degradation was a contributing factor to the downfall of the following historical societies in addition to the Fertile Crescent: Easter Island, Pitcairn Island, Henderson Island, the Native American Anasazi in what is now the Southwestern United States, the Maya, the Norse colony in Greenland, Angkor Wat, and the Harappan Indus valley.[149]

All that being said, it is only in modern times that the globe as a whole is being forced to recognize soil as a truly nonrenewable resource. As it now stands, "[s]oils of farmlands used for growing crops are being carried away by water and wind erosion at rates between 10 and 40 times the rates of soil formation, and between 500 and 10,000 times soil formation rates on forest land."[150] Urban sprawl is eating up arable land at a break-neck pace, especially in developing countries,[151] and deserts are spreading out like inkblots on the world map.[152] Meanwhile, the world's agrarian cultures face an equally dire situation. As the following discussion demonstrates, the causes are manifold but a common thread is this: it is largely our own actions that are driving soils and agrarian communities to the brink.

B. Major Threats to Soil and Agrarian Culture

1. Industrial Agriculture and Short-Sighted Farming Practices

Farming has changed dramatically over the past 200 years. Though it was probably rarely the romantic trade idealized by the likes of Thomas Jefferson and Henry David Thoreau, it is fair to say that farming has seen better times. From both an ecological and cultural standpoint, the industrialization of agriculture has come at a heavy cost.[153] Subsistence and small-scale farming—

149. *Id.*

150. *Id.* at 489.

151. *See* Anthony Gar-on Yeh & Xia Li, *The Need for Compact Development in the Fast-Growing Areas of China: The Pearl River Delta*, *in* COMPACT CITIES: SUSTAINABLE URBAN FORMS FOR DEVELOPING COUNTRIES 73 (2000) ("Cities in developing countries are expanding very rapidly. Most of the development is in the form of urban sprawl at the fringe of the urban areas. This urban sprawl has led to many environmental and transport problems and the loss of valuable agricultural land.").

152. Elizabeth Rosenthal, *Likely Spread of Deserts to Fertile Land Requires Quick Response, U.N. Report Says*, N.Y. TIMES, June 28, 2007, http://www.nytimes.com/2007/06/28/world/28deserts.html.

153. Poet and rural activist Wendell Berry has summed up the situation as follows:

> The problem . . . is that the faith in industrial agriculture as an eternal pillar of human society is getting harder to maintain, not because of the attacks of its opponents but because of the increasingly manifest failures of industrial agriculture itself: massive soil erosion, soil degradation, pollution by toxic chemicals, pollution by animal factory wastes, depletion of aquifers, runaway subsidies, the spread of pests and diseases by the long-distance transportation of food, mad cow disease, indifferent cruelty to animals, the many human sufferings associated with agricultural depression, exploitation of 'cheap' labor, the abuse of migrant workers. And now, after the catastrophes of September 11, the media have begun to notice what critics of industrial capitalism have always known: The corporate food supply is highly vulnerable to acts of biological warfare.

characterized by a closer relationship with the land, generational continuity, and a rich set of cultural traditions—have given way to the modern business model, with its emphasis on economies of scale, specialization, short-term profit margins, and a segmented chain of production and distribution.[154] True to its name, industrial agriculture has converted farming into an industry.[155] Farming is no longer a way of life for many; culture and ecology have been sacrificed in the name of efficiency and competition.[156]

Take the case of the Great Plains. Once a biome thriving with biological diversity, including endless herds of buffalo and even grizzly bears, America's grasslands have been sapped of their grandeur through monoculture and other

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Wendell Berry, *The Prejudice Against Country People*, 66-4 THE PROGRESSIVE 21 (2002), *available at* http://www.progressive.org/node/1596.

154. Professor Carmen Gonzalez explains the consolidation of market power as follows:

> Supported by decades of government subsidies, overseas food aid programs, and public sector agricultural research, these multinational grain traders, agrochemical corporations, seed manufacturers, and supermarket chains wield unprecedented market power. Two grain companies control 75 percent of the world's grain trade. Six agrochemical corporations control 75 percent of global agrochemical sales and also dominate seed markets. Ten corporations control 67 percent of proprietary seed sales, nearly 90 percent of the agrochemical market, and 40 percent of retail grocery sales. This market power enables a handful of transnational corporations to pay farmers relatively low prices for crops even when prices spike on regional and international markets (as they did during the 2008 food crisis) and to charge farmers high prices for inputs such as seeds and fertilizers.

Carmen G. Gonzalez, *Climate Change, Food Security, and Agrobiodiversity: Toward a Just, Resilient, and Sustainable Food System*, 22 FORDHAM ENVTL. L. REV. 493, 508–09 (2011) (footnotes omitted); *see also Hidden Costs of Industrial Agriculture,* UNION OF CONCERNED SCIENTISTS (Aug. 24, 2008), http://www.ucsusa.org/food_and_agriculture/science_and_impacts/impacts_industrial_agriculture/costs-and-benefits-of.html.

155. William Conlogue explains the transition, and what was lost in the process, as follows:

> Farm industrialization is not simply synonymous with the use of machinery or scientific methods; preindustrial farmers used machinery—horse-drawn seeders, for example—and scientific methods such as fertilizers and selective breeding. Agricultural industrialization requires farmers to conceive of plants, animals, land, and people through a narrow mechanistic frame that tends not to see them as living things. The industrial farm works toward ever-greater control over nature as a factor in production rather than working with it. Profit is the measure of the new farm, not a family's continuance on the land, its quality of life, or its relations to the larger community. The new farmer rejects traditional conceptions of agricultural work, work whose model is the husbandman. The new farmer disdains the conflation of management and labor in the figure of the farmer, the privileging of inherited farm practices, the recognition of immanent value in work and property as opposed to their exchange value, the noncommercial networks of exchange within a community. In contrast to traditional notions of farmers as husbandmen, industrial agriculture looks to business and science as models. Its basic precepts include division of labor, adoption of the latest methods and machinery, systematic business management and book farming, heavy participation in a cash market that leads to specialization, emphasis on change and experimentation, and reliance on experts outside the community for reliable advice. Industrial agriculture aggressively seeks to replace haphazard tradition with rationality, systematization, efficiency, organization, professionalization, and an identification of farming with urban manufacturing.

CONLOGUE, *supra* note 144, at 16.

156. BRETT, *supra* note 2.

practices that ignore the intricacies of ecology.[157] Hypnotized by the fertility of its soil, American settlers plowed and planted their way to disaster.[158]

Farther north, the dairy country of the Upper Midwest has had its own experience with industrialized farming in the way of massive dairy operations. No matter how sensibly operated, a dairy farm will always have manure as a by-product and the unaccustomed nose will always cringe a bit. But the aroma produced by a traditional dairy farm is nothing compared to a "Concentrated Animal Feeding Operation" (CAFO), "a 'mega-farm' where cows by the thousand live on concrete and rarely get to see the sun, where they never actually graze, where their lives are shortened from round-the-clock milking."[159] In the area around Clayton, Michigan, there are twelve of these CAFOs, accompanied by sixty lagoons containing 400 million gallons of animal waste.[160] "The gas that comes off these lagoons and off the fields when they spray them with the waste makes you dry-heave and want to vomit. Your eyes water, you feel sick and dizzy."[161] It's not the "healthy country smell" that one might associate with a small-scale dairy farm.[162]

Besides their scale, the emergence of CAFOs highlights another problem with industrial agriculture: specialization and the downfall of the mixed-use farm. For most of human history, farms "tended toward a balanced mixture of horticulture and livestock that suited the local environment."[163] There were not corn farmers, dairy farmers, and pig farmers; there were just farmers, and they usually looked over a range of crops and livestock.[164] The reason for this is fairly simple: in addition to yielding various products for the farmer to either consume or bring to market, the variety of crops and natural fertilizer provided by the animals led to healthier soils, which in turn were able to better support grazing plants for the livestock.[165] Though by no means perfect, the small, mixed-used farm did achieve a degree of circularity that is missing from large, specialized operations.[166]

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157. PALMER, *supra* note 1, at 98–99.

158. *Id.*

159. Steve Boggan, *The Toxic Truth About Mega-Farms: Chemical Fumes, Distressed Animals and Poisoned Locals Driven from Their Homes and Worse*, MAIL ONLINE (July 5, 2010), http://www.dailymail.co.uk/news/article-1292011/The-truth-mega-farms-Chemical-fumes-distressed-animals-poisoned-locals.html.

160. *Id.*

161. *Id.*

162. *Id.*

163. BRETT, *supra* note 2, at 92.

164. *See* Katherine R. Smith, *Retooling Farm Policy*, 17 ISSUES IN SCI. & TECH. 70 (2002) ("[B]ecause of specialization and concentration, the character of the farm sector has changed dramatically. Whereas farms in the past tended to be diversified operations, a majority of today's farms specialize in one or a few related commodities.").

165. *See* BRETT, *supra* note 2, at 80–82, 88.

166. *See id.* at 82 ("If you grow only corn, using artificial fertilizers, you will gradually strip your land of life, as many farmers have belatedly discovered . . . .").

Despite the present state of affairs, farming and ecological balance are not mutually exclusive. Industrial agriculture focuses on one thing—short-term production—and ignores everything else.[167] Farming, when approached creatively, can be conducted in a manner that is far more balanced. Crop rotation, free-range grazing, allowing fields to lie fallow, planting cover crops, engaging in selective reforestation and repopulation with native grasses—these and other techniques require short-term sacrifice, but they pay off in the long run.[168]

2. "Free" Trade (NAFTA and Friends)

If you ask a Mexican *campesino* to name the biggest threat to agrarian culture, there's a good chance you'll hear one word: "NAFTA."[169] Thanks to the North American Free Trade Agreement (NAFTA) and its elimination of tariffs,[170] Mexico must now import corn from the United States.[171] The price of corn may be cheaper, but the total cost to the economy is greater still. "In an ironic effect of the agreement, the removal of barriers to the export of cheap U.S. corn to Mexico will drive millions of Mexican farmers from the land, who will then migrate with their families to the cities, many of them to the United States."[172] In the name of free trade, NAFTA has paved the way for the expansion of industrial agriculture and the commoditization of growers. "There is growing evidence that NAFTA's implementation regulations are accelerating the loss of small- and medium-size farms, and promoting the increase of corporate agriculture."[173] This is not a problem affecting some minor sector of the population. "Today, more than one-fifth of Mexico's workforce is

167. Another major defect of industrial agriculture is its focus on a limited range of agricultural products. *See* Gonzalez, *supra* note 154, at 496 ("Although thousands of crops have been cultivated since the dawn of agriculture, twelve crops currently supply 80 percent of the world's dietary energy from plants. Just four crops—rice, wheat, potato and maize—supply nearly 60 percent of plant-derived calories and protein.").

168. *See* STEWART SMITH, PAMELA BELL, & ANDREW FILES, UNDERSTANDING THE DICHOTOMY BETWEEN INDUSTRIAL AGRICULTURE AND SUSTAINABLE AGRICULTURE: TYPES AND CHARACTERISTICS OF MAIN FARMS 2 (2004), *available at* http://www.sag.umaine.edu/more/types-and-characteristics-o.pdf ("[A]lthough alternative systems may not have higher yields or profits they reduce contamination and improve soil and water quality."); *cf.* Joseph S. Tulchin, Economic Development and Environmental Protection in Latin America 48 (1991) ("Short-term yields per unit area in a monoculture will likely exceed the yield of any single crop in a polycultural system but the total useful yield over the long term may be significantly greater in the polycultural system.").

169. North American Free Trade Agreement, U.S.-Can.-Mex., Dec. 17, 1992, 32 I.L.M. 289 (1993); BARRY, *supra* note 95, at 4 ("Mexico's farm sector, except for a small group of large-scale agroexporters with secure markets, see more risk than opportunity in the trade opening that NAFTA brings.").

170. The WTO's Agreement on Agriculture, discussed below, operates to a similar effect.

171. EARL SHORRIS, THE LIFE AND TIMES OF MEXICO 211 (2004).

172. OLSON & LYSON, *supra* note 9, at 181–211.

173. *Id.*

employed in agriculture, and there are more *campesinos* than existed at the time of the Mexican Revolution."[174]

In addition to NAFTA, the expansion of industrial, globalized agriculture has been facilitated by other neoliberal legislation[175] and international agreements such as the rules promulgated by the World Trade Organization.[176] Laws that inhibit free trade, even if they advance global conservation goals, can be struck down by the WTO, discouraging member governments from taking progressive action:

> Unacceptable laws could include subsidies to promote energy conservation, banning of pesticides allowed elsewhere in the world, restrictions on the export of raw logs to protect value-added timber industries, and tariffs to protect certain types of farmers from cheaper imports. Even a "support local farmers" campaign by a New England state drew European complaints as unfair government intrusion in food trade.[177]

In sum, NAFTA and other neoliberal legislation have done much to chip away at small-scale farming and the culture that goes along with it. And, as explained above, industrial agriculture is usually bad news for soil conservation. In the end, both the earth and the people who work it have suffered mightily under the banner of free trade.

3. Erosion

Erosion has played an important and tragic role in United States history. On April 19, 1935, a gigantic dust storm erupted from the Great Plains, blowing all the way east until it engulfed the Capitol Building in Washington, D.C.[178] "There goes Oklahoma," remarked one legislator.[179] This was the Dust Bowl. Between 1933 and 1936, Amarillo, Texas, saw nine of these "black blizzards" every month for the first four months of the year, turning the land into a powdery mess.[180] The situation in Texas was not particularly unusual, as the dust storms affected virtually every part of the Plains.[181] Depicted in John Steinbeck's *The Grapes of Wrath*, this tragedy could have been avoided had we paid more attention to the land's susceptibility to erosion. During the great westward expansion of the late nineteenth century, hordes of farmers, spurred

174. BARRY, *supra* note 95, at 2.

175. Neoliberalism is "a modern politico-economic theory favouring free trade, privatization, minimal government intervention in business, reduced public expenditure on social services, etc." COLLINS ENGLISH DICTIONARY—COMPLETE AND UNABRIDGED (2003).

176. OLSON & LYSON, *supra* note 9, at 181–211; *see also infra* Part IV.A.2.b.

177. OLSON & LYSON, *supra* note 9, at 181–211.

178. TIMOTHY EGAN, THE WORST HARD TIME: THE UNTOLD STORY OF THOSE WHO SURVIVED THE GREAT AMERICAN DUSTBOWL 228 (2006).

179. *Id.*

180. William Lockertz, *The Lessons of the Dust Bowl*, 66 American Scientist 560, 560 (1978).

181. *Id.*

on by the Homestead Act,[182] plowed up huge swaths of grassland to make room for wheat. "Much of this land—highly erodible when plowed—should have remained in grass."[183] The result was catastrophic: As many as 2.5 million individuals were forced to abandon their farms.[184] Disaster relief came at an equally high cost: "In a crash program to save its soils, the United States returned large areas of eroded cropland to grass, adopted strip-cropping, and planted thousands of miles of tree shelterbelts."[185]

History has a way of repeating itself. Despite the tragedy of the Dust Bowl, the USSR fell into the same trap some twenty years later: "In an all-out effort to expand grain production, the Soviets plowed an area of grassland larger than the wheat area of Australia and Canada combined. The result, as Soviet agronomists had predicted, was an ecological disaster—another Dust Bowl."[186]

The Soviets failed to learn the obvious lesson of the Dust Bowl: not all land is made for farming. Unfortunately, it seems that very few of us have learned this lesson. Ethiopia loses nearly two billion tons of topsoil every year washed away by rain.[187] One of the main culprits is careless grazing and farming on its mountainous slopes; the topsoil loses the anchoring benefit of roots, then gravity and precipitation do the rest. "This is one reason Ethiopia always seems to be on the verge of famine, never able to accumulate enough grain reserves to provide meaningful food security."[188]

Ethiopia is but one nation in an endless list of countries struggling with erosion. In terms of the planet's overall health, the problem may be as serious as climate change:

> Although more than 99% of the world's food comes from the soil, experts estimate that each year more than 10m hectares (25m acres) of crop land are degraded or lost as rain and wind sweep away topsoil. An area big enough to feed Europe—300m hectares, about 10 times the size of the UK—has been so severely degraded it cannot produce food, according to UN figures.[189]

To be fair, the need for nutrition is often so pressing that we seem to have no choice but to sacrifice the land in satisfaction of our short-term

182. Homestead Act of 1862, 12 Stat. 392; THAD A. BROWN, THE IMPACT OF POPULATION MOBILITY ON AMERICAN VOTING BEHAVIOR 29 (1988).

183. Lester Brown, *Peak Soil Is No Joke: Civilization's Foundation Is Eroding*, GRIST (Sept. 29, 2010), www.grist.org/article/civilizations-foundation-eroding.

184. ELIZABETH BROOKS, THE LLANO ESTACADO OF THE U.S. SOUTHERN HIGH PLAINS: ENVIRONMENTAL TRANSFORMATION AND THE PROSPECT FOR SUSTAINABILITY 82 (2002).

185. Brown, *supra* note 183.

186. *Id.*

187. *Id.*

188. *Id.*

189. Radford, *supra* note 13.

requirements.[190] In the long term, however, we are bequeathing an even graver situation to future generations.

4. Sprawl and the Loss of Valuable Farmland

In the 1950s and 1960s, Long Island's Suffolk County was a leading producer of fruits and vegetables. Suffolk County produce filled market stalls in New York City, providing urbanites with fresh, local crops.[191] Well removed from the hubbub of the metropolis, it was farmland through and through. Now Suffolk County is just another suburb—strip-malls and subdivisions and 1556 people per square mile.[192]

If erosion is the most significant threat to the quality of agricultural farmland, urban sprawl takes the lead when it comes to *quantity*. Urban sprawl is a one-way ratchet: "Once farmland is lost, it rarely, if ever, reverts back to agricultural production."[193] Urban and suburban development

> forecloses any options for agriculture on a particular piece of land; if you grew up on a vegetable farm in western Long Island or a productive orchard in the Santa Clara Valley (or any of a hundred other urban fringe areas) during the 1940s or 1950s, you literally can't go home again.[194]

The same goes for developing countries around the world.[195] In my current home of Cochabamba, Bolivia, the landscape and culture are changing at warp speed. The Cochabamba Valley is known as the "granary of Bolivia," and it was one of the main agricultural regions of the Incan Empire.[196] When

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190. *See, e.g.*, BRETT, *supra* note 2, at 226 ("If you're a poor peasant scrabbling out a living on a hopeless piece of land, the need to protect it from predators is overwhelming, even when this leads to further environmental damage that will return to haunt you.").

191. *Geographic Comparison Table*, U.S. CENSUS BUREAU, http://factfinder.census.gov/servlet/GCTTable?_bm=y&-ds_name=DEC_2000_SF1_U&-CONTEXT=gct&-mt_name=DEC_2000_SF1_U_GCTPH1_US9&-redoLog=false&-_caller=geoselect&-geo_id=&-format=US-25 (last visited July 23, 2011). By way of reference, Sacramento County in California has a population density of 1267 people per square mile. *Id.*

192. *Id.* Some might say this is the inevitable result of population growth, but there are many ways to accommodate a growing populace short of urban sprawl. These include urban growth boundaries, brownfields development, greenbelts, vertical growth, and other densification strategies. *See generally* Witold Rybczynski, *Dense, Denser, Densest: Americans Like Their Cities Spacious. Will Concerns About Costs and the Environment Push Them to Rein in Sprawl?*, 35 WILSON Q. 46 (2011) (describing the opportunities and challenges of urban densification in the United States); *see also* MICHAEL R. GREENBERG, ENVIRONMENTAL POLICY ANALYSIS AND PRACTICE 14 (2007) ("Brownfields redevelopment is a separate policy activity that has been pursued for well over a century, especially in the United Kingdom and elsewhere, as an approach for rehabilitating declining neighborhoods and reclaiming land."); MICHAEL HOUGH, CITIES AND NATURAL PROCESS: A BASIS FOR SUSTAINABILITY 221–32, 235–41 (2004) (discussing greenbelts and urban growth boundaries).

193. Tim Bernasek, *Oregon Agriculture and Land-Use Planning*, 36 ENVTL. L. 165, 169 (2006).

194. OLSON & LYSON, *supra* note 9, at 3–5.

195. Yeh & Li, *supra* note 151, at 73.

196. *See* TOM B. JONES, SOUTH AMERICA REDISCOVERED 175 (1949) ("Most travelers found Cochabamba, 'the granary of Bolivia,' infinitely preferable to other Bolivian cities. The valley produced wheat, maize, and barley; apples, pears, and quinces were also grown. These products were exported to the mining areas and to the cacao-growing region of Yungas."); s*ee also* BROOKE LARSON,

the Spanish came, Cochabamba farmers fed countless workers at the mines in Potosi—the world's most important source of silver from the sixteenth to the eighteenth centuries—and kept bellies full in the urban center of La Paz.[197] Although the story of agriculture in the Cochabamba Valley is not without its depressing moments—the Spanish, and even the colonizing Incas, were not exactly progressive in their approach to rural labor—it has informed the identity of the region and imbued it with values and cultural traditions that can be found nowhere else on earth.[198] This is all changing, and urban sprawl is one of the main culprits.

Cochabamba has been a full-fledged city for quite some time. It is only in recent decades, however, that it has begun to encroach significantly upon the surrounding agricultural landscape.[199] For a variety of social and economic reasons, communities that were traditionally devoted to farming have been converted to residential and commercial zones. It makes little sense from a national and global perspective to have rich, productive soil overrun by single-lot homes and stores; there are other areas that could be developed (including upward growth in the urban core) without the sacrifice of prime farm land. But even if they ought to, national and global interests do not drive development decisions.[200] Landowners see that they can make more money through subdivision and sales than through agricultural use or maintaining the land as an open space, and they act according to what they see is their own best interest. Tiquipaya, Colcapiruha, Queru Queru—these traditional farming communities have all been or are in the process of being converted to expensive suburbs, eliminating forever their rural character and pushing aside *campesinos* who can no longer afford to live there.[201]

COCHABAMBA, 1550–1900: COLONIALISM AND AGRARIAN TRANSFORMATION IN BOLIVIA 173 (1998) ("The European sojourners and administrators, weary after weeks of travel by mule or horseback across the altiplano, must have been relieved and delighted upon arriving in Cochabamba valley, to find a temperate climate and a fertile land inhabited by many Spaniards and creoles. Like Vázquez de Espinosa more than a century earlier, Cosine Bueno wrote in the 1740s that Cochabamba had every right 'to call itself the granary of Peru [encompassing modern-day Bolivia], because it produces in abundance all kinds of seeds in a benign and healthy climate . . .'"); *see also id.* at 298 (explaining that "the Valle Bajo [of Cochabamba] was annexed directly by the Incas and turned into a principal granary").

197. ROBERT H. JACKSON, REGIONAL MARKETS AND AGRARIAN TRANSFORMATION IN BOLIVIA: COCHABAMBA, 1539-1960, 39 (1994).

198. Interview with Mauricio Sanchez Patzy, Professor of Sociology, Universidad Mayor de San Simon, in Cochabamba, Bolivia (Aug. 8, 2011).

199. *Id.*

200. *Cf.* Barbara L. Lawrence, *The Context and Causes of Sprawl*, *in* NATURE IN FRAGMENTS: THE LEGACY OF SPRAWL 3, 3 (Elizabeth A. Johnson & Michael W. Klemens eds., 2005) (explaining that, in the United States at least, "sprawl is driven by a set of public policies at the national, state, and local levels").

201. Interview with Mauricio Sanchez Patzy, *supra* note 198. Sprawl is not the only problem facing the Cochabamba Valley. Careless land-use practices combined with the landscape's dramatic topography have resulted in alarming rates of erosion. Karl S. Zimmerer, *Environmental Discourses of Soil Degradation in Bolivia: Sustainability and the Search for Socioenvironmental "Middle Ground"*, *in* LIBERATION ECOLOGIES: ENVIRONMENT, DEVELOPMENT, SOCIAL MOVEMENTS 98, 111 (Richard Peet & Michael Watts eds., 1996) ("Severity of erosion in Cochabamba surpasses even the debilitating national

It is not only the countryside that suffers under urban sprawl; the cities themselves feel the consequences. The unplanned or poorly planned growth we see in the United States and around the world leaves urban cores impoverished—a result of the rich fleeing to the surrounding bedroom communities—while simultaneously swallowing up valuable farmland and open space.[202] Detroit is a perfect example of this phenomenon. After the riots of 1967, whites fled the city proper at alarming rates.[203] The suburbs in Macomb and Oakland Counties exploded: houses, shopping malls, and parking lots went up with little thought of the long-term consequences. Detroit, meanwhile, suffered. Whole neighborhoods were abandoned, leading to blight and increased crime.[204] This in turn led to further flight and, eventually, a political and racial situation that pitted city-dwellers against their suburban neighbors. It cannot all be blamed on unplanned suburban development, but such development certainly played a role.[205] Had lawmakers and political leaders considered stricter limits on urban growth, perhaps Detroit itself would have maintained the economic and social resources to thrive. Unplanned suburban growth reinforces and enables the idea that it is okay to abandon the city when the going gets tough.

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average. Its threat has become a pressing issue for many institutions and inhabitants—including more than 100,000 peasant farmers in the region whose livelihoods depend on small-scale cropping, livestock raising, and a wide variety of non-farm work.")

202. *See* OLSON & LYSON, *supra* note 9, at 3 ("The approach to development in the United States is very inefficient—a diffuse pattern that leaves impoverished urban cores behind while replacing rural landscapes with suburban sprawl that degrades many landscape functions and offers a diminished quality of life."); *see also* OWEN D. GUTFREUND, TWENTIETH CENTURY SPRAWL: HIGHWAYS AND THE RESHAPING OF THE AMERICAN LANDSCAPE 95 (2004) ("In these circumstances, public investments in transportation infrastructure worked against the city, advancing the viability of suburban communities while undermining the sustainability of the older urban core. To make matters worse, subsidized superhighways provided added inducement for people and capital to migrate outward.").

203. David M. Sheridan, *Making Sense of Detroit*, 38 MICH. Q. REV. 321, 326 (1999) ("It is another fire that marks the beginning of the current historical moment: the fire that resulted from the 1967 riot, the worst of that decade. Although physically damaging, the fire did not literally return the city to empty space as the 1805 fire did. Instead, this emptying was accomplished symbolically: as a symbol of urban instability, it expedited the 'white flight' that ultimately resulted in a highly under- and homogeneously populated city.").

204. *See generally* Peter Hitchens, *From Motown to Ghost Town*, MAIL ON SUNDAY, July 10, 2011, at 85.

205. *See* Myron Orfield, *Land Use and Housing Policies to Reduce Concentrated Poverty and Racial Segregation*, 33 FORDHAM URB. L.J. 877, 877–878 (2006) ("Urban sprawl tends to exacerbate residential racial segregation because unchecked development at the fringe permits rapid abandonment of inner-suburban and central-city housing stocks as White residents move into expanding suburban developments. The resulting isolation of non-Whites in the increasingly segregated areas that Whites abandon effectively denies many of those residents access to the sites of opportunity in distant, developing areas of the region.").

5. Salinization

Salinization is a close second to erosion as the most serious threat to soil quality.[206] As a result of salinization, we annually lose at least 1.6 million hectares of fertile land worldwide.[207] Although salinization occurs naturally through the movement of saline water (e.g., from saline springs), climatic dryness, and coastal influence, human-induced salinization is the real problem.[208] And when we're talking about human-induced salinization, we're mainly talking about irrigation.[209]

When farmers irrigate irresponsibly—using too much water, irrigating with water high in saline content, or failing to apply appropriate drainage practices—salinization occurs and leads to a downward spiral.[210] "Without appropriate preventive measures, salt-sensitive crops will disappear and be replaced by increasingly salt-tolerant plant species until the land is rendered unsuitable for any useful crop production."[211]

This is a serious problem across the globe, especially in drier areas. Approximately 20 percent of all irrigated land is affected by high salinity.[212] In Pakistan, 14 percent of the once-fertile land in the Indus Basin has become unusable through because of salinization.[213] Closer to home, a drive through California's Central Valley reveals immense swaths of white, intersected by fences that now serve no purpose.[214] And the mighty Colorado River, which

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206. Van Ginkel et al., *supra* note 34, at 250.

207. *Id.*

208. *Id.*

209. *Id.*

210. *See id.* at 248 (describing the general domino effect that occurs with land degradation, including salinization). The following passage from the International Institute for Land Reclamation and Improvement explains the process of salinization through improper irrigation:

> Salinity develops in (semi)arid regions, simultaneously with water-logging. As long as the water-table remains deep, the salts, imported with the irrigation water (in the order of 0.5 to 2 tons per [hectare] per year), are washed down to the deeper soils with the percolation losses of irrigation water. If the water-table becomes shallow, however, excess irrigation can no longer take place, otherwise the land would become flooded with stagnant water. Hence, salt leaching no longer occurs, and the salts brought in with the irrigation water accumulate in the root-zone.

R.J. Oosterbaan, *Effectiveness and Social/Environmental Impacts of Irrigation Projects*, *in* ANNUAL REPORT 1988 OF THE INTERNATIONAL INSTITUTE FOR LAND RECLAMATION AND IMPROVEMENT 26 (1989), *available at* http://www.waterlog.info/pdf/irreff.pdf.

211. VAN GINKEL ET. AL, *supra* note 34, at 247. Technically speaking, "[t]he major effects of salinity on soil properties are swelling of clay soils, dispersion of fine soil particles, crust formation, and a decrease in water movement within the soil profile." *Id.* at 250.

212. *Id.* at 250.

213. *Water in the 21st Century: Imperatives for Wise Water Management: From Public Good to Priced Commodity*, ASIAN DEV. BANK, http://www.adb.org/Documents/Reports/Water/from_public.asp (last visited Dec. 27, 2011).

214. For an overview of the salinity problem in the Central Valley and its economic repercussions, see generally Richard E. Howlett et al., The Economic Impacts of Central Valley Salinity (Mar. 16, 2009), http://swap.ucdavis.edu/SWAPFiles/ReportsPapers/MainDocument_031909.pdf (last visited March 23, 2012).

picks up the discharge from countless irrigated acres along its course through the western United States, is so brackish at its entry point to Mexico that it is unfit for human consumption.[215] To comply with its obligations under the Mexican Water Treaty of 1944,[216] the United States has been forced to construct a slew of desalinization plants and washing stations upstream of the border.[217] Even so, the U.S. Department of Agriculture (USDA) has stated that "[a]n additional 800,000 tons of annual salt control are needed through 2020 to ensure that the probability of exceeding the numeric criteria for total dissolved solids in the Colorado River remains low."[218] Additional control will come at a cost, but so will inaction: damages from salinity in the Colorado River Basin run between $500 million and $750 million per year "and could exceed $1.5 billion per year if future increases are not controlled."[219] Downstream, Mexico suffers at a rate that may exceed $100 million per year.[220] Nationally and internationally, salinization is becoming impossible to ignore.

6. Desertification

Land degradation in drylands—lands that receive little rain but are still able to support some level of agriculture or grazing—leads to an especially vexing result: desertification. If not carefully managed, drylands can go from productive and life-sustaining to virtually barren.[221] Already more susceptible to salinization, drylands are also subject to higher rates of erosion because they lack the extensive plant cover that comes with abundant rainfall.[222] They are sensitive environments calling for sensitive management. We have learned this lesson the hard way.

Desertification was a major contributor to the collapse of several civilizations, including the Sumerians of the Fertile Crescent and the Xia Imperial Dynasty.[223] In our time, the Sahara Desert is pushing southward at a rate of thirty miles per year.[224] Elsewhere in Africa, the surface area of Lake

215. *Colorado River Basin Salinity Control Program*, NATURAL RES. CONSERVATION SERV. [hereinafter "NRCS"], http://www.nrcs.usda.gov/programs/salinity/ (last updated July 12, 2010).

216. Water Treaty, U.S.-Mex., Feb. 3, 1944, 59 Stat. 1219.

217. *Colorado River Basin Salinity Control Project*, U.S. DEP'T OF THE INTERIOR, http://www.usbr.gov/projects/Project.jsp?proj_Name=Colorado+River+Basin+Salinity+Control+Project (last updated April 18, 2011).

218. NRCS, *supra* note 215.

219. U.S. DEP'T OF THE INTERIOR, *supra* note 217.

220. *Id.*

221. VAN GINKEL ET AL., *supra* note 34, at 249–50.

222. *See id.* at 249 ("Drylands are more susceptible to wind erosion than any other form of degradation because [their] soils tend to be dry, poorly structured, and sparsely covered by vegetation.").

223. HELMUT GEIST, THE CAUSES AND PROGRESSION OF DESERTIFICATION 4–6 (2005).

224. Abraham McLaughlin & Christian Allen Purefoy, *Hunger Is Spreading in Africa*, CHRISTIAN SCI. MONITOR, Aug. 1, 2005, http://www.csmonitor.com/2005/0801/p01s02-woaf.html.

Chad has shrunk some 95 percent since the 1960s.[225] Farther east, "China's desertification may be the worst in the world."[226] From 1950 to 1975, China saw six hundred square miles of land converted to desert every year.[227] As of 2000, this number had jumped to 1400 square miles.[228] This has forced the Chinese to partially or completely abandon approximately 24,000 villages.[229]

The prime causes of desertification are overuse, especially overgrazing, and irrigation.[230] Climate change may play a role, but it is dwarfed in significance by human actions.[231] In the case of Lake Chad, for example, the drying effects of a long drought were compounded by overgrazing in the surrounding savannah.[232] In arid and semiarid regions, vegetation has a major influence on the climate; its loss from overgrazing in the Lake Chad area worsened what was already a serious drought.[233] This drought in turn prompted increases in irrigation, placing even more pressure on the lake and its tributaries.[234] Rather than ameliorating the difficult circumstances produced by drought, our lack of foresight made things worse:

> The situation is a "domino effect," the researchers say. Overgrazing reduces vegetation, which in turn reduces the ecosystem's ability to recycle moisture back into the atmosphere. That contributes to the retreat of the monsoons. The consequent drought conditions have triggered a huge increase in the use of lake water for irrigation, while the Sahara has gradually edged southward.[235]

With an expanding population and more irrigation, the situation is expected to deteriorate even further.[236] If we do not change course, the entire Lake Chad region could become a desert. Aggressive irrigation and grazing may produce more crops and livestock in the short term, but over the long haul such an approach may actually preclude these activities altogether.

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225. Hillary Mayell, *Shrinking African Lake Offers Lesson on Finite Resources*, NAT'L GEOGRAPHIC NEWS, Aug. 26, 2001, http://news.nationalgeographic.com/news/2001/04/0426_lakechadshrinks.html.

226. LESTER R. BROWN, PLAN B 3.0: MOBILIZING TO SAVE CIVILIZATION 95 (2008), *available at* http://www.earth-policy.org/images/uploads/book_files/pb3book.pdf.

227. *Id.* at 96.

228. *Id.*

229. *Id.*

230. NATHANIEL HARRIS, ATLAS OF THE WORLD'S DESERTS 183 (2003).

231. *See, e.g.*, Mayell, *supra* note 225 ("The lake's decline probably has nothing to do with global warming, report the two scientists, who based their findings on computer models and satellite imagery made available by NASA. They attribute the situation instead to human actions related to climate variation, compounded by the ever increasing demands of an expanding population.").

232. *See id.* ("Overgrazing of the savanna is one of the biggest factors in the shrinking of the lake . . . .").

233. *Id.*

234. *Id.*

235. *Id.*

236. *Id.*

The story in China is largely the same. Climate change from greenhouse gases may play some role, but local grazing practices represent the major problem:

> While the United States, a country with comparable grazing capacity, has 97 million cattle, China has a slightly smaller herd of 82 million. But while the United States has only 9 million sheep and goats, China has 284 million. Concentrated in China's western and northern provinces, sheep and goats are destroying the land's protective vegetation. The wind then does the rest, removing the soil and converting productive rangeland into desert.[237]

7. Contamination

Contamination occurs when toxic substances are introduced into the environment. In the case of soil, the leading cause of agricultural contamination is the use of pesticides, manures, and fertilizers.[238] As far as soil is concerned, the main problem with manures and fertilizers is the introduction of heavy metals like arsenic, zinc, cadmium, uranium, and copper.[239] In addition, fertilizers contain salts, contributing to the salinization problem. This is obviously not welcome news for soil conservationists, but the bigger problem still is pesticides.

In 1962, Rachel Carson opened our eyes to the harms of pesticides.[240] She showed us how dichlorodiphenyltrichloroethane (DDT) and other chemicals were killing birds, fish, and even humans.[241] Although the United States banned DDT ten years later[242]—and a worldwide ban followed under the Stockholm Convention[243]—it seems we have forgotten the broader message of *Silent Spring*. Since 1940, global pesticide use has "grown steadily."[244] Pesticides, which include herbicides, insecticides, and fungicides,[245] are by their very nature harmful to life.[246] They are popular because they harm some

237. Brown, *supra* note 183.

238. IBRAHIM A. MIRSAL, SOIL POLLUTION: ORIGIN, MONITORING, AND REMEDIATION 137 (2008). There are several pollution sources besides agriculture, including "urban sources" (e.g., waste disposal), "industrial sources" (e.g., mining and smelting), "atmospheric sources" (e.g., wind-blown pollutants), and "incidental sources" (e.g., Chernobyl). *Id.* at 138.

239. *Id.* at 137.

240. *See generally* RACHEL CARSON, SILENT SPRING (1962).

241. *Id.* at 23, 26, 123, 140, 222.

242. U.S. ENVTL. PROT. AGENCY, DDT REGULATORY HISTORY: A BRIEF SURVEY (TO 1975) (1975), *available at* http://www.epa.gov/aboutepa/history/topics/ddt/02.html (last updated June 8, 2011).

243. *See* Conference of Plenipotentiaries on the Stockholm Convention on Persistent Organic Pollutants, Stockholm, Swed., May 22–23, 2001, *Final Act of the Conference of Plenipotentiaries on the Stockholm Convention on Persistent Organic Pollutants* [hereinafter "Stockholm Convention"], 1 n.1, U.N. Doc. UNEP/POPS/CONF/4 (June 5, 2001), *available at* http://www.pops.int/documents/meetings/dipcon/25june2001/conf4_finalact/en/FINALACT-English.PDF.

244. PATRICE DION, SOIL BIOLOGY AND AGRICULTURE IN THE TROPICS 255 (2010).

245. CARSON, *supra* note 240, at 139.

246. *See* Kim M. Blindauer et al., *Environmental Pesticide Illness and Injury: The Need for a National Surveillance System*, 61 J. ENVTL. HEALTH 9, 9 (1999).

life forms (the target) more than others.[247] But they do their job too well, killing off many helpful organisms in addition to the "harmful" ones.[248] This decreases biodiversity and negatively impacts soil quality.[249] With this in mind, it perhaps comes as little surprise that Cuba has some of the healthiest soil in the world. Thanks to the U.S. embargo, Cuba's soil remains relatively free of agricultural chemicals.[250]

The harms of agricultural pesticides are not limited to the soil itself. The alarming die-off of bees has been linked to pesticides,[251] and these toxins end up in our food.[252] When the rain comes, pesticides, along with fertilizers, are washed downstream and end up in the ocean, producing "dead zones" like we see in the Gulf of Mexico[253] and contributing to coral bleaching like we see in Australia's Great Barrier Reef.[254]

8. Nutrient Depletion

According to the United Nations, "[d]eficiency of plant nutrients in the soil is the most significant biophysical factor limiting crop production across very large areas in the tropics."[255] Putting aside nutrient depletion through erosion—which alone costs hundreds of billions of dollars every year—the most common form of nutrient depletion occurs as a result of overly aggressive agriculture.[256] Nutrients are naturally removed from the soil by plants, which then use these nutrients to grow. In a balanced ecosystem, however, the nutrients are replaced when the plants die and the underlying bedrock is weathered. This delicate equilibrium is disturbed when nutrients are removed faster they can be replaced.[257] If not done carefully, raising and harvesting

247. *See* S. ELLIS & A. MELLOR, SOILS AND ENVIRONMENT 284 (1995).

248. *Id.*

249. *Id.*

250. BRETT, *supra* note 2, at 84.

251. David Derbyshire, *Could Pesticides Be to Blame for Disappearance of the Honey Bee?*, DAILY MAIL, Oct. 1, 2009, at 11.

252. Sean Poulter, *Pesticides Found on 66pc of Fruit Given Out in Schools*, DAILY MAIL, June 23, 2006, at 21.

253. Jenny Marder, *Farm Runoff in Mississippi River Floodwater Fuels Dead Zone in Gulf*, PBS NEWSHOUR: THE RUNDOWN (May 18, 2011, 12:33 PM), http://www.pbs.org/newshour/rundown/2011/05/the-gulf-of-mexico-has.html.

254. Nick Bryant, *Australia's Great Barrier Reef at 'Risk from Pesticide*,*'* BBC NEWS, Aug. 13, 2011, http://www.bbc.co.uk/news/world-asia-pacific-14516253.

255. UNITED NATIONS ENV'T PROGRAMME, GLOBAL ENVIRONMENTAL OUTLOOK: ENVIRONMENT FOR DEVELOPMENT 4, at 96 (2007) *available at* http://www.unep.org/geo/geo4/report/GEO-4_Report_Full_en.pdf.

256. ALAN WILD, SOILS, LAND AND FOOD: MANAGING THE LAND DURING THE TWENTY-FIRST CENTURY 75, 81 (2003).

257. *See* Michael Karr, *Mineral Nutrient Depletion in US Farms and Range Soils*, YOUNGEVITY CAN., http://www.canadianlongevity.net/misc/mineral_depletion.php (last visited Aug. 23, 2011) ("Agriculture, both crops and livestock, depletes soils of mineral nutrients, because of the removal of nutrients contained in the produce sold. Since the 1950's the increase in farm productivity and efficiency has not always resulted in a corresponding increase in the replenishment of mineral nutrients to the soils

crops, especially with monoculture practices, can do just that.[258] The quick fix is addition of fertilizer, but that brings its own set of problems.[259]

On top of the environmental concerns presented by fertilizers, soil depletion presents economic and sustainability concerns. A key nutrient to plant life, phosphorous is one of the principal elements in chemical fertilizers.[260] Unfortunately, there is not enough phosphorous to go around. Estimates range from 50 to 130 years before we exhaust global phosphorous supplies,[261] and we are feeling the pinch already:

> Increased demand for fertilizer and the decreased supply of phosphorus exports will result in higher prices, significantly affecting millions of farmers in the developing world who live on the brink of bankruptcy and starvation. Rising fertilizer prices could tip this balance.
>
> Already, signs are emerging that our current practices cannot continue for long. Between 2003 and 2008, phosphate fertilizer prices rose approximately 350 percent. In 2008, rising food prices sparked riots in more than 40 countries. Although the spike in fertilizer prices was only partially responsible for the higher food prices, the riots illustrate the social upheaval caused by disruptions to the world's food supply. The 2008 food riots were only stopped by government promises of food subsidies—a viable strategy only as long as governments can afford the ever-increasing costs of food support. [262]

9. The Rise of the City and the Fall of the Campo

In 1950, more than 15 percent of the United States population earned a living through farming.[263] By 1992, farmers represented less than 2 percent of the population.[264] Likewise, the number of farms in the United States dropped from more than 5.3 million to under two million during this time period.[265]

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through commercially available means. This is because many growers in the US do not have sufficient management expertise to account for or replace all plant nutrient elements removed.").

258. *See, e.g.*, Asoka Mendis & Caroline Van Bers, *Bitter Fruit,* 25 ALTERNATIVES J. 18, 18 (1999); *see also* JOSEPH S. TULCHIN & ANDREW I. RUDMAN, ECONOMIC DEVELOPMENT AND ENVIRONMENTAL PROTECTION IN LATIN AMERICA 48 (1991) ("Research shows that diversified cropping helps to overcome three important limiting factors to tropical agriculture: soil nutrient depletion, weed competition, and plant diseases.").

259. *See supra* Part III.B.7.

260. TED STEINBERG, DOWN TO EARTH: NATURE'S ROLE IN AMERICAN HISTORY 115 (2002) (discussing the use of phosphorous-based fertilizers in the American South).

261. Patrick Derey & Bart Anderson, *Peak Phosphorous*, ENERGY BULL., Aug. 13, 2007, http://www.energybulletin.net/node/33164.

262. James Elser & Stuart White, *Peak Phosphorous*, FOREIGN POL'Y, Apr. 20, 2010, http://www.foreignpolicy.com/articles/2010/04/20/peak_phosphorus.

263. OLSON & LYSON, *supra* note 9, at 182.

264. *Id.*

265. *Id.*

Raw production may not have slipped,[266] but farming was losing its place in the American conscious as a significant occupation.

Based upon the foregoing discussion of agriculture's effects on soil quality, one might suppose this trend is a positive development. But fewer farmers does not mean reduced production or use of the land: Industrialized farms, with their mechanization and advances in plant and animal science, are turning out more product than ever.[267] At best, the fact that we have fewer farmers is a wash from a soil-conservation perspective. From a cultural and economic perspective, it is a tragedy.

What's happening in "flyover country"? The very name embodies the contempt we have come to hold for rural society and the farming sector. For many Americans, the bulk of our nation is a dull stretch of land that we quickly pass on our way to more exciting places, broken up by the occasional resort town offering tourists an escape from city life:

> Many CEOs and Hollywood stars seek a change of scenery at private ranches and resorts in the interior, where the descendants of once proud farming and ranching families wait on their tables or scrub their floors. As ambitious young people move out, entire regions enter an economic death spiral, characterized by an aging population, a shrinking tax base, and contracting public and private investment.[268]

These communities are dying and, unfortunately, so is the rural way of life. The concept of family farming and ranching has become so novel that it's the subject of a reality TV show.[269] This way of life is quickly becoming a thing of the past.[270]

Above, I mentioned that the shrinking number of Americans involved in farming was at best a wash for the goals of soil conservation. That is probably

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266. *See id.* ("Smaller, family-labor farms have declined substantially in number as larger, increasingly industrial-like operations have become the primary source of food and other agricultural products. . . . Technologically sophisticated and highly standardized production techniques have penetrated most segments of farming, and advances in plant and animal sciences have resulted in substantial increases in production.").

267. *Agricultural Productivity in the United States*, ECON. RESEARCH SERV., U.S. DEP'T OF AGRIC., http://www.ers.usda.gov/Data/AgProductivity/ (last updated May 5, 2010).

268. Michael Lind, *The New Continental Divide*, ATL. MONTHLY, Jan.–Feb. 2003, at 86.

269. Animal Planet's *Last American Cowboy* chronicles life on three Montana ranches. According to the president of Animal Planet, "'The families featured in *Last American Cowboy* have extraordinary and compelling stories of grit and determination as they struggle to preserve their way of life for future generations . . . .'" John Thompson, *Reality TV Portrays Life on Montana Ranches*, IDAHO FARM BUREAU Q., Winter 2011, at 5 (quoting Marjorie Kaplan).

270. Thomas Merton has lamented the rise of the city as a spiritual crisis:

> The primordial blessing, 'increase and multiply,' has suddenly become a hemorrhage of terror. We are numbered in billions, and massed together, marshaled, numbered, marched here and there, taxed, drilled, armed, worked to the point of insensibility, dazed by information, drugged by entertainment, surfeited with everything, nauseated with the human race and with ourselves, nauseated with life. As the end approaches, there is no room for nature. The cities crowd it off the face of the earth.

THOMAS MERTON, RAIDS ON THE UNSPEAKABLE 70 (1966).

too generous. As the United States has shed jobs in the farming sector, agricultural practices have moved into the periphery of the public consciousness.[271] We do not know what is happening out there.[272] Because it is just "dirt" in "flyover country" worked by a sliver of the population, we really do not care.[273] Industrial agriculture receives far less scrutiny than big oil, mining, and forestry, yet its impact on the environment is just as severe.

IV. PROTECTING OUR SOIL AND AGRARIAN COMMUNITIES REQUIRES A NEW GLOBAL TREATY

A. Attempts to Date: Social Movements and Legal Responses

Despite its relatively low profile, the movement toward soil conservation and heightened protection of rural culture has seen some significant victories. As with most reform efforts, however, legal change has only come after the people have organized and demanded such change. And in the case of soil and rural communities, the legal protections developed are just not enough.

1. Social Movements

When I was eight years old, my dad took my brother and me to a Willie Nelson concert. The show was sponsored by a group called Farm Aid.[274] Though I didn't much enjoy it at the time, I appreciate it deeply in retrospect. Unbeknownst to me, I was participating in—or at least witnessing—social activism targeted specifically at agrarian concerns. As I write this, Farm Aid has been at it for over twenty-five years, "work[ing] with local, regional and national organizations to promote fair farm policies and grassroots organizing campaigns designed to defend and bolster family farm-centered agriculture."[275]

Farm Aid is just one example of people organizing to defend family farming and rural culture. On the international front, groups like La Via Campesina (global),[276] Union Nacional de Organizaciones Regionales

271. *See* BRETT, *supra* note 2, at 88 ("[G]lobalization has separated us from contact with the soil and moved us at an accelerating rate into cities. And city people no longer understand rural life, speeding up its rush towards extinction.").

272. *See id.*

273. *See id.*

274. *About Us*, FARM AID, http://www.farmaid.org/site/c.qlI5IhNVJsE/b.2723609/k.C8F1/About_Us.htm (last visited Dec. 28, 2011) ("Willie Nelson, Neil Young and John Mellencamp organized the first Farm Aid concert in 1985 to raise awareness about the loss of family farms and to raise funds to keep farm families on their land. Dave Matthews joined the Farm Aid Board of Directors in 2001. Farm Aid has raised more than $39 million to promote a strong and resilient family farm system of agriculture. Farm Aid is a nonprofit organization whose mission is to keep family farmers on their land.").

275. *Id.*

276. *What Is La Via Campesina?*, LA VIA CAMPESINA (Feb. 9, 2011, 2:08 PM), http://viacampesina.org/en/index.php?option=com_content&view=category&layout=blog&id=27&Itemid=44 ("La Via Campesina is the international movement which brings together millions of peasants,

Campesinas Autonomas (Mexico),[277] the National Network of Small-Scale Farmers Groups (Tanzania),[278] the All Nepal Peasants' Federation,[279] and many others are leading the charge.

Of course, non-governmental organizations are not the only groups that have organized for change. In fact, some of the more impactful movements have been led by communities of ordinary folks standing up for themselves. A case in point is the Zapatista movement of Chiapas, Mexico.

On January 1, 1994, the same day that NAFTA went into effect, a group of armed *campesinos* rose up out of the Lacandon Jungle in Chiapas, Mexico.[280] They called themselves "Zapatistas," seeing their struggle as an extension of the movement led by Emiliano Zapata three-quarters of a century earlier.[281] With their "dramatic entry" into Mexican politics, they sent a strong message to their nation's elites:

> Don't forget us, the rebels were saying, you depend on us for your political and economic stability. We, the campesinos of Mexico, grow your corn, cut your cane, and pick your coffee. We have not gone away during the past 75 years of post-revolutionary governments, and we will not go away with neoliberalism and free trade.[282]

The Zapatistas demanded land redistribution and Mexico's withdrawal from NAFTA.[283] One of their principal complaints was that they were being pushed aside by economic policies that favored industrial agriculture over small-scale farming.[284] Although the Zapatistas didn't achieve everything they sought, their actions made a lasting impact and inspired millions worldwide.[285]

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small and medium-size farmers, landless people, women farmers, indigenous people, migrants and agricultural workers from around the world. It defends small-scale sustainable agriculture as a way to promote social justice and dignity. It strongly opposes corporate driven agriculture and transnational companies that are destroying people and nature.").

277. *¿Que Es la UNORCA?*, UNIÓN NACIONAL DE ORGANIZACIONES REGIONALES CAMPESINAS AUTÓNOMAS [NAT'L UNION OF AUTONOMOUS REG'L PEASANT ORGS.], http://www.unorca.org.mx/objetivos/objet-01.htm (last visited Dec. 28, 2011).

278. *About MVIWATA*, NAT'L NETWORK OF SMALL-SCALE FARMERS GROUPS IN TANZ. (MVIWATA), http://mviwata.org/content/about-mviwata (last visited Dec. 28, 2011).

279. ALL NEPAL PEASANTS' FEDERATION, http://www.anpfa.org.np/ (last visited Dec. 28, 2011).

280. BARRY, *supra* note 95, at 3.

281. *See id.*

282. *Id.*

283. Elizabeth Henderson, *Rebuilding Local Food Systems from the Grassroots up*, 50 MONTHLY REV. 112, 116 (July 1998).

284. *See* Shawn Hattingh, *The Free Trade Assault on Farming in Mexico: Ya Basta!*, SHARE THE WORLD'S RES. (Mar. 13, 2008), http://www.stwr.org/imf-world-bank-trade/the-free-trade-assault-on-farming-in-mexico-ya-basta.html (last visted Feb. 8, 2012). As mentioned above, NAFTA was a deathblow to many small-scale Mexican farmers:

> Mexico's farm sector, except for a small group of large-scale agroexporters with secure markets, see more risk than opportunity in the trade opening that NAFTA brings. But the risks are different according to the type of grower. Most farmers are among the poorest of the poor in Mexico. They have no pickups or tractors to lose. They wear huaraches of old tire rubber, not engraved leather norteño boots. For them, the farm crisis is a threat to the survival of their families. The same lament echoes from one village to another, from Chihuahua to

In addition to movements focused on the empowerment of rural society, there have also been many efforts directly targeting soil concerns. Some of the most inspiring have occurred at the local level. To give one example, cattle ranchers along the United States-Mexican border have found ways to reintroduce and conserve native species and improve soil and water conditions.[286] Realizing that conservation requires collective action, more than thirty ranchers in Arizona and New Mexico have organized themselves by adopting conservation easements, planning for managed fires, sharing grasses, and restoring local streams.[287] To be sure, it's not pure altruism: "In return for promising not to subdivide their land, the Malpai Group [a nonprofit organization] pays ranchers either in cash or grass for the difference in value between what they get from raising cattle and what they would have gotten from selling their property."[288] But perhaps that is just the point: real change will not occur without real incentives.

Change also requires organization, especially organization at the local level. This is where soil and water conservation districts (SWCDs) come into play. Something of a blend between formal legal institutions and grassroots organizations, the total number of SWCDs in the United States is now close to 3000.[289] Although these organizations are often public entities and coordinate with more established government bodies (such as the USDA and state departments of natural resources),[290] they represent a grassroots movement: The people who direct SWCDs live and depend upon the soil that they strive to protect. It is this very connection that gives them their strength. As the Main Association of Conservation Districts explains, SWCDs work because "the programs are developed by local people to solve local problems."[291] Even though soil conservation is a global concern, local efforts play a key role in our search for solutions.

> Chiapas. "We are campesinos,' observed a young indian man from a lowlands village in Chiapas. 'The land is all we have, all we know. Without the land, what will happen to us and our children? We will be begging on the streets of Mexico City or working as peones like our grandfathers did."

BARRY, *supra* note 95, at 5.

285. Henderson, *supra* note 283, at 116.

286. *See, e.g.*, Jeffrey P. Cohn, *A New Breed of Ranchers: Landowners in Mexico's Sonoran Desert and the U.S. Southwest Are Implementing Techniques to Conserve Soil and Water Not Only for Cattle but Also for an Improved Ecosystem*, AMERICAS, Mar.–Apr. 2005, at 6.

287. *Id.*

288. *Id.*

289. *About SWCDs*, ASS'N OF ILL. SOIL AND WATER CONSERVATION DISTS., http://www.aiswcd.org/Guide/about.htm (last visited Dec. 28, 2011).

290. Some might take issue with my decision to classify soil and water conservation districts (SWCDs) as the result of a "social movement." To be sure, SWCDs were created through state legislation—recommended by President Roosevelt in the wake of the Dust Bowl—but their character remains more grassroots than bureaucratic. *See id.*

291. *What Are Conservation Districts?*, MAIN ASS'N OF CONSERVATION DISTS., http://maineswcds.org/who.htm (last visited Feb. 8, 2012).

2. Legal Responses and the Need for a Global Protocol Specifically Tailored to Promote Soil Conservation, Sustainable Farming, and the Preservation of Agrarian Culture

Despite the significant developments in environmental law over the past few decades, soil conservation has been largely overlooked. Legislation and international agreements on sustainable farming are somewhat more prevalent, but they are still far too weak. Legal rules designed to protect agrarian culture are all but nonexistent.

a. The Legal Status Quo Regarding Soil Conservation

To say that there has been no progress in the effort to construct a legal regime regarding soil conservation would be an exaggeration. To say that the international community has failed to embrace many of the ideas generated by soil conservation advocates is, unfortunately, quite accurate.

The following international agreements have some—albeit generally indirect—bearing on soil conservation: the UN Convention to Combat Desertification (UNCCD),[292] the UN Convention on Biological Diversity (UNCBD),[293] and the Kyoto Protocol.[294] Although the UNCCD is exclusively focused on the issue of desertification—a major soil conservation issue—it limits itself by focusing primarily on desertification in Africa and in failing to establish concrete benchmarks.[295] The UNCCD is a big step in the right direction, but its language is far too vague and aspirational. Capacity building is important, but we also need specific requirements and a serious enforcement mechanism.[296]

Given the biological diversity found within the ground under our feet, the UNCBD could be an important vehicle for soil conservation. But it is not. Despite the "ecosystem approach" taken by the convention, the important role played by soil in ecosystems and biodiversity is "nearly invisible."[297] The

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292. U.N. Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa, U.N. Doc. A/AC.241/27 (Sept. 12, 1994) [hereinafter UNCCD], *available at* http://www.unccd.int/cop/officialdocs/incd/pdf/24127eng.pdf.

293. U.N. Convention on Biological Diversity, June 5, 1992, 1760 U.N.T.S. 79; 31 I.L.M. 818, *available at* http://www.cbd.int/doc/legal/cbd-en.pdf.

294. Kyoto Protocol to the U.N. Framework Convention on Climate Change, U.N. Doc. FCCC/CP/1997/7/Add.1; 37 I.L.M. 22 (Dec. 10, 1997) [hereinafter Kyoto Protocol].

295. *See generally* UNCCD, *supra* note 292.

296. *See id.* at pt. II, art. 5 ("[A]ffected country Parties undertake to: (a) give due priority to combating desertification and mitigating the effects of drought, and allocate adequate resources in accordance with their circumstances and capabilities; (b) establish strategies and priorities, within the framework of sustainable development plans and/or policies, to combat desertification and mitigate the effects of drought; (c) address the underlying causes of desertification and pay special attention to the socio-economic factors contributing to desertification processes; (d) promote awareness and facilitate the participation of local populations . . . in efforts to combat desertification and mitigate the effects of drought[.]").

297. Wyatt, *supra* note 5, at 183.

closest the UNCBD comes to referencing soil is in its definition of "biological diversity": "The variability among living organisms from all sources . . . and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems."[298] Even if soil is implicit in this definition, the global soil crisis calls for something explicit.

The Kyotol Protocol, an international agreement growing out of the United Nations Framework Convention on Climate Change, established binding targets for industrialized nations—the United States conspicuously not among them—to reduce emissions of greenhouse gases.[299] By signing the protocol, party nations committed to diminish their emissions by an average of five percent against 1990 levels over the five-year period stretching from 2008 to 2012.[300] Although the primary means of reduction is supposed to be national reform (i.e., each country addresses its own emissions), the Kyoto Protocol added considerable flexibility by allowing for carbon trading and participation in the "Clean Development Mechanism" (CDM).[301] The CDM allows industrialized nations to finance projects in developing nations that reduce those latter nations' greenhouse gas emissions.[302] The reduction is then applied toward the funding party's target.[303] The CDM is where soil should figure in, but it does not. Although the Kyoto Protocol recognizes the impact soil and land-use practices have on climate change, projects involving carbon sequestration in agricultural soil have been excluded from the CDM.[304]

Either through lack of teeth (the UNCCD) or non-recognition of soil's role in the process (the UNCBD and the Kyoto Protocol), these agreements fail to adequately deal with the issue of soil conservation. As one commentator has observed, "It is probably because soils affect or are affected by most environmental processes that it has been easier for policy makers and land managers simply to consign consideration of soils to the management of other resources, rather than create an independent management scheme for soil."[305]

298. U.N. Convention on Biological Diversity, *supra* note 293, at art. 2.

299. Kyoto Protocol, *supra* note 294, at art. 3.

300. *Id.* at art. 3.1.

301. *Id.* at art. 12.

302. *See id.*

303. *Id.*; *see also* U.N. Framework Convention on Climate Change, Clean Development Mechanism, http://unfccc.int/kyoto_protocol/mechanisms/clean_development_mechanism/items/2718.php.

304. FRÉDÉRIC FORGE, CANADIAN PARLIAMENTARY RESEARCH BRANCH, CARBON SEQUESTRATION BY AGRICULTURAL SOIL 6 (2001), *available at* http://dsp-psd.pwgsc.gc.ca/Collection-R/LoPBdP/PRB-e/PRB0038-e.pdf ("Unlike reforestation, carbon sequestration in agricultural soil was not included in the original Kyoto Protocol; in other words, soils are not officially recognized as carbon sinks, and carbon stored in soil cannot be factored into a country's emissions budgets."); *see also* Wyatt, *supra* note 5, at 186.

305. Lacy, *supra* note 5, at 433.

Recognizing the need for agreements and legislation specifically targeting soil, advocates have formulated the following: the World Soil Charter,[306] the European Charter for the Protection and Sustainable Management of Soil,[307] the Thematic Strategy for Soil Protection,[308] the European Soil Charter,[309] the Alpine Convention Soil Conservation Protocol ("Alpine Convention"),[310] African Convention on the Conservation of Nature and Natural Resources (article on soil),[311]Association of Southeast Asian Nations' Agreement on the Conservation of Nature and Natural Resources (article on soil),[312] World Soils Agenda,[313] the Tutzing Initiative for a Soil Convention,[314] the International Conference on Land Degradation,[315] and the International Union for Conservation of Nature (IUCN) Draft Protocol for the Conservation and Sustainable Use of Soils.[316]

Despite their numbers and the wealth of ideas they contain, most of these instruments are nonbinding or simply have not been adopted. With the Alpine Convention standing as the world's only binding agreement specifically targeting soil—and that convention being limited to eight nations—our soil resources remain largely unprotected.[317]

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306. Food and Agric. Org. of the U.N., World Soil Charter (Nov. 1982), *available at* http://www.fao.org/docrep/T0389E/T0389E0b.htm#Appendix:%20World%20soil%20charter (last visited Dec. 28, 2011).

307. Eur. Comm. of Ministers, *Revised European Charter for the Protection and Sustainable Management of Soil*, 840th Meeting, App. 28, Item 9.1 (2003), *available at* https://wcd.coe.int/wcd/ViewDoc.jsp?id=37477&Site=CM (last visited Dec. 28, 2011).

308. Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions: Thematic Strategy for Soil Protection, EUR. PARL. DOC. (COM (2006) 231 final (2006), *available at* http://ec.europa.eu/environment/soil/pdf/com_2006_0231_en.pdf.

309. Eur. Comm. of Ministers, *European Soil Charter*, 211th Meeting, Resolution (72)19 (1972), *available at* https://wcd.coe.int/com.instranet.InstraServlet?command=com.instranet.CmdBlobGet&InstranetImage=588295&SecMode=1&DocId=644074&Usage=2.

310. Soil Conservation Protocol, 2005 J.O. (L 337) 29, *available at* http://www.alpconv.org/NR/rdonlyres/F720F0F4-2608-4CF6-8A62-4BEC3F7F56A8/0/SoilProtocolEN.pdf.

311. Organisation of African Unity, African Convention on the Conservation of Nature and Natural Resources art. IV, Sept. 15, 1968, *available at* http://www.au.int/en/sites/default/files/AFRICAN_CONVENTION_CONSERVATION_NATURE_AND_NATURAL_RESOURCES.pdf.

312. Ass'n of Se. Asian Nations, Agreement on the Conservation of Nature and Natural Resources art. VII (July 9, 1985), *available at* http://www.asean.org/1490.htm.

313. CTR. FOR DEV. & ENV'T, A WORLD SOILS AGENDA: DISCUSSING INTERNATIONAL ACTIONS FOR THE SUSTAINABLE USE OF SOILS (2002).

314. *See* RABAH LAMAR ET AL., THE SOIL CAMPAIGN: PROPOSALS 45-46, *available at* infotek.fph.ch/d/f/1719/1719_ENG.pdf?public=FRE&t=.pdf (providing an overview of the Tutzing Initiative for a Soil Convention).

315. Fifth International Conference on Land Degradation, Valenzano, Bari, Italy, Sept. 18–22, 2008, http://www.iamb.it/5ICLD/index.php.

316. *See Sustainable Use of Soils and Desertification Specialist Group*, INT'L UNION FOR CONSERVATION OF NATURE, http://www.iucn.org/about/union/commissions/cel/cel_working/cel_wt_sg/cel_sg_soils/ (last updated Feb. 24, 2011).

317. In the United States, soil has received some protection through the Soil Conservation and Domestic Allotment Act of 1935, 16 U.S.C. §§ 590(e), (e)(1), (g), (h), (p)(1), (q)(3) (2006); Title I of the Food and Agriculture Act of 1962, Pub. L. No. 87-703, 76 Stat. 605 (1962); Title 15 of the 1972 Rural

b. The Legal Status Quo of Sustainable Farming

In comparison to the law bearing on soil use, the law governing agriculture is far more developed. But to say that it is more developed is to say nothing of the normative value of that development. A brief look at some of the major laws and international accords governing agriculture shows that the deck is stacked in favor of large-scale, industrial agriculture.

Starting from the top, the World Trade Organization's Agreement on Agriculture[318] sets the stage for the success of large agricultural enterprises—generally from industrialized nations—that are focused on profit and very little else. Professor Carmen Gonzalez provides a scathing overview:

> The WTO Agreement on Agriculture purported to address the structural inequities in global agricultural trade and to create a "fair and market-oriented trading system." However, the Agreement contained numerous ambiguities that enabled wealthy countries to continue to subsidize and protect the domestic agricultural sector while constraining the ability of developing countries to utilize tariffs to protect small farmers from economically devastating surges of cheap imported food. In effect, the Agreement on Agriculture institutionalized the inequities that permitted agricultural producers in the United States and the European Union to destroy the livelihoods of millions of farmers in the developing world by dumping agricultural commodities on world markets at below the price of production.[319]

Set against this dominant framework, the legislation and international agreements militating in favor of sustainable agriculture will face an uphill battle. In the United States, sustainable farming gets a lift through the Food, Conservation, and Energy Act of 2008[320] (commonly known as the "Farm Bill") and the Sustainable Agriculture Research and Education (SARE) program.[321] The Farm Bill provides nearly $5 billion in annual funding for conservation (including both land retirement and working-lands programs)[322] and further funding for local food programs (e.g., farmers' markets).[323] The SARE program, operated by the USDA, provides research grants to support

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Development Act, Pub. L. No. 92-419, 86 Stat. 657 (1972); and Title XII of the Food Security Act of 1985, Pub. L. No. 99-198, 99 Stat. 1354 (1985). This legislation is helpful but simply not adequate.

318. Marrakesh Agreement Establishing the World Trade Organization Annex 1A: Agreement on Agriculture, Apr. 15, 1994, 1867 U.N.T.S. 410, *available at* http://www.wto.org/english/docs_e/legal_e/14-ag_01_e.htm.

319. *See* Gonzalez, supra note 154, at 507.

320. Pub. L. No. 110-234, 122 Stat. 923 (2008).

321. SARE's authorization lies in sections 1619–1624 of the Food, Agriculture, Conservation and Trade Act of 1990 (FACTA), 7 U.S.C. § 5801 (2006), and for selected national projects, 7 U.S.C § 5812 (2006). *See* Catalog of Fed. Domestic Assistance, SUSTAINABLE AGRICULTURE RESEARCH & EDUCATION, https://www.cfda.gov/?s=program&mode=form&tab=step1&id=69af35a5eaba5ac839056a52df33ef26 (last visited Dec. 29, 2011).

322. RENEE JOHNSON & JIM MONKE, CONG. RESEARCH SERV., WHAT IS THE 'FARM BILL'? 3, 8 (Sept. 23, 2008).

323. *Id.* at 3, 10 - 11.

projects that advance sustainable agriculture (e.g., projects that "conserve soil, water, energy, natural resources, and fish and wildlife habitat").[324]

On the international front, the Stockholm Convention, signed by 130 nations, aims to eventually ban twelve of the worst pesticides and agricultural chemicals, including aldrin, chlordane, dieldrin, endrin, heptachlor, hexachlorobenzene, mirex, and toxaphene.[325] The European Union has gone farther, banning or severely restricting a total of 109 pesticides.[326]

Another important international agreement is the International Treaty on Plant Genetic Resources for Food and Agriculture, better known as the "International Seed Treaty."[327] This agreement aims to enhance food security through conserving and ensuring the sustainable use of plant-based genetic material. One of the more significant components of this treaty is its declaration that intellectual property rights shall not interfere with farmers' ability to access and use seeds. This has become a big issue as transnational companies now wield much control over seeds and the extent to which certain breeds can be readily purchased.[328] This consolidation, along with the uniformity that accompanies factory farming, has reduced seed catalogues tremendously.[329] Local varieties of plants that do not ship well or that do not have a popular shape or color have fallen to the wayside, and the seeds that are made available by the transnationals are intentionally designed so that they will not breed true in the second generation.[330] As such, farmers have to buy new seeds every year.[331] In addition, with the advent of genetically-modified (GM) seeds, large seed companies have sometimes used intellectual property laws in perverse ways. In Canada, for instance, an organic canola grower whose field happened to receive GM pollen from an adjacent operation could "be legally obligated to pay the seed company for the 'theft' of its product and be forced to allow it to bomb [the] organic fields with poison to destroy the 'pirated' crop."[332]

Several other agreements indirectly aid the cause of sustainable agriculture or emphasize its importance without promulgating specific rules. These include Agenda 21 (the current sustainable development strategy adopted by the UN

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324. Catalog of Fed. Domestic Assistance, *supra* note 321.

325. *About the Convention*, STOCKHOLM CONVENTION ON PERSISTENT ORGANIC POLLUTANTS, http://chm.pops.int/Convention/tabid/54/language/en-GB/Default.aspx (last visited Dec. 29, 2011).

326. PESTICIDE ACTION NETWORK UK, WHICH PESTICIDES ARE BANNED IN EUROPE? 2 (Apr. 2008), *available at* http://www.pan-europe.info/Resources/Links/Banned_in_the_EU.pdf.

327. Food and Agriculture Organization of the United Nations, International Treaty on Plant Genetic Resources for Food and Agriculture (2009), *available at* ftp://ftp.fao.org/docrep/fao/011/i0510e/i0510e.pdf.

328. BRETT, *supra* note 2, at 171.

329. *Id.*

330. *Id.*

331. *Id.*

332. *Id.* at 175.

Conference on Environment and Development),[333] the Ramsar Convention (protecting wetlands),[334] the UNCBD (mentioned above), and the UNCCD (also mentioned above).

c. The Legal Status Quo of Preservation of Agrarian Culture

There is very little legislation, either international or domestic, that addresses agrarian culture. Though UNESCO has promulgated several culture conventions to "foster the international exchange of knowledge, expertise and mutual understanding,"[335] none of them deal with agrarian culture. Scanning the laws of individual nations likewise reveals no direct hits. At best, the cultural aspects of farming communities receive protection only as a consequence of legislation designed to support small-scale farming itself (e.g., in the United States, the Food Safety Modernization Act indirectly promotes the preservation of agrarian culture by diminishing certain compliance burdens for family farmers and certified organic operations).[336]

d. The Need for International Law

Above, I mentioned that global interests do not play much of a role in development decisions. The same is true for how the cultivation and livestock industries decide to use their soil. A landowner who is considering subdividing an agricultural plot for construction of condos has no obligation to consider the effects of this decision on global food security or the state of the world's soil resources. Neither does the agribusiness firm have an obligation to consider the long-term ecological or sociocultural effects of its practices. It may have to comply with certain relatively lax environmental rules that take into account local interests, but global considerations are hardly in the picture. Given that healthy, abundant soil and food security are global concerns, the status quo makes little sense. Global problems demand global responses.

Recognizing that food often crosses many borders in its journey from field to plate, scholars have argued for stronger international law in the area of food safety to prevent outbreaks of food-borne disease.[337] A similar rationale applies

333. United Nations Conference on Environment and Development, Rio de Janeiro, Braz., June 3–14, 1992, *Agenda 21*, U.N. Doc. A/CONF.151/26/Rev.1 (Vol. I) (Aug. 12, 1992)., *available at* http://www.un.org/esa/dsd/agenda21/.

334. *The Convention on Wetlands Text, as Amended in 1982 and 1987*, RAMSAR CONVENTION ON WETLANDS, http://www.ramsar.org/cda/en/ramsar-documents-texts-convention-on/main/ramsar/1-31-38%5E20671_4000_0__ (last visited Dec. 29, 2011).

335. *UNESCO Cultural Conventions*, U.K. NATIONAL COMMISSION FOR UNESCO, http://www.unesco.org.uk/unesco_cultural_conventions (last visited Dec. 29, 2011).

336. *See* Udi Lazimy, *President Signs Food Safety Overhaul*, ORGANIC FARMING RESEARCH FOUND. (Jan. 4, 2011), *available at* http://ofrf.org/policy/federal_legislation/food_safety_110106.html.

337. *See, e.g.*, Stefani Negri, *Food Safety and Health: An International Law Perspective*, 3 GLOBAL HEALTH GOVERNANCE, no. 1, Fall 2009 at 1, *available at* http://www.ghgj.org/Negri_food%20safety%20and%20global%20health.pdf.

to food security. Though the threat of food insecurity cannot be transmitted in the same way as food-borne disease, the similarity arises from the fact that a nation suffering from food insecurity by way of decreased agriculture—through desertification, erosion, etcetera—creates dangers for its neighbors. Starving nations produce refugees, as we saw in the African drought of 2011.[338] Furthermore, if enough nations suffer from food insecurity, the entire global food system is thrown off kilter. The pressure created by a food-insecure nation is two-fold: (1) other nations have to produce more to feed the people of the food-insecure nation; and (2) if other nations previously benefitted from the surplus of the now-insecure nation, they have to produce more or seek other sources to make up the difference. Because food insecurity is directly related to both soil loss and unsustainable farming practices, a treaty addressing soil conservation and sustainable farming makes sense.

In addition to this utilitarian rationale, there is also a rights-based argument for international law addressing soil conservation and sustainable farming. The right to food has been recognized since the 1948 Universal Declaration of Human Rights.[339] In 2000, the U.N. Commission on Human Rights designated a Special Rapporteur on the Right to Food to "respond fully to the necessity for and integrated and coordinated approach in the promotion and protection of the right to food."[340] At its core, the right to food is the right to be free from hunger.[341] If it were only national or local factors that impinged upon this right, then national or local legislation would be an appropriate response. However, "the notion that hunger . . . can today be *fully* explained in terms of national and local factors is a fallacy."[342]

Even if individual states had the power to enforce robust soil-conservation and sustainable-farming laws, it is not clear that they would do so. In the absence of binding international law, individual states do not have the necessary incentives to act appropriately. Agriculture is full of externalities—hidden costs, such as soil damage, that are not captured by market prices.[343] Just as companies often ignore ecological externalities and focus instead on short-term returns, states, especially those strapped for cash, often fail to internalize these hidden costs. Boosting agricultural output becomes a priority

338. Peter Goodspeed, *Starving Somalis Flooding into Refugee Camps*, NAT'L POST (Ontario), July 12, 2011, http://fullcomment.nationalpost.com/2011/07/12/goodspeed-analysis-starving-somalis-flooding-into-refugee-camps/.

339. Universal Declaration of Human Rights, G.A. Res. 217A (III), U.N. Doc. A/810, at 71 (1948).

340. *See* The Right to Food, Comm. on Human Rights Res. 2000/10, U.N. Doc. E/CN.4/RES/2000/10, at 2 (2000).

341. Uwe Kracht, *Food Is a Human Right*, WORLD HUNGER NOTES, http://www.worldhunger.org/articles/global/foodashumrgt/kracht.htm (last visited Dec. 29, 2011).

342. Smita Narula, *The Right to Food: Holding Global Actors Accountable Under International Law*, 44 COLUM. J. TRANSNAT'L L. 691, 697 (2006), *available at* http://web.gc.cuny.edu/nehhumanrights06/docs/narula1.pdf.

343. INT'L FED'N OF ORGANIC AGRIC. MOVEMENTS EU GRP., EXTERNALITIES: THE TRUE PRICE OF A PRODUCT, *available at* http://www.ifoam.org/about_ifoam/around_world/eu_group-new/positions/factsheets/Pdf/Externalities.pdf.

for the tax revenue and political gains it produces. Even if they are aware of the long-term costs of aggressive, unsustainable agriculture, poor states, following the market, fail to internalize these costs. In contrast, binding international law can force internalization.

In addition, states are not the only actors on the stage. Transnational corporations and international financial institutions exert extraordinary influence over who gets what and how.[344] Weak states often lack the power to regulate these forces on their own.[345] In the absence of international law, even states fully dedicated to the task may be unable to regulate practices negatively affecting soil conservation and agricultural sustainability.[346]

The notion that global coordination is needed to tackle the issues of soil conservation and sustainable farming also suggests that international law has a role to play in terms of preserving agrarian culture. Soil loss and degradation threaten agrarian culture by making it more difficult for small-scale farmers to earn a living from their land. The ascendancy of industrial agriculture, in addition to contributing to soil issues, also jeopardizes agrarian culture by driving small-scale farmers out of business, forcing them to seek other work, usually in the city.[347] Insofar as an international treaty is required to protect global soil resources and promote sustainable farming, so too is a treaty necessary to preserve agrarian culture.

B. A Sketch of a Global Treaty

The treaty I envision would address three main issues: (1) soil conservation, (2) sustainable farming, and (3) the preservation of agrarian culture. As I have endeavored to demonstrate throughout this paper, these issues are bound together in fundamental ways. Accordingly, though I address the issues separately for ease of comprehension, I urge that my recommendations be read as component pieces of a greater whole. That being said, I recognize that the following ideas are rather basic. If they serve as jumping-off points for further analysis, they have served their purpose.

344. Narula, *supra* note 342, at 719.

345. *See id.* at 697 ("Trade liberalization, the inability to effectively regulate the power of TNCs [transnational corporations], and burdensome external debt servicing obligations may restrict the state's ability to fashion appropriate tools to promote the realization of the right to food.").

346. *Id.*

347. Ikerd, *supra* note 35.

1. Rules to Promote Soil Conservation

a. Urban Growth Boundaries

The first rule necessary to promote soil conservation is the establishment of mandatory urban growth boundaries.[348] Each nation signing the treaty will commit to containing urban and suburban zones within reasonable boundaries, thus preventing sprawl. Cities that have already taken the initiative, such as Portland, Oregon,[349] may serve as models for cities and nations with inadequate experience in urban planning. Because most world cities have ample room to grow up rather than out,[350] the urban-growth rule should put the brakes on lateral expansion and penalize recalcitrant parties.

b. Erosion Control

A set of rules to curb erosion is also necessary. The treaty will require participating nations to enact legislation that condemns land-use practices known to contribute to soil erosion, as well as legislation that promotes practices conducive to preservation of top soil. The legislation will need to be tailored according to the physical characteristics of the region (e.g., drylands will require different policies than tropical rainforests), but the range of measures should include the following: prohibition of agricultural on lands highly susceptible to erosion to prevent disasters like the Dust Bowl; brush or straw barriers, silt fences, sediment traps, surface roughening, mulching, hydroseeding, windbreaks, terracing in mountainous regions, crop rotation, cover crops, and mandatory lead-off ditches with rock check dams;[351] and, in more susceptible regions that are nevertheless suitable to some level of agriculture, a requirement of partial reforestation and/or temporary nonuse.

c. Irrigation Reform

If we are to have any hope of curbing desertification and salinization, we must reform irrigation practices.[352] The treaty I propose will require adherence to the following irrigation principles: water and saline content of soil must be

348. Obviously, this measure would also aid sustainable farming and the preservation of agrarian culture.

349. *See generally* SAMUEL R. STALEY & GERARD C.S. MILDNER, URBAN GROWTH BOUNDARIES AND HOUSING AFFORDABILITY: LESSONS FROM PORTLAND (Oct. 1999), *available at* http://www.una.edu/faculty/blgordon/445%20Documents/Article%20-%20Managing%20Urban%20Growth,%20Lessons%20from%20Portland.pdf.

350. *See* RONALD K. VOGEL, HANDBOOK OF RESEARCH ON URBAN POLITICS AND POLICY IN THE UNITED STATES 399 (1997) (discussing land-use policies around the world and their effect on sprawl).

351. *See generally* VA. DEP'T OF FORESTRY, EROSION CONTROL MEASURES (2008), *available at* http://www.dof.virginia.gov/wq/resources/FieldBMP/FieldBMP_08_Erosion-Control.pdf.

352. Irrigation reform is also desperately needed in light of the global water crisis. *See generally* FRED PEARCE, WHEN THE RIVERS RUN DRY (2006).

monitored consistently to ensure efficient use of water resources and as an early warning system for salinization issues;[353] drip irrigation, with direct delivery to the active root zone, is favored over conventional sprinkler irrigation;[354] where drip irrigation is not feasible, irrigation should be performed at night to reduce evaporation;[355] "waste water" should be used judiciously; and adequate drainage systems must be installed to "reduce the environmental effects of salts and trace elements carried in water discharge."[356] Again, participating nations that fail to enact and enforce specific legislation implementing these principles will be subject to the full panoply of international sanctions.

d. Nutrient Depletion Control

To combat nutrient depletion, the treaty would require party nations to monitor and submit reports on the state of their soils. Although this may sound overly burdensome, and it would require a significant amount of time and money, it could be introduced gradually. Each country would conduct an initial survey, testing soils in various geographical zones under different uses. This would reveal trouble areas warranting further study. These "trouble areas" would be monitored more carefully, and the party nation would be required to submit annual reports to an international body designated to study the reports and recommend further action. The body—which could have a similar role with respect to erosion, contamination, et cetera—might recommend suspension of agricultural activity for a certain period of time, increased use of organic fertilizers, crop rotation, and other pollution remedies. Stricter measures would require ratification by the nation subject to the action, while more moderate measures could be imposed unilaterally. In addition, by insisting that all party reports be available to the public, the submission requirement itself would tend to encourage more ecological practices, acting as a sort of shaming mechanism.

e. Restrictions on Contamination

The two main sources of soil contamination are pesticides and artificial fertilizers. At present, a complete ban on these substances is infeasible, but the treaty would need to impose significant limitations on their use. The treaty

353. There are several ways to measure water content in soil, including evapotranspiration, the "feel" method, use of a neutron probe or tensiometer, modified electrical resistance, and the gravimetric method. *See* ROBERT EVANS, D.K. CASSEL, & R.E. SNEED, MEASURING SOIL WATER FOR IRRIGATION SCHEDULING: MONITORING METHODS AND DEVICES (June 1996), *available at* http://www.bae.ncsu.edu/programs/extension/evans/ag452-2.html.

354. N.S.W. DEP'T OF PRIMARY INDUS., *Best Irrigation Practices*, *in* BEST PRACTICE GUIDELINES FOR GROWING VEGETABLES 19, *available at* http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0008/125648/vegbpg-4.pdf.

355. *Id.* at 20.

356. U.S. DEP'T OF AGRIC., IRRIGATION & DRAINAGE: A NATIONAL RESEARCH PLAN TO MEET COMPETING DEMANDS AND PROTECT THE ENVIRONMENT 17 (2001), *available at* http://www.ars.usda.gov/is/np/irrigationdrainage/IrrigDrainBro.pdf.

would establish a policy-making body—a sort of global soil conservation committee, made up of scientists, agricultural experts, and legal authorities—to formulate restrictions on these substances. The policy would essentially function like the carbon-emission cap under the Kyoto Protocol.[357]

2. Rules to Promote Sustainable Farming

a. Establishment of Permanent Agricultural Zones

Many of the measures I recommend in this Part would serve both to promote sustainable farming and to protect agrarian culture. This first measure is no exception.

The idea would be to identify regions around the world that must be preserved primarily as agricultural zones for the good of humanity. Examples in the United States might include the Willamette Valley in Oregon, the Central Valley in California, large swaths of the Midwest, and the Piedmont area in the South. Examples abroad would be the Rhine Valley in Germany, the Pampas in Argentina, and the Volga District in Russia. Just as we stake out natural wonders for heightened protection in the form of parks, wilderness areas, and monuments, we could accord heightened legal protection to these agricultural zones. Projects that would infringe upon their agricultural character would not be absolutely prohibited, but they would face additional obstacles and financial disincentives. Think of it as international zoning law.

b. Incentives to Encourage Local Production and Consumption

To encourage local production and consumption of foodstuffs, I recommend a series of financial incentives and other support mechanisms. Party nations should be required to provide tax breaks and direct subsidies for farmers' markets (like we see in the SARE program[358]) and small, local producers should be exempted from burdensome compliance regimes (like we see in the Food Safety Modernization Act[359]). Supermarkets and other food outlets should be rewarded for carrying local products, and "buy local" campaigns should be funded by the government.

c. Incentives to Encourage Organic, Free-Range, and Mixed-Use Farming

Stronger incentives are also needed to encourage organic farming, free-range livestock, and mixed-use farms. Although many nations already provide

357. Another idea would be the creation of an "Endangered Soils Act" designed to protect highly vulnerable soil species. *See* Pw, *supra* note 82, at 6.

358. *See* Catalog of Fed. Domestic Assistance, *supra* note 321.

359. *See* Lazimy, *supra* note 336.

some incentives and subsidies, more is needed if organic and free-range methods are to challenge industrial agriculture as the dominant model. The same goes for mixed-use farming. To buck the trend of large farms specializing in one or two cash crops, forsaking the synergies and ecological benefits that stem from a mixture of crops and livestock, the international community must take concrete action. Party nations could commit to provide direct subsidies and tax breaks to organic and free-range enterprises. The funding for these subsidies could be provided through increased taxation on industrial agriculture, as discussed below. To ease the burden, the subsidies could be introduced gradually, and partial subsidies could be made available to enterprises using both industrial and organic/free-range methods.

d. Bans on Harmful Pesticides

Whereas incentives might be appropriate to encourage the development of a more localized and organic food system, certain practices must be outright banned. A number of pesticides—including methyl bromide, endosulfan, and atrazine[360]—should join DDT on the prohibited list under the Stockholm Convention.[361] This would not only lead to more ecologically sustainable farming but would also take one more advantage away from industrial agriculture, as many small-scale farmers cannot afford these expensive pesticides.[362]

3. Rules to Promote the Preservation of Agrarian Culture

a. Right to Collective Bargaining

I have suggested throughout this paper that large-scale, industrialized agriculture is one of the biggest threats to rural society. Small-scale farmers who own their own land have far more power (even if not enough) than day laborers working on mega-farms. One way to enhance the power of farmhands—and therefore strengthen rural communities—is through a universal right to collective bargaining.[363] Although some nations recognize

360. For more information on these substances, see JO IMMIG, NAT'L TOXICS NETWORK, A LIST OF AUSTRALIA'S MOST DANGEROUS PESTICIDES (2010), *available at* http://ntn.org.au/wp-content/uploads/2010/07/FINAL-A-list-of-Australias-most-dangerous-pesticides-v2.pdf.

361. *See* Stockholm Convention, *supra* note 243.

362. *See* MARKAR MELKONIAN, MARXISM: A POST-COLD WAR PRIMER 92 (1996) ("As we can see, then, competition among industrial capitalists favors large producers over smaller ones. The same thing holds for agriculture. . . . Many small farmers cannot afford to invest in heavy machinery, irrigation systems, fertilizers, pesticides, and improved seed stock.").

363. The International Labour Organization has been especially critical of the failure to protect collective-bargaining rights:

> Many established farm worker unions complain of violations of the right to join unions and bargain collectively, especially unions in Central America and Colombia protesting changes on coffee and banana plantations. Fifty-five percent of the union complaints in the 1990s of

this right through federal law, others do not (e.g., Canada[364] and the United States[365]). This should change.

b. Subsidized Cultural Programs and UNESCO World Heritage Sites

To engender greater appreciation for agrarian society, the treaty I envision would require nations to invest a modest sum in cultural programs. These programs could be overseen by UNESCO. In addition to its support of endangered languages,[366] preservation of underwater relics,[367] and arts education,[368] UNESCO could add a rural culture theme to its portfolio. Specifically designed to promote cultural traditions endemic to rural communities, UNESCO governance would highlight these traditions and serve as a sort of marketing platform to attract broader support.

UNESCO being most famous for its management of "World Heritage Sites,"[369] the treaty I propose would also push to include select agricultural zones for inclusion among these sites. Although the selection criteria as they stand are broad enough to include agricultural zones, they should be modified to make eligibility explicit.[370]

> violations of ILO core standards were from the Americas, and many were directed at governments that assisted, for example, banana plantations to expel workers. Unions find it hard to organize and represent farm workers effectively because many live on employer-owned property, and union organizers often have no clear legal right to enter the property to talk to workers. Even if some farm workers have collective bargaining rights, others may be excluded, and employers may restructure work to favor the employment of excluded workers. For these reasons, collective bargaining in agriculture "does not appear to be a significant feature in the agriculture sector of many countries" and is shrinking as unions find it very hard to make the adjustment from representing permanent plantation workers to organizing seasonal workers.

Marilyn Pigott, *ILO: Global Farm Worker Issues*, RURAL MIGRATION NEWS (Oct. 2003), http://migration.ucdavis.edu/rmn/comments.php?id=785_0_5_0.

364. *See generally* Ontario (Attorney Gen.) v. Fraser, 2 S.C.R. 3 (S.C.C. 2011) (narrowing collective-bargaining rights for agricultural workers)

365. The NLRA specifically excludes "agricultural workers" from its protections. *See* 29 U.S.C. § 152(3) (2006) ("The term 'employee' . . . shall not include any individual employed as an agricultural laborer, or in the domestic service of any family or person at his home, . . . or any individual having the status of an independent contractor . . . .").

366. *Languages and Multilingualism: Languages Matter!*, UNESCO, http://www.unesco.org/new/en/culture/themes/cultural-diversity/languages-and-multilingualism/ (last visited Dec. 30, 2011).

367. *Underwater Cultural Heritage: Safeguarding the Underwater Cultural Heritage*, UNESCO, http://www.unesco.org/new/en/culture/themes/underwater-cultural-heritage/ (last visited Dec. 30, 2011).

368. *Arts Education*, UNESCO, http://www.unesco.org/new/en/culture/themes/creativity/arts-education/ (last visited Dec. 30, 2011).

369. *See generally World Heritage List*, UNESCO WORLD HERITAGE CONVENTION, http://whc.unesco.org/en/list (last visited Dec. 30, 2011).

370. *See* UNESCO WORLD HERITAGE CONVENTION, THE CRITERIA FOR SELECTION, http://whc.unesco.org/en/criteria (last visited Dec. 30, 2011).

c. Higher Taxes on Industrial Agriculture

The foregoing measures would be helpful but likely insufficient on their own to stem the tide pulling back on agrarian culture. To really put the brakes on this cultural undertow, industrial agriculture will need to be challenged head-on. The most direct way to do this is through higher taxes.

Ideally, every party to the treaty will commit to increasing taxes on industrialized agricultural enterprises. The tax increase could be modest, but it should be sufficient to encourage reform by stripping industrial agricultural of its competitive advantage over small-scale farming. For instance, enterprises engaging in industrial agriculture might pay 5 to 10 percent in income and capital-gains taxes versus their non-industrial counterparts. Defining "industrial agriculture" would obviously pose some challenges, but given the complex definitions that permeate most tax codes, this should not be prohibitive.

d. Subsidies for Small-Scale Farms

Apart from taxing industrial agriculture at a higher rate, keeping small-scale farmers in business will also require subsidies and, in the case of developing countries, tariffs on imports. NAFTA and the WTO Agreement on Agriculture chipped away at these schemes; from the perspective of agrarian culture, that was a big mistake. Subsidies and tariff protection for small-scale farmers should not only be allowed, but they should also be encouraged. These subsidies could be funded with the additional revenue generated through the tax measures discussed above. Unless small-scale farmers can make a decent living and compete with industrial agriculture, we will continue to see mass migration from the countryside to the city.

e. Incentives for People to Stay in the Countryside

This brings me to my final point: incentives for people to stay in the campo. The idea of offering a financial incentive to encourage residence in a certain place is not so strange after all. The United States practically gave away land under the Homestead Act to encourage westward expansion,[371] and businesses frequently offer relocation bonuses to encourage moves to "undesirable" locations.[372] The difference here is that we want to encourage people to stay put, not leave. Governments admittedly will be unlikely to cut checks to citizens simply because they live in the country, but modest tax breaks may be feasible.

371. LARRY W. WATERFIELD, CONFLICT AND CRISIS IN RURAL AMERICA 203 (1986).

372. *See, e.g.*, Jeff T. Wattrick, *Mayor Bing to Detroit Police: Move to City, Get Renovated Home for as Little as $1,000*, MLIVE.COM, Feb. 7, 2011, http://www.mlive.com/news/detroit/index.ssf/2011/02/detroit_to_renovate_boston-edi.html.

V. BARRIERS TO CHANGE

A. Soil's Low Profile

Despite the best efforts of countless individuals and organizations, the global soil crisis remains relatively unknown. As Professor David Pimentel explains: "Soil erosion is second only to population growth as the biggest environmental problem the world faces. . . . Yet, the problem, which is growing ever more critical, is being ignored because who gets excited about dirt?"[373]

If the treaty I propose is to have any chance of success—both in adoption and, following that, in enforcement—this will need to change. Treaties always imply winners and losers. In the case of a global treaty on soil conservation, the losers would be very wealthy. Industrial agriculture, food manufacturers, developers— these and other economic heavyweights would lobby with all their might against the treaty I envision. To overcome this pressure, the world's governments would need to feel even greater pressure from the treaty's proponents. Until the soil crisis attains more visibility—until it enflames emotions like climate change—this will not be possible.

B. Soil and Agriculture Seen As Domestic Issues or As Distinct Issues to Be Approached Separately

Even where people do perceive soil conservation and sustainable agriculture as important public issues, they often either (1) fail to see them as international problems, or (2) fail to see the connection between the two issues.

Taking these misconceptions in order, the tendency to view soil as a domestic issue results from its physical characteristics. Unlike water and air, soil does not appear to move freely across international borders. Although this is not actually the case—soil is frequently transported from one place to another, but the movement is less visible and less dramatic than that of water or air—the perception controls.[374] As such, soil policy is largely confined to the domestic codes.

This is a mistake. If nothing else, soil's role as provider of food lends it an international quality that should not be overlooked.[375] While many observers

373. Susan S. Lang, *'Slow, Insidious' Soil Erosion Threatens Human Health and Welfare as Well as the Environment, Cornell Study Asserts*, CHRON. ONLINE (Ithaca), Mar. 22, 2006, http://www.news.cornell.edu/stories/march06/soil.erosion.threat.ssl.html (quoting David Pimental) (internal quotation marks omitted).

374. For instance, sediment is transported across international borders bisected by rivers, and soil can jump across borders after being picked up by the wind.

375. There are several other reasons why land degradation should be approached as a global problem:

> Through the emission of greenhouse gases and changes in the ecosystems that contribute to the reduction in carbon sinks, [land degradation] contributes to climate change. It contributes to the depletion of biodiversity, directly through the degradation and destruction of lands, and indirectly by accentuating the need to expand cropping into natural forests and rangelands. It

would prefer to see a more localized system of food production and consumption, that is not the world in which we live.[376] Bananas from Costa Rica, coffee from Colombia, rice from Thailand, beef from Canada—these products line the shelves of U.S. supermarkets. While some (generally poorer) nations tend to import less in foodstuffs, they are still part of the global food system through their role as exporters.[377] No matter on which side a nation finds itself in the global food equation (importer, exporter, or both), it is vulnerable to the international effects of environmental crises. If the Argentine Pampas suffers from severe drought—as it did in 2009—Argentina has less corn, wheat, and cattle to export, and prices rise on the global market.[378] Because we all have a stake in the global food market, we must all take an interest in soil concerns, even when these concerns arise in other nations.[379] For similar reasons, agricultural policy should not be confined to domestic law.[380]

Further, as this discussion shows, the idea that soil conservation and sustainable agriculture are completely separate issues is also nonsense. But sometimes nonsense is persistent. In the struggle against a globalized, industrialized food system, different groups have taken up different causes. Though they fight for the same ultimate goal—sustainable farming that respects the environment, the health of the consumer, and the dignity of the farmer—"the various organizations have not always grasped the systemic nature of the problems or the need for an integrated analysis and many-sided response."[381] Worse still,

> groups have sometimes been pitted against one another because they failed to see the connections. For example, some major environmental

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> affects water resources through river and reservoir sedimentation and the change in the hydrological cycles of degraded catchments. These global concerns open up the possibility of international cooperation in land degradation control.

Van Ginkel et al., *supra* note 34, at 253–54; *see also id.* at 245–46 ("Land degradation is a local problem in a vast number of locations, but it has cumulative effects at regional and global scales.").

376. *See, e.g.*, Renee MacKillop, *Food Hubs—Localizing Food Systems?*, FOOD FIRST, Mar. 28, 2011, http://www.foodfirst.org/en/Food+hubs.

377. JOHN MADELEY, BIG BUSINESS, POOR PEOPLES: THE IMPACT OF TRANSNATIONAL CORPORATIONS ON THE WORLD'S POOR 64–66 (1999).

378. Alexei Barrionuevo, *In Parched Argentina, Worries over Economy Grow*, N.Y. TIMES, Feb. 20, 2009, at A8.

379. *See* Van Ginkel et. al, *supra* note 34, at 253 ("The direct and immediate causes, nature, and perception of land degradation are site-specific. Conventional approaches to land conservation and rehabilitation are local. Now, as land degradation poses a threat to the sustainable welfare of many people across geopolitical boundaries, it is a cause for regional and global concern.").

380. When the United States grants subsidies to producers of one commodity over another or chooses to give tax breaks to mega-farms, the effects ripple across the globe. Subsidies drive down the price of agricultural products, making it difficult for small farmers to compete; in some cases, like that of cotton-growers in Africa, this can push communities to the brink of starvation. *See* Gumisai Mutume, *Mounting Opposition to Northern Farm Subsidies: African Cotton Farmers Battling to Survive*, 17 AFR. RECOVERY 18 (2003).

381. Henderson, *supra* note 283, at 116.

> organizations joined with corporate interests to resist targeting price supports for small farmers in the deluded belief that it would be easier to control pollution from a few large farms. Failing to see that low prices for farm commodities were linked with the low wages paid to farmworkers, small farmers have sometimes joined in attacks against better conditions for farmworkers. The history of the growth of the movement for a sustainable food and agriculture system is the complex story of how more and more of these separate groups are discovering their interconnections and common interests.[382]

Although more and more people are seeing the connections, they still find themselves in the minority. Until the global community as a whole recognizes that soil conservation is an international issue—and that soil conservation and sustainable agriculture are inextricably linked—popular perception will remain an obstacle to the treaty I propose.

C. The Notion That Soil Receives Sufficient Protection Through Other Environmental Laws

Not too many who take the time to study the situation will deny that there is a lack of legislation specifically tailored to the issue of soil conservation. That being said, many would still challenge the need for such legislation on the grounds that soil receives sufficient protection through other environmental rules. There is some validity to this argument, but on the whole it fails to convince.

Soil receives a meaningful degree of protection through zoning laws (including urban growth boundaries) and other land use legislation, water regulations, rules concerning air pollution, and bans of certain toxic substances. Why isn't this sufficient? Well, it's just not working. The fact that we would be worse off without the existing legal regime does not mean that we are in a place of security. A bleeding patient is thankful for a tourniquet, but he needs further attention if he is to make a complete recovery. The statistics show that unless we change, we are headed for disaster: "Around the world, soil is being swept and washed away 10 to 40 times faster than it is being replenished, destroying cropland the size of Indiana every year."[383]

D. "The Prejudice Against Country People"

As more and more people have moved to the city, a sort of geographical elitism has taken hold. City dwellers are cosmopolitan, hip, going places. Those left behind in the country—because who would stay there voluntarily?—are behind the times. They are bumpkins, hillbillies, hicks, *indios*, and *campesinos*. Wendell Berry calls this "the prejudice against country people."[384] Country

382. *Id.*
383. Lang, *supra* note 373.
384. Berry, *supra* note 153, at 21.

folks are viewed as second-class citizens, and therefore their causes also receive less attention.[385]

Wendell Berry may exaggerate the situation, but he is closer to the truth than most of us would care to admit:

> I believe it is a fact, proven by their rapidly diminishing numbers and economic power, that the world's small farmers and other "provincial" people have about the same status now as enemy civilians in wartime. They are the objects of small, "humane" consideration, but if they are damaged or destroyed "collaterally," then "we very much regret it," but they were in the way—and, by implication, not quite as human as "we" are. The industrial and corporate powers, abetted and excused by their many dependents in government and the universities, are perpetrating a sort of economic genocide—less bloody than military genocide, to be sure, but just as arrogant, foolish, and ruthless, and perhaps more effective in ridding the world of a kind of human life. The small farmers and the people of small towns are understood as occupying the bottom step of the economic stairway and deservedly falling from it because they are rural, which is to say not metropolitan or cosmopolitan, which is to say socially, intellectually, and culturally inferior to "us."[386]

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385. Here in Bolivia, the prejudice against country people combines with racism (campesinos tend to be darker-skinned) and classism (they tend to be poor) to create a volatile mix. It has turned violent on more than one occasion. In 1974, Cochabamba saw the Masacre del Valle, when perhaps over 100 unarmed peasants were killed while protesting the government's manipulation of food prices. *See* MARIA L. LAGOS, AUTONOMY AND POWER: THE DYNAMICS OF CLASS AND CULTURE IN RURAL BOLIVIA 62–63 (1994); *see also* ASAMBLEA PERMANENTE DE DERECHOS HUMANOS DE BOLIVIA [PERMANENT ASSEMBLY ON HUMAN RIGHTS IN BOLIVIA], LA MASACRE DEL VALLE: COCHABAMBA ENERO 1974 (1978), *summary available at* http://www.iisg.nl/today/en/23-01.php. More recently, in 2000, youths from the middle and upper classes stormed Cochabamba's main plaza, where they attacked and drove off demonstrating campesinos. A witness to the event recalls asking some friends where they were headed in such a rush. Their response: "A pegar campesinos." They were going "to beat up peasants." Interview with Kathya Milena Sanchez, Environmental Engineer, in Cochabamba, Bol. (Aug. 8, 2011).

386. Berry, *supra* note 153, at 22. Berry goes on to describe the socio-psychological underpinnings of this prejudice, and how it is affecting lives in the United States and beyond:

> The prejudice begins in the idea that work is bad, and that manual work outdoors is the worst work of all. The superstition is that since all work is bad, all "labor-saving" is good. The insanity is to rationalize the industrial pillage of the natural world and to heap scorn upon the land-using cultures on which human society depends for its life. Now, in the United States, the despised work of agriculture is done by the still-surviving and always struggling small farmers, and by many Mexican and Central American migrant laborers who live and work a half step, if that, above slavery. The work of the farmland, in other words, is now accomplished by two kinds of oppression, and most people do not notice, or if they notice they do not care. If they are invited to care, they are likely to excuse themselves by answers long available in the "public consciousness": Farmers are better off when they lose their farms. They are improved by being freed of the "mind-numbing work" of farming. Mexican migrant field hands, like Third World workers in our sweatshops, are being improved by our low regard and low wages. And besides, however objectionable from the standpoint of "nostalgia," the dispossession of farmers and their replacement by machines, chemicals, and oppressed migrants is "inevitable," and it is "too late" for correction.

Id. at 23–24.

To be successful, the treaty I propose will need to overcome or otherwise diffuse this prejudice.[387] If it is seen exclusively as an effort to benefit rural communities, it is far less likely to be embraced by global decision makers. If, on the other hand, the treaty is presented as salutary for the entire world, including urbanites, governments will be more likely to lend their support. Accordingly, while the stakeholders who would benefit most from the treaty are those living and working in rural communities, the benefits to people outside these communities should be disproportionately emphasized.

E. Short-Term Decision Making

To earn the long-term benefits brought about by soil conservation and sustainable agriculture, society must be willing to make short-term sacrifice. This is easier said than done. The global food system is firmly based in industrial agriculture, which all its infrastructure of laws, machines, chemicals, and related enterprises. Though it is obvious that this is not sustainable in the long run—the land simply cannot handle the abuse, and the warning signs are becoming harder to ignore—restructuring the global food system will have its growing pains. Even though sustainable farming is capable of feeding the planet—and indeed is the only way to feed the planet over the long haul—the shift will require sacrifice in terms of what we eat and how farmers grow. To curb desertification in Asia, the Chinese may need to raise fewer goats.[388] To ensure the continuity of genetically diverse fruits and vegetables, U.S. consumers may need to accept produce that differs from current expectations.[389] To reduce nutrient depletion and erosion in the tropics, Canadians may need to eat fewer bananas and melons.[390]

Reflecting on the battle to change the logging industry, historian Paul Hirt summed up the concept as follows: "Because forestry is a long-term affair requiring consistency, and politics is a short-term affair requiring constant compromises, the two make terrible business partners."[391] The same could be said for soil conservation and sustainable farming. Environmental advocates and business leaders tend to line up on opposite sides of the fence, driven by interests that are antagonistic toward each other. To be sure, many in the

387. The idealist in me would like to suggest that this prejudice will fade away on its own, but I believe it is too deeply entrenched and will not give way so easily. Efforts like the treaty I propose would go a long way to curbing this prejudice; in the meantime, the prejudice needs to be acknowledged as an obstacle.

388. *See* BROWN, *supra* note 226, at 161.

389. *See* BRETT, *supra* note 2, at 170.

390. *See* Asoka Mendis & Caroline Van Bers, *Bitter Fruit,* 25 ALTERNATIVES J. 18, 18 (1999) ("While such fruits are generally affordable for Canadians, the human and environmental costs of their production in poorer Southern countries are high. These costs have emerged in the context of big changes in the global economy and deeply rooted demand and supply trends for fruits imported into Canada. But that doesn't mean change is impossible.").

391. PAUL HIRT, A CONSPIRACY OF OPTIMISM: MANAGEMENT OF THE NATIONAL FORESTS SINCE World War II 82 (1996).

business community have come to see that sustainability is consistent with a strong bottom line (at least in the long run), but the knee-jerk response to reject conservation remains dominant.[392] This rejection is the product of short-term thinking.

CONCLUSION

Soil and the communities that work it need our help. I have offered some ideas in this Article that will hopefully generate momentum toward a binding treaty. Some of these ideas may not be politically feasible—and others may be rejected after further analysis—but if they spark serious discussion, that will be a big step in the right direction. What soil conservationists and agrarian communities need more than anything else is policy-makers' attention. If they care about our planet and the well-being of future generations, our leaders will be quick to lend an ear.

Sooner or later, binding law will be required to address these issues. Given the nonrenewable nature of our soil resources—and the nearly impossible task of undoing cultural erosion—we would be wise to take action now. Though individual nations have the resources to make significant progress through policy modifications, collective action is required due to the international nature of the issues. Without reassurance that other nations are also making short-term sacrifice in favor of long-term interests, many states will balk at the idea of pursuing progressive policies. Yet, the status quo is untenable and the market itself is insufficient to move us toward our goal. Industrial agriculture will continue to wreak havoc on our soil and the cultures that depend upon it unless we have a new binding regime such as the proposed global treaty.

392. *See generally* JOSEPH M. PETULLA, ENVIRONMENTAL PROTECTION IN THE UNITED STATES: INDUSTRY, AGENCIES, ENVIRONMENTALISTS 6 (1987) ("Business interests generally value environmental considerations far less than a growing and strong economy.").