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The Environmental Role of Agriculture in an Era of Carbon Caps

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THE ENVIRONMENTAL ROLE OF AGRICULTURE IN AN ERA OF CARBON CAPS

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The link between the production of food and the environmental regulation of farms, never a strong one, may finally begin to take shape as the world grapples with the new Carboniferous era, a man-made epoch of climate change and climate-change regulation. Such a development is long overdue. Almost half a century has passed since the initial publication of Rachel Carson's *Silent Spring*,[1] the book that launched modern environmentalism. Yet the environmental law that emerged from this movement has always been, from the perspective of Rachel Carson's messages in *Silent Spring*, deeply disappointing. In a narrow sense, the disappointment relates to the environmental law that governs farms. Not only is the regulation of agricultural pesticides – the central subject matter of *Silent Spring* – notoriously unsuccessful,[2] but environmental law as a general matter is so riddled with exemptions for agriculture that it has been described as the "anti-law" of farms.[3] But modern environmental law also disappoints on a deeper level. *Silent Spring*'s broader message was a respect for natural processes that Rachel Carson hoped would realign our economics,

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[1] RACHEL CARSON, SILENT SPRING (1962).

[2] *See, e.g.*, Donald Hornstein, *Lessons from Federal Pesticide Regulation on the Paradigms and Politics of Environmental Law Reform*, 10 YALE J. REG. 369, 371 (1993) ("[T]he use of risk assessments to discern 'reasonable risk' under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) has arguably led to one of the most colossal regulatory failures in Washington."); *see also id.* at 394 ("EPA's Science Advisory Board concluded in 1990 that, when compared with dozens of other risks, pesticides presented one of the country's more widespread and severe environmental problems.").

[3] *See* J.B. Ruhl, *Farms, Their Environmental Harms, and Environmental Law*, 27 ECOLOGY L.Q. 263, 267 (2000) (Congress has made "a nearly unbroken series of decisions to exclude farms and farming from the burdens of federal environmental law, with states mainly following suit. Congress has erected what I will call a vast 'anti-law' of farms and the environment.").

pushing us to find ways to integrate human endeavors with nature in a way that today we would term "sustainable." In contrast, modern environmental law has generally focused merely on outputs rather than inputs, on cleaning up waste-streams rather than changing underlying economic processes.[4]

But climate change may be shaking up how we look at agriculture and the environment. To some extent, the changing climate itself is already beginning to affect the natural inputs on which farming is based: historical weather patterns and their associated ranges of rainfall, temperature, wind, snowpack, river levels, and weed/insect/pathogen populations.[5] And changes in these inputs have provoked serious discussions in the public policy literature about: the amounts and types of food that agriculture may be capable of producing in a climate-changed world;[6] about which agricultural regions may be hardest hit;[7] and about the types of governmental or market-based support services farmers may need in order to adapt.[8]

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[4] David M. Driesen & Amy Sinden, *The Missing Instrument: Dirty Input Limits*, 33 HARV. ENVTL. L. REV. 65, 74 (2009) ("The vast majority of our mandatory environmental regulations focus on pollution outputs rather than production inputs").

[5] *See generally* NICHOLAS STERN, THE ECONOMICS OF CLIMATE CHANGE: THE STERN REVIEW (2007) (increases in the frequency and intensity of regional high temperature weather patterns are likely to cause extensive species extinction, violent rises in sea levels, varying freshwater runoff, and result in critical reductions in crop yields); W.E. Easterling et al., *Food, Fibre and Forest Products*, *in* CLIMATE CHANGE 2007: IMPACTS, ADAPTATION, AND VULNERABILITY. CONTRIBUTION OF WORKING GROUP II TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 273-313 (poorer populations who rely on subsistence farming and have less resources to adapt to the effects of global climate change are highly likely to see crop yields reduced, in addition to a spread in human disease affecting the agricultural labor supply).

[6] *See, e.g.*, Bruna Barbier et al., *Human Vulnerability to Climate Variability in the Sahel: Farmers' Adaptation Strategies in Northern Burkina Faso*, 43 ENVTL. MGMT. 790 (2009) (describing a case study of such local farming adaptation strategies as planting more drought-resistant crops, using more inorganic fertilizer, and the development of improved irrigation); *see also* James Risbey et al., *Scale, Context, and Decision Making in Agricultural Adaptation to Climate Variability and Change*, 4 MITIGATION & ADAPTATION STRATEGIES GLOBAL CHANGE 137-65 (1999) (case study on Australian farmers' adaptation strategies which include the planting of different crops, varying planting dates, the purchasing of crop insurance, modifications in fertilizers, and updated irrigation techniques).

[7] *See, e.g.*, Ian Burton & Bo Lim, *Achieving Adequate Adaptation in Agriculture*, 70 CLIMATE CHANGE 191 (2005) (describing the uncertainty as to exactly where and to what extent different regions of the world will be affected by climate change); W.N. Adger, *Social Aspects of Adaptive Capacity*, CLIMATE CHANGE, ADAPTIVE CAPACITY AND DEVELOPMENT (Joel B. Smith et al. eds., 2003) (projections and uncertainty in prediction which regions will be most affected by climate change).

This Article, however, addresses a different aspect of agriculture and the emerging environmental law of climate change. In discussing how society might mitigate its emissions of greenhouse gases, policymakers have come full circle, returning to the deeper project that Rachel Carson proposed for us fifty years ago: to realign the processes of the economy within the constraints of the natural world. Much of this discussion has focused on energy, the principal source of greenhouse gas ("GHG") emissions.[9] But a surprising amount of attention has recently shifted to agriculture.

In part, the link between agriculture and climate-change mitigation reflects the fact that agriculture itself generates GHG emissions (in the United States under ten percent).[10] In larger part, though, it is because agriculture and forestry may offer relatively cost-effective opportunities to adopt processes that can capture and store ("sequester") excess GHGs from the atmosphere in carbon sinks such as biomass or soil.[11] In a white paper in 2007 (and in its revision in 2009), McKinsey & Company, the international consultancy firm, found that "terrestrial carbon" locked up in forestry and agriculture could match the carbon abatement potential of switching to alternative, low-carbon energy supplies. Indeed, McKenzie found that, because of its low per-unit cost, land-based carbon sequestration was one of three major business opportunities in a low-carbon economy.[12] With science and

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[8] *See, e.g.*, Alexandra Scuro, *Are GMOs Good or Bad Seeds in the Developing World?: A Discussion of the Growing Role of Developing Countries in the Debate Over Climate Change and the Loss of Biodiversity*, 18 FORDHAM ENVTL. L. REV. 369, 374 (2007) (use of genetically modified organisms and seeds may be a necessary adaptation to the depending effects of climate change and its concomitant risk of human starvation); *see also Insurance Tool Helps Farmers, Nations Manage Climate Change Risk*, AFRICA NEWS, June 18, 2009 (increasing use of previously unavailable crop insurance on the African continent).

[9] C.S. Snyder et al., *Review of Greenhouse Gas Emissions from Crop Production Systems and Fertilizer Management Effects*, 133 AGRIC. ECOSYSTEMS & ENV'T 247, 248 (2009) ("fossil fuel combustion is considered responsible for more than 75% of human-caused CO_2 emissions").

[10] *Id.* ("agriculture generates less than 10% of the total emissions of GHGs in the United States").

[11] RENEE JOHNSON, CONG. RESEARCH SERV., CLIMATE CHANGE: THE ROLE OF THE U.S. AGRICULTURAL SECTOR AND CONGRESSIONAL ACTION 9 (2009), http://www.fas.org/sgp/crs/misc/RL33898.pdf ("Agriculture can sequester carbon, which may offset GHG emissions by capturing and storing carbon in agricultural soils.").

[12] MCKINSEY & CO., PATHWAYS TO A LOW-CARBON ECONOMY: VERSION 2 OF THE GLOBAL GREENHOUSE GAS ABATEMENT COST CURVE 12 (2009), http://www.wwf.se/source.php/1226616/Pathways%20to%20a%20Low-Carbon%20 Economy,%20Executive%20Summary.pdf (terrestrial carbon represents an opportunity to reduce twelve gigatons of carbon-dioxide-equivalent emissions, making it one

economics suggesting the prospect of a win-win situation, it did not take long for politicians to recognize the possibilities. In June 2009, the historic Waxman-Markey climate bill narrowly passed the U.S. House of Representatives. The bill passed only with the support of an agricultural bloc that successfully inserted provisions allowing for an "offset" market that would allow carbon emitters to pay farmers for undertaking greenhouse-friendly ways to grow crops.[13]

This Article seeks not to celebrate the possibility of a market for agricultural offsets. The technical and economic difficulties of this market may in fact overwhelm its superficial appeal, turning it from a win-win solution into a rent-seeking loophole that undermines, rather than enhances, society's need to control GHG atmospheric concentrations. To paraphrase Gustave Flaubert, it all depends on the details.[14]

But this Article does seek to sketch the possible new threshold on which agriculture currently finds itself – as the subject of perhaps the world's first legal regime self-consciously seeking not merely to correct an environmental externality, but to align economic processes more holistically within ecological constraints. To be sure, by sketching this threshold, I certainly do not mean to claim that, in even a successful market for agricultural carbon offsets, Rachel Carson's dream would be fulfilled. Other reform efforts within agriculture, such as the growth of organic farming[15] and the movement for locally-grown agriculture,[16] can also stake claims as ideological descendents of Rachel Carson's vision. My points are more modest. First, by looking at the example of climate-related policymaking in agriculture, we are given a valuable case history of what the contours (and difficulties) may be of a new generation of environmental-agricultural laws that really do attempt the heavy lifting that Rachel Carson urged

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of three major areas of business opportunities along with alternative, low-carbon energy supply (12 $GtCO_2$ reduction potential) and improvements in energy efficiency (14 $GtCO_2$ reduction potential)).

[13] *See* Legislation, 40 ENV'T REP. (BNA) 1546 (July 3, 2009) (House of Representatives passed H.R. 2454 on June 26, 2009 that includes a system of offsets that farmers and forest owners would be able to generate by adhering to practices that sequester carbon in the soil or that reduce emissions); *see infra* notes 92-96.

[14] *See* GREGORY TITELMAN, RANDOM HOUSE DICTIONARY OF POPULAR PROVERBS AND SAYINGS 119 (1996) (attributing to Gustave Flaubert the sayings "God is in the details" and "the devil is in the details").

[15] *See, e.g.*, Donald T. Hornstein, *The Road Also Taken: Lessons From Organic Agriculture for Market-and Risk-Based Regulation*, 56 DUKE L.J. 1541 (2006) (describing the growth of organic farming).

[16] *See, e.g.*, Susan A. Schneider, *Reconnecting Consumers and Producers: On the Path Toward a Sustainable Food and Agriculture Policy*, 14 DRAKE J. AGRIC. L. 75, 84 (2009) (discussing growth of local farmers markets and the locally-grown-produce movement).

us to try. Second, by considering the science, policy design, and economics of an agricultural offset market, we can see the contours of a new playing field on which farmers worldwide may soon be operating.

I. SETTING THE STAGE FOR A NEW AGRICULTURE: THE END(ING) OF TRADITIONAL CROP SUBSIDIES UNDER INTERNATIONAL TRADE LAW

In a country where agricultural regions are given disproportionately greater political representation in the legislature (South Dakota has the same number of United States Senators as either New York or California), the attraction and political economy of agricultural subsidies coming from Washington, D.C. probably need little elaboration. Less appreciated, however, are the effects of globalization and free trade on what otherwise would be a purely domestic (and politically cozy) set of agricultural policies. Recently, pressure from free-trade has begun to crack the system of federal agricultural subsidies that, for over half a century, have shaped the mindset and crop production decisions of conventional farmers. Among other things, this means that the future may hold fewer financial incentives to support vast monocultures that, due to artificial price supports, regularly produce more crops, such as corn, than a freer market would dictate.

Such a development could have enormous implications both for the practice of agriculture and for the nation's food supply. Agriculturally, upon the removal of price incentives that only incentivize farmers to produce more, growers may finally be able to direct their knowledge and experience toward less environmentally destructive, agricultural systems. This outcome may be even more likely if the government paid farmers who produce *positive* environmental externalities in their production systems. And, as a side note, the implications of this development for the food supply, nutrition, and public health could be significant; a market stripped of artificially cheap corn – and high-fructose corn syrup – for example, might significantly impact the American diet.[17] This development in international trade – the ending of agricultural subsidies that reward overproduction – deserves to be briefly amplified.

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[17] Jedediah Purdy & James Salzman, *Corn Futures: Consumer Politics, Health, and Climate Change*, DUKE L. SCH. RES. PAPER SERIES NO. 216, August 2008, at 4 ("[t]he low cost of high-fructose corn syrup explains how convenience stores can turn a profit selling a half gallon of soda for 69 cents . . . . [t]he low cost of corn as cattle-feed makes beef cheaper, allowing fast-food chains to supersize burgers and still sell them for less than ever before in inflation-adjusted terms.").

Between the New Deal and the 1990s, Congress authorized a system of agricultural subsidies, such as "deficiency" payments[18] and nonrecourse loans,[19] which were designed to support farmers' incomes without regard to the vagaries of crop yield. This system rewarded farmers simply for producing a crop without regard to market demand. [20] In the mid-1990s, however, Congress approved the results of the Uruguay Round of trade negotiations, creating the World Trade Organization ("WTO"), and "for the first time subjected U.S. agricultural subsidies to significant restrictions under global trade rules."[21] The rationale for this shift was the idea that growth in American agricultural exports, under the WTO's liberalized trading regime, would provide farmers with an expanded source of income that would more than counterbalance a reduced stream of agricultural subsidies. Accordingly, in its 1996 Farm Bill, Congress limited domestic agricultural subsidies to $19.1 billion by eliminating deficiency payments and replacing them with a series of fixed payments that would diminish over a seven-year period.[22]

Soon, however, this shift in thinking was tested. In the late 1990s, agricultural commodity prices collapsed, and Congress responded with new farm legislation that sought to reverse the diminishing payments it had approved in 1996.[23] In 2002, Congress again increased farm subsidies in the Farm Security and Rural Investment Act of 2002[24] (the 2002 "Farm Bill").[25] To square these actions with its earlier approval of the Uruguay Round of international trade rules (under

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[18] In 1973, Congress allowed for the establishment of target prices for certain crops. *See* Agriculture and Consumer Protection Act of 1973, 7 U.S.C. § 612(c) (2006) (establishing target prices for certain crops); § 1445(b-3) (repealed) (If market prices failed to reach target prices, farmers enrolled in "deficiency" programs received "deficiency payments" equal to the difference between the market and target prices.).

[19] 15 U.S.C. §§ 714-714p (2006). Under a nonrecourse loan program, the Commodity Credit Corporation offers nonrecourse loans at a government-set loan rate, which acts as a government-guaranteed minimum price for the commodity; if the market price falls below the loan rate, the farmer simply forfeits the crop (the loan's sole collateral) to the government and keeps the loan. *See, e.g.*, 7 U.S.C. § 1425 (2006).

[20] Purdy & Salzman, *supra* note 17, at 3.

[21] Matthew C. Porterfield, *U.S. Farm Subsidies and the Expiration of the WTO's Peace Clause*, 27 U. PA. J. INT'L ECON. L. 999, 1002 (2006).

[22] *Id.* at 1003.

[23] *Id.* at 1004.

[24] *See* Farm Security and Rural Investment Act of 2002, 7 U.S.C. § 7901 (2002), *suspended by*, Food Conservation and Energy Act of 2008 Pub. L. 110-234, 122 Stat. 923 (2008).

[25] *See* Porterfield, *supra* note 21, at 1004.

which agricultural subsidies were to be *reduced*), Congress attempted to gain international support for reinvigorating domestic subsidy programs through the so-called "Doha Round" of international trade talks that began in Doha, Qatar, in 2001.[26] The Doha Round, however, seemed to collapse in July 2006 when negotiations were suspended "primarily because of broad disagreements over agriculture."[27] Thus, as to agricultural subsidies, international trade law reverted to the framework that announced in the Uruguay Round and Congress approved in the mid-1990s.

That said, it had always been unclear whether the Uruguay framework was sufficiently strong actually to penalize the United States with trade sanctions for Congress's reintroduction of increased agricultural subsidies. Although the New York Times chastised the government in an editorial in 2004 entitled *Those Illegal Farm Subsidies*,[28] many experts believed that ambiguity in the text of the Uruguay Round's *Agreement on Agriculture*[29] would "rarely permit successful reining in by [the WTO's] dispute settlement panels of the nearly $1 billion a day developed nations [were providing] to their farmers."[30]

In 2004, however, two decisions issued by WTO dispute settlement panels sent a warning shot to the business-as-usual system of agricultural commodity subsidies. The first decision, arising from a complaint brought by Brazil against the United States for American subsidies on upland cotton, found that the United States had exceeded the amount of subsidies it was allowed under the Agreement on Agriculture.[31] The second decision, from a Brazilian complaint against the European Union ("EU") for the EU's level of subsidies to domestic sugar producers, found that the EU had exceeded its internationally applicable limits on commodity subsidies. Not only did these decisions surprise many observers, but they triggered the WTO's often-cumbersome enforcement mechanism – under which the complaining

[26] *Id.* at 1022-23.

[27] *Id.* at 1023.

[28] *See* Editorial, *Those Illegal Farm Subsidies*, N.Y. TIMES, Apr. 28, 2004, at A20.

[29] Agreement on Agriculture, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1A, THE LEGAL TEXTS: THE RESULTS OF THE URUGUAY ROUND OF MULTILATERAL TRADE NEGOTIATIONS 43 (1999), 1867 U.N.T.S. 410.

[30] Stephen J. Powell & Andrew Schmitz, *The Cotton and Sugar Subsidies Decisions: WTO's Dispute Settlement System Rebalances the Agreement on Agriculture*, 10 DRAKE J. AGRIC. L. 287, 289 (2005).

[31] *See* Panel Report, *United States-Subsidies on Upland Cotton*, 348, WT/DS267/R (Sept. 8, 2004).

state is authorized to impose tariffs on exports (of any kind) from the offending state. These actions signaled that the WTO was taking seriously the world's commitment to phase out certain types of agricultural crop subsidies.

In September 2009, the WTO authorized Brazil to retaliate against the American cotton subsidies with almost $300 million in trade sanctions – the second-largest retaliation ever approved by the WTO. Brazil has indicated informally its interest in levying these sanctions against the U.S. services and intellectual property export sectors.[32] Yet the impact of international trade law on American crop subsidies may be just beginning.[33] In the words of two prominent commentators, "The Sugar Panel's finding that below-cost exports of an agricultural product may [violate American obligations under the WTO] . . . makes the United States rice, corn, soybeans, and other commodities programs vulnerable to dispute challenge."[34]

In fact, the new trade rules change the incentive mix for farmers in another way, as well. In addition to the newly brandished "stick," the WTO's new rules on agricultural subsidies also contain a "carrot." The Agreement on Agriculture requires member nations to reduce farm support but differentiates among types of support based upon each subsidy's trade-distorting features. The most trade-distorting, and thus least favored, types of support are known as "Amber Box" subsidies; which Congress authorized under the 2002 Farm Bill.[35] However, two other types of subsidies are considered by the Agreement on Agriculture to be less trade-distorting: "Blue Box" subsidies, which are made for farmers who agree to limit production; and "Green Box" subsidies, which include payments made under "environmental and conservation programs."[36] For our purposes, it is significant that payments made to farmers that reward them for their stewardship of their lands' carbon-sequestration properties – whether made under Blue Box or Green Box types of programs – continue

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[32] *See* Marc Chandler, *Will WTO Sanctions End Farm Subsidies?*, Seeking Alpha, Sept. 3, 2009, http://seekingalpha.com/article/159760-will-sanctions-end-farm-subsidies.

[33] *See* European Communities – Export Subsidies on Sugar, Reports of the Panels P 8.3, WT/DS265/R, WT/DS266R, & WT/DS283/R (Oct. 15, 2004), aff'd Report of the Appellate Body, WT/DS265/AB/R, WT/DS266/AD/R, & WT/DS283/AB/R (Apr. 28, 2005).

[34] Powell & Schmitz, *supra* note 30, at 290.

[35] *See* Porterfield, *supra* note 21, at 1006 ("Payments authorized under the 2002 Farm Bill that qualify as Amber Box subsidies include counter-cyclical payments and marketing loan program payments.").

[36] *Id.* at 1007 (citing the Agreement on Agriculture, Annex 2).

under the new international trade rules, just as the deficiency payments tied to production are being limited.

The significance of these developments, therefore, is this: the current system of domestic agricultural subsidies has received an endogenous shock, the sort of shock that, played out into the foreseeable future, might very well open American farmers to the financial necessity of re-imagining the ways in which they make business and operating decisions.

II. BIOFUELS: A CAUTIONARY TALE

In recent years, policy entrepreneurs have claimed that biofuels, such as corn-based ethanol, represent another way in which the government could enlist farmers to aid in GHG reduction. In fact, this claim has proven to be contentious. For our purposes, however, one need not definitively resolve whether corn-based ethanol is on balance a good thing. Instead, biofuels serve more as a cautionary tale, as their short history reflects an inability to escape the distorting influence of special-interest politics, even in the design and refinement of next-generation environmental programs and initiatives.

To be fair to biofuels, society's interest in them did not grow exclusively, or even mostly, out of concern with GHGs. After the gas shortages occasioned by the Iranian Revolution in the late 1970s, Congress enacted the Energy Tax Act of 1978 offering a federal subsidy for "gasohol" to push the country toward energy independence.[37] Despite increases in this federal subsidy over the ensuing years, the price competitiveness of ethanol remained uncertain because collapsing oil prices in the mid-1980s presented consumers with a world awash in cheap fossil fuels.[38] In the late 1980s, however, demand for ethanol came from another direction. A push for oxygenated fuels arose to control conventional air pollutants, which in turn increased demand for ethanol as a fuel additive. The federal Clean Air Act of 1990 reinforced this regulatory signal. Moreover, as demand began to decrease for methyl tertiary butyl ether ("MTBE"), one of the country's most common (and dangerous) fuel additives,[39] demand

[37] *See* Bruce A. McCarl & Fred O. Boadu, *Bioenergy and U.S. Renewable Fuels Standards: Law, Economic, Policy/Climate Change and Implementation Concerns*, 14 DRAKE J. AGRIC. L. 43, 45 (2009) (noting that gasohol is primarily corn-based ethanol as a component of gasoline).

[38] *Id.*

[39] *Id.* at 45-46 (adding that MTBE was banned completely in June 2006).

expanded for ethanol as an additive and peaked in 2006 when the use of MTBE as an additive virtually ceased.[40]

At that point, growers began planting more acres with corn and a mini-industry in biorefineries blossomed. Indeed, it seemed that corn-based ethanol might have done most of what we had asked of it. The ethanol industry could properly claim that ethanol supplied more fuel "than the oil we import from Iran, Iraq, or Venezuela . . . [with] only Canada and Saudi Arabia supply[ing] more."[41] And the net public health benefits of ethanol as an aromatic octane enhancer in gasoline seemed considerable.[42]

By the mid- to late-1990s, however, corn-based ethanol began to draw increasing scrutiny, including scrutiny from a climate-change perspective. From an energy-independence and GHG perspective, an accounting problem was raised: factoring in the gasoline needed in the field to grow the corn and that needed in ethanol's synthesis, ethanol might not significantly cut fossil fuel use and, under certain conditions, might even have a negative net energy balance.[43] From a broader environmental perspective, environmental concerns arose over secondary effects such as increased pesticide and fertilizer loadings, increased use of groundwater for irrigation, and the conversion into corn of marginal (but ecologically valuable) farmland from the federal conservation reserve program.[44] From the international food supply perspective, ethanol-related demand had so raised the international price of corn that it sparked "tortilla riots" in Mexico City.[45]

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[40] *Id.* at 46.

[41] ETHANOL ACROSS AM., ISSUE BRIEF: ENVIRONMENTAL IMPACTS OF ETHANOL PRODUCTION 1 (2009), http://www.ne-ethanol.org/pdf/enviromental_impact_ethanol_2009.pdf

[42] Indeed, environmental regulators began to imagine reductions of eighty percent of the hazardous aromatics in gasoline by increasing the ethanol content of gasoline to twenty-five percent (a change, however, that would require many more flexible-fuel vehicles on the road or an expansion of warranty protection by car manufacturers for existing engines). *See* Douglas G. Tiffany, *Economic and Environmental Impacts of U.S. Corn Ethanol Production and Use*, 5 REGIONAL ECON. DEV. 42, 44 (2009).

[43] *Id.* at 45 (estimating the net energy balance of ethanol at 1.25 to 1.0, a result that would go even lower in a year of poor corn yields when the same amount of energy produced less crop); David Pimentel & Tad W. Patzek, *Ethanol Production Using Corn, Switchgrass, and Wood; Biodiesel Production Using Soybean and Sunflower*, 14 NATURAL RESOURCES RES. 65, 66 (2005) (corn-based ethanol actually used twenty-nine percent more (fossil fuel) energy than it produced).

[44] *See* Jeni Lamb et al., *Adding Biofuel to the Fire: A Sustainability Perspective on Energy Policy in the 2008 Food, Conservation, and Energy Act*, SUSTAINABLE DEV. L. & POL'Y 36, 40 (2008).

[45] Michael Grunwald, *The Clean Energy Scam*, TIME, Mar. 27, 2008.

The United Nations World Food Programme referred to this increased demand as the "silent tsunami," that "threaten[ed] to plunge more than 100 million people on every continent into hunger."[46] In the U.S. farm belt, higher corn prices were draining the profit margins of poultry-, swine-, and cattle-producers.[47]

Soon the accumulated weight of these concerns collided with the increasing political power of the ethanol lobby. At first, the ethanol lobby seemed to carry the day. The 1996 and 2002 Farm Bills created numerous new biofuel research and development programs, adding to the web of federal ethanol subsidies.[48] A few years later, the Energy Policy Act of 2005[49] created a Renewable Fuels Standard ("RFS") that mandated significant increases in biofuel volumes to be used in the country's fuel supply, beginning at four billion gallons in 2006 and almost doubling to seven and a half billion gallons by 2012.[50]

In 2007, however, faced with mounting evidence that some biofuels might not have the energy savings and greenhouse-gas qualities that had been touted, Congress reassessed having corn-based ethanol as the country's biofuel of choice. In the Energy Independence and Security Act of 2007 ("EISA"),[51] Congress laid the foundation for linking biofuels and GHG-emissions reduction. Although the EISA extended the Renewable Fuels Standard to increase the amount of biofuel in the nation's fuel supply,[52] the EISA required all new biofuels to be "renewable." The EISA defines renewable as "meeting or exceeding a minimum 20% percent GHG reduction threshold" over fossil fuels.[53] The EISA, moreover, created separate, ambitious man-

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46 Press Release, United Nations World Food Programme, WFP Says High Food Prices a Silent Tsunami, Affecting Every Continent (Apr. 22, 2008), *available at* http://www.wfp.org/node/195.

47 *See* Lamb et al., *supra* note 44, at 37.

48 *See* McCarl & Boadu, *supra* note 37, at 47 ("[T]he 1996 Farm Bill emphasized the need for research and development directed toward . . . agriculture-based bioenergy feedstocks . . . . [T]he 2002 Farm Bill established new programs and grants for the purchase of bio-based products to support development of biorefineries.").

49 Energy Policy Act of 2005, H.R. 6, 109th Cong. (2005).

50 *See* McCarl & Boadu, *supra* note 37, at 48-49.

51 Energy Independence and Security Act of 2007, Pub. L. No. 110-140, 121 Stat. 1492.

52 *Id.* at § 202(a)(2)(B)(i)(1) (extending the amount of biofuels from 9 billion gallons in 2008 to a startling 36 billion gallons by 2022).

53 *See* OFFICE OF TRANSP. & AIR QUALITY, EPA, U.S. ENVTL. PROT. AGENCY, EPA PROPOSES NEW REGULATIONS FOR THE NATIONAL RENEWABLE FUEL STANDARD PROGRAM FOR 2010 AND BEYOND 3 (2009), http://www.epa.gov/otaq/renewablefuels/420f09023.pdf [hereinafter EPA NEW REGULATIONS] (the EISA "established new renewable fuel categories and eligibility requirements, including setting the first ever mandatory GHG reduction thresholds for the various categories

dates for "advanced" biofuels[54] (such as "cellulosic" biofuel)[55] that could obtain GHG-emissions reductions in the fifty percent range[56] and specified that most of the nation's dramatic increase in biofuel capacity would come from "advanced" biofuels.[57]

In the EISA, Congress delegated to the Environmental Protection Agency ("EPA") the all-important task of calculating the full GHG-emission qualities of biofuels. The statute instructed EPA to make its determinations using an especially comprehensive "lifecycle analysis" ("LCA") that would account for "the aggregate quantity of greenhouse gas emissions (including direct emissions and significant indirect emissions from land use changes) . . . related to the full lifecycle, including all stages of fuel and feedstock production and distribution . . . . [of each biofuel]."[58] This delegation was extremely important, and it did not augur well for corn-based ethanol. Pound for pound, ethanol delivers only two-thirds of the energy content of the gasoline it replaces, thus requiring the growth, transport, distillation, and distribution of more ethanol than gasoline.[59] When factoring in the fossil fuels needed to plant, till, harvest, transport, and refine all of the necessary corn – throughout the life cycle of the fuel – the net energy savings and greenhouse-gas reductions of ethanol begin to shrink. Indeed, some ethanol systems, such as those that used coal-powered refineries, have negative energy balances; these types of ethanol "pathways" actually worsen our dependence on foreign oil and emit more GHGs into the atmosphere than the fossil fuels they replace.[60]

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of fuels").

54 The Energy Independence and Security Act of 2007 § 201(1)(B), P.L. No. 110-140, 121 Stat 1492 (2007).

55 *See* McCarl & Boadu, *supra* note 37, at 49-50. "Cellulosic biofuel" is defined in the Act as "renewable fuel derived from any cellulose, hemicellulose, or lignin that is derived from renewable biomass and that has lifecycle greenhouse gas emissions . . . that are at least 60 percent less than the baseline lifecycle greenhouse gas emissions." The Energy Independence and Security Act of 2007 § 201(1)(E), P.L. No. 110-140, 121 Stat 1492 (2007). "Biodiesel" is defined in the Act as "renewable fuel that is biodiesel . . . and that has lifecycle greenhouse gas emissions . . . . that are at least 50 percent less than baseline lifecycle greenhouse gas emissions." § 201(1)(3).

56 *See* EPA NEW REGULATIONS, *supra* note 53, at 3.

57 *See* McCarl & Boadu, *supra* note 37, at 49 (cellulosic biofuel volume was to increase under the EISA from 0.1 billion gallons in 2010 to 16 billion gallons in 2022).

58 The Energy Independence and Security Act of 2007 § 201, L. No. 110-140, 121, Stat. 1492, 1520 (to be codified at 42 U.S.C. § 7545(o)); *see* EPA NEW REGULATIONS, *supra* note 53, at 4.

59 *See* Grunwald, *supra* note 45, at 53-54.

60 *See* Tiffany, *supra* note 42, at 45-48; *see also* Stephen D. Cook, *EPA Proposes Rule on Which Biofuels Qualify Under Renewable Fuels Standard*, 40

These environmental concerns prompted a growing awareness that the biofuels industry needed to improve and that its future belonged to advanced biofuels rather than to simple expansion of corn-based ethanol. President Obama instructed Secretary of Agriculture Tom Vilsack to use funds from the Food, Conservation, and Energy Act of 2008[61] to finance mechanisms that could reduce emissions from ethanol plants and to help finance facilities that could produce ethanol from biomass, rather than from corn.[62] The President also directed the Department of Energy to spend over $750 million from the American Recovery and Reinvestment Act (the Stimulus Bill)[63] to accelerate biofuels research and development.[64]

In Spring 2009, federal and state regulators dealt a huge regulatory blow to many of the traditional pathways for producing corn-based ethanol. The state of California, and the EPA, independently determined that most corn-based ethanol was *not* a low-carbon fuel. Specifically, regulators using LCA found that the already-thin energy- and GHG-benefits of some corn-based ethanol systems could actually be outweighed by the indirect effects of the increased, worldwide corn production they caused. Specifically, the agencies found that rising demand for corn caused by ethanol production led to increased land-clearing overseas and farming on such non-agricultural lands as neotropical rainforests, releasing indirectly the GHG stored there.[65] The California Air Resources Board ("CARB") made its decision pursuant

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ENV'T REP. (BNA) 1047 (May 8, 2009) (corn ethanol produced in a plant powered by coal has cumulative emissions that are thirteen percent higher than gasoline whereas those produced with biomass heat reduce emissions, at least when calculated using a 100-year-time frame).

[61] *See* H.R. 2419, 110th Cong. (2008) (enacted).

[62] *Id.*

[63] *See* H.R. 1, 111th Cong. (2009) (enacted).

[64] Cook, *supra* note 60, at 1047.

[65] *See* Carolyn Whetzel, *State Adopts Low-Carbon Fuel Standard in Move to Lower Greenhouse Gas Emissions*, 40 ENV'T REP. (BNA) 1108 (May 1, 2009) (describing California's use of indirect emissions in life-cycle analysis of low-carbon fuels); Cook, *supra* note 60, at 1047. If one considers merely the direct emissions of GHG from gasoline and corn, gasoline has direct carbon emissions of approximately ninety-five grams per mega-joule of energy used to produce it and corn ethanol has direct emissions of approximately sixty-eight grams per mega-joule; the CARB rule found that the indirect land use (deforestation) effects of the corn ethanol market added another thirty grams per mega-joule on the ethanol side, making corn ethanol a net GHG contributor even before adding in the other indirect GHG effects of corn ethanol under a full lifecycle analysis. *See* Cole Gustafson, *New Energy Economics: Markets for Traditional Corn Ethanol Narrowing*, N.D. ST. U. AGRIC. COMM., Mar. 26, 2009, http://www.ag.ndsu.edu/news/columns/biofuels-economics/new-energy-economics-markets-for-traditional-corn-ethanol-narrowing.

to the state's Global Warming Solutions Act of 2006[66] which sought to cut GHG emissions in California to 1990 levels by 2020.[67] The EPA's decision was made pursuant to its mandate under the 2007 EISA statute to use LCA ("including significant indirect emissions from land use changes") in developing the EISA's Renewable Fuel Standard.[68]

Before considering the ethanol industry's response to these developments, it is worth noting that, in many ways, the agencies' LCA confirmed the environmental case that had been building only against the *most* energy- and land-intensive types (pathways) of ethanol production. Not all ethanol production, and certainly not all biofuel production, was adversely affected by the agencies' decisions. One spokesperson for CARB, for example, noted that seven out of eleven pathways for corn ethanol passed muster under California's low-carbon-fuel standard.[69] Indeed, some environmentalists complained that the regulators had used various types of regulatory accounting "gimmicks," such as a hundred-year time frame rather than a thirty-year time frame, to improve the "renewability" profile of most biofuels.[70] Companies producing advanced biofuels, which fared better than corn-based ethanol under these regulations, "applauded" the regulatory developments and claimed that the new regulations would "provide the confidence needed to attract investors."[71] Both the CARB and EPA proposals were consistent with federal actions to spur advancement and innovation in the biofuels industry.[72] These proposals were also consistent with the generally accepted convention in international climate regulation that one must consider "leakage," the effect of GHG-reducing action taken in one part of the world that can lead to offsetting GHG-*increasing* actions in another geographic location.[73] Finally, both regulatory decisions were consistent with a

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[66] California Global Warming Solutions Act of 2006, Assem. B. No. 32 § 38501(h) (2006).

[67] *See* Whetzel, *supra* note 65, at 1108.

[68] Cook, *supra* note 60, at 1047 (describing EPA's mandate as to indirect emissions, life cycle analysis, and the RFS under the EISA).

[69] *See id.* ("CARB spokesman Stanley Young told BNA May 1 that 'not all ethanols are created equal' . . . [and] that those using "natural gas or biomass to dry distillers grain . . . . instead of coal . . . have a definite and specific role to play to meet the [low-carbon-fuel] standard.").

[70] *Id.* ("The analysis based on a 30-year time frame shows about half the greenhouse gas reduction as the 100-year time frame, except for fuels made of cornstalks or other cellulosic biomass, which were about the same.").

[71] *See* Whetzel, *supra* note 65, at 1108.

[72] *See supra* text accompanying notes 62, 64.

[73] *See, e.g.*, Philip M. Fearnside, *Carbon Benefits from Amazonian Forest Reserves: Leakage Accounting and the Value of Time*, 14 MITIGATION & ADAPTION

significant body of scientific and economic literature finding that higher ethanol-induced prices for corn in one part of the world can lead to deforesting or increased cultivation (with attendant increased GHG emissions) in other parts of the world.[74]

Thus, in light of the relative *modesty* of the regulators' science-backed proposals, the corn-ethanol industry's full-throated attack on the California and EPA regulatory decisions may be the most notable example yet of the dangers that special-interest politics can present in shaping GHG regulation. The industry's response took two forms. The first was the increasingly common strategy of attacking regulators for junk science and zealotry. Within days of CARB's proposed rule in April 2009, the ethanol industry had attacked it as a "scientifically unsound penalty" and successfully demanded that CARB create a second expert panel to review evidence over the next eighteen months.[75] Within days of EPA's proposal in May 2009, the ethanol industry claimed that it would be vindicated by a properly conducted "scientific peer review" of the indirect land-use component of the agency's ethanol LCA.[76] These charges were countered when EPA released, in August 2009, several peer-review documents in which scientists expressed their "general satisfaction" with the scientific underpinnings of EPA's proposal,[77] leaving the industry to claim that the peer reviewers were "biased,"[78] while simultaneously magnifying several methodological comments made by the peer reviewers to argue that the peer review had proven EPA wrong.[79]

Separately, the industry launched attacks on the regulators' "transparency." Industry groups demanded release of some models

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STRATEGIES GLOBAL CHANGE 557, 557-58 (2009) ("Of primary importance [in developing GHG policy] . . . is the accounting for carbon benefits of Amazon forest reserves, especially the losses to 'leakage,' or the effects on carbon emissions that occur outside of a mitigation project as a result of the project activity.").

[74] *See, e.g.*, Timothy Searchinger et al., *Use of U.S. Croplands for Biofuels Increases Greenhouse Gases Through Emissions from Land-Use Change*, 319 SCIENCE 1238, 1238-40 (2008).

[75] *California May Revisit Land-Use GHG Impacts in Clean Fuels Rule*, 3 CARBON CONTROL NEWS No. 17, Apr. 27, 2009.

[76] *Ethanol Industry Eyes RFS Peer Review to Boost Fuel's GHG Benefits*, 3 CARBON CONTROL NEWS No. 19, May 11, 2009, at 2.

[77] Stephen D. Cook, *Peer Review Generally Supports EPA Analysis of Greenhouse Gas Emissions From Biofuels*, 40 ENV'T REP. (BNA) 1047 (Aug. 14, 2009).

[78] *Ethanol Industry Claims Bias in EPA Peer Review of Biofuel Gas*, 3 CARBON CONTROL NEWS No. 32, Aug. 10, 2009.

[79] *See* Cook, *supra* note 77, at 1047 ("House Agriculture Committee Chairman Collin Peterson (D-Minn.) said the peer reviews showed the weaknesses of the EPA modeling.").

that the agencies had used in their regulatory decisionmaking[80] even though the attackers simultaneously argued that the agencies should broadly protect industry trade secrets when responding to environmentalists' demands for other information in the agencies' possession.[81] In short, the industry attacked the agencies' proposed LCA with the sort of full-court press in the name of "good science" that has come to characterize rulemaking in the new "subterranean" administrative law.[82]

Moreover, lest this subterranean attack fail, the ethanol industry and its allies in Congress began a more overt, and more overtly political, attack on the application of LCA to ethanol. The American Clean Energy and Security Act ("ACES"), H.R. 2454, had been introduced on May 15, 2009 by Representatives Henry Waxman and Edward Markey.[83] ACES is widely regarded as the most significant piece of GHG legislation in a generation. Yet it was introduced precisely as the CARB and EPA regulatory proposals on biofuel LCA had attracted intense, special-interest scrutiny. It was not long before these two developments merged. Representative Collin Peterson, Chair of the House Agriculture Committee, introduced legislation on May 14, 2009, that simply would have forbidden EPA from considering indirect land-use change in its implementation of the RFS.[84] After ACES was introduced the following day, Peterson announced that he would oppose ACES unless Peterson's concerns about LCA were met.[85] Thereafter, as the bill's sponsors did not seem to have enough support to pass ACES, Peterson and the agricultural bloc he represented found themselves with significant political leverage. In late June 2009, Rep-

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[80] *E.g.*, Steven D. Cook, *Industry Group Seeks Release of Models Used by EPA for Renewable Fuels Standard,* 40 ENV'T REP. (BNA) 1291 (June 5, 2009); *California Low-Carbon Fuel Rule Raises Transparency Concerns*, 3 CARBON CONTROL NEWS No. 32, Aug. 10, 2009.

[81] *California Low-Carbon Fuel Rule Raises Transparency Concerns*, *supra* note 80.

[82] *See* Donald T. Hornstein, *Accounting for Science: The Independence of Public Research in the New, Subterranean Administrative Law*, LAW & CONTEMP. PROBS., Autumn 2003, at 227, 235-37.

[83] American Clean Energy and Security Act of 2009, H.R. 2454 111th Cong. (2009).

[84] *See Climate Bill Slated for House Floor Vote; Waxman, Other Chairmen Reach Agreements*, 40 ENV'T. REP. (BNA) 1 (June 26, 2009) [hereinafter *Climate Bill*] ("Peterson said EPA would also be barred from considering whether ethanol production leads to international land use changes that may trigger increases global greenhouse gas emissions. The agreement . . . will defer a decision on that issue for at least five years while . . . the issue is studied by EPA, USDA, and the Energy Department.").

[85] *Id.*

resentatives Waxman and Peterson announced an agreement whereby ACES would forbid EPA for five years from considering whether ethanol production led to increased GHG emissions from international land-use changes.[86]

Even more aggressive bills have been introduced in the Senate, by farm-belt Republicans and Democrats alike, which would forbid EPA outright from ever considering indirect GHG effects in its LCA of biofuels.[87] Other legislative proposals sought simply to "deem" corn ethanol an "advanced" biofuel.[88] At this point, it remains unclear whether this political pressure will prevail. In September 2009, Senator Tom Harkin, then-Chair of the Senate Agriculture Committee, drafted an amendment to EPA's 2010 spending bill that would have barred the use of funds to consider indirect effects on international land use in EPA's implementation of the RFS.[89] The amendment was withdrawn after EPA Administrator Lisa Jackson wrote Senator Harkin on September 24, 2009, that the Agency agreed that there might be "significant uncertainties associated with . . . the estimate of indirect land use change" and promised that EPA would work to "quantify the uncertainty."[90] EPA, however, reiterated that it was "important to take into account indirect emissions from biofuels when looking at the lifecycle emissions as required by the EISA."[91] As of this writing, the political tug-of-war over ethanol LCA is still unfolding.

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[86] *See id.* ("Peterson said EPA would also be barred from considering whether ethanol production leads to international land use changes that may trigger increases global greenhouse gas emissions. The agreement . . . will defer a decision on that issue for at least five years while . . . the issue is studied by EPA, USDA, and the Energy Department"); *see also* Steven D. Cook, *Jackson Touts Benefits to Agriculture in House Energy, Climate Legislation*, 40 ENV'T REP. (BNA) 1757 (July 24, 2009) ("In addition, the agreement would repeal a requirement in the Energy Independence and Security Act . . . for EPA to analyze indirect greenhouse gas emissions arising overseas from the production of ethanol in the United States.").

[87] *Thune Bill Allows Ethanol Makers to Sidestep GHG Cuts*, 3 CARBON CONTROL NEWS No. 19, May 11, 2009 ("[T]hune's legislation would instruct EPA to focus on direct lifecycle greenhouse gas (GHG) emissions in setting its standards.").

[88] *Harkin Plan to Ease EPA GHG Rules Heightens Biofuels Industry Tension*, 3 CARBON CONTROL NEWS No. 32, Aug. 10, 2009 ("Senate Agriculture Committee Chairman Tom Harkin (D-IA) is weighing modifications to the greenhouse gas (GHG) provisions in EPA's renewable fuel standard (RFS) to allow corn ethanol to qualify as an advanced biofuel . . . .").

[89] *See* Ben Geman, *Biofuels: EPA Rule Will Reflect 'Uncertainty' on Indirect Emissions, Fending off Amendment*, ENV'T & ENERGY DAILY, Sept. 24, 2009, http://www.eenews.net/EEDaily/print/2009/09/24/2.

[90] *See id.*; *see also* Letter from Lisa P. Jackson, Environmental Protection Agency Administrator, to Senator Tom Harkin, (Sept. 23, 2009) (on file with Health Matrix: Journal of Law-Medicine).

[91] Letter from Lisa P. Jackson to Senator Tom Harkin, *supra* note 90.

The bottom line is that the newest generation of climate-change legislation already has proven susceptible to the distortions of special-interest politics, notwithstanding the differences in political-party control. In what might be a harbinger for agriculture's role in an emerging carbon-offset market, special-interest politics has affected (although hopefully not trumped) at least some of the climate-change science on which the legitimacy of the country's biofuel regime depends.

III. THE OTHER SHOE DROPPING: AGRICULTURAL CARBON OFFSETS, POLITICS, AND REGULATORY DESIGN

The tussle over biofuels only foreshadowed the outsized role agriculture was to take when the House of Representatives passed ACES. Specifically, in Summer 2009, this political pressure explained the emergence of agricultural "offsets" in political and public-policy debates on the ACES bill.

At the level of regulatory design, the attraction of offsets in general is easy to explain. The regulatory centerpiece of ACES is a "cap-and-trade" system in which increasingly stringent GHG limitations (the "cap") is imposed largely on the energy-producing sector of the economy with firms within the sector retaining latitude to arrange cost-effective measures to meet their lower-GHG obligations (the "trade").[92] A regulated firm within the cap can arrange such trades with other, similarly- regulated firms ("allowance trading") and, to a somewhat lesser extent, with unregulated firms in sectors of the economy outside of the cap ("offsets").[93] Although, as explained below, offsets present certain challenges not found in allowance trading, they also offer two key advantages. First, by expanding GHG-reduction possibilities outside of the cap, offsets promise lower GHG emissions, sooner, than would exist in a world restricted only to allowance trading.[94] Second, by expanding the supply of GHG-reduction possi-

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[92] *See, e.g.*, *Climate Bill*, *supra* note 84, at 1 (Title III authorizes a cap-and-trade program to curb U.S. greenhouse gas emissions 17 percent by 2020 from 2005 levels).

[93] *See, e.g.*, Laurie A. Ristino, *It's Not Easy Being Green: Reflections on the American Carbon Offset Market*, 8 SUSTAINABLE DEV. L. & POL'Y 34, 34 (2008) ("Under a cap-and-trade regime, a limited percentage of a regulated industry's emission reduction requirement may be met with the purchase of carbon offsets. Offsets are different from on-site reductions because they mitigate regulated source emissions by reducing emissions through an unregulated sector GHG reduction project.").

[94] *Id.* at 37 ("Carbon offsets have the potential to play an effective, interim role as part of an overall comprehensive federal framework that uses multiple strate-

bilities, offsets can reduce the price by which lower-GHG emissions can be achieved[95] – thereby easing the economy's transition to a lower-carbon future and, perhaps, political opposition to GHG legislation by those who see in it only higher energy costs caused by a cap-and-"tax" scheme.[96]

Continuing at the level of regulatory design, offsets also present a set of unique dangers. Because a regulated firm within the cap can continue to emit a certain level of GHGs, so long as it acquires a corresponding amount of offsetting reductions, an offset program exhibits the qualities of a zero-sum game.[97] If the hoped-for emission reductions from the offset project fail to materialize while GHG emissions from industrial sources within the cap continue, there will not be any net reduction in the overall amount of carbon emissions.[98] Such incidences can absolutely cripple the legitimacy of the cap-and-trade scheme, masking the continued emissions of GHGs, at levels beyond the target policymakers had deemed acceptable, with the exchange of money for what in reality would be ineffective trades. [99] Two common problems with offset integrity are especially noted in the public policy literature. The first problem involves paying for an offset project that would have happened anyway. This "*additionality*" prob-

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gies to address climate change.").

[95] *See, e.g.*, CONG. BUDGET OFFICE, THE USE OF OFFSETS TO REDUCE GREENHOUSE GASES 8 (2009), http://www.cbo.gov/ftpdocs/104xx/doc10497/08-03-Offsets.pdf ("The cost savings to the economy generated by offsets could be substantial. CBO estimates that between 2012 and 2050 average annual savings from offsets could be about 70 percent under [ACES].").

[96] *See, e.g.*, Sarah Palin, *The 'Cap and Tax' Dead End*, WASH. POST, July 14, 2009, at A17; Editorial, *The Cap and Tax Fiction*, WALL ST. J., June 25, 2009, at A12.

[97] *See* Written Testimony of Michael Wara to the Subcomm. on Energy & Env't, U.S. House of Representatives, Concerning the Role of Offsets in Climate Legislation 2 (Mar. 5, 2009) (copy on file with author) ("A carbon offset market, if perfect in both design and implementation, is a zero-sum game. Emissions are reduced at carbon offset projects. These emissions reductions then allow firms with compliance obligations to emit more than they otherwise would and at a lower per ton cost.").

[98] *Id.* ("If, however, design or oversight is imperfect, with some offset projects securing credit for reductions that do not represent real alterations to their baseline emissions, getting paid to do what they would have done in any case, then emissions will be unchanged outside of the cap but higher within the cap.").

[99] *See* Michael W. Wara & David G. Victor, *A Realistic Policy on International Carbon Offsets* 8 (Program on Energy and Sustainable Dev., Working Paper No. 74, 2008) ("Our argument is that the theoretical benefits of lower costs and broader engagement of developing countries through the extensive use of offsets are an illusion. They are based on the assumption that it is possible to administer an offsets system so that it rewards only bona fide reductions. This assumption is valid for only a fraction of the real offsets market.").

lem means that emissions would remain unchanged outside of the cap but higher within the cap, resulting in a failure to achieve net reductions in overall GHGs.[100] The second problem entails paying for an offset project that in fact merely shifted the location of GHG emissions. This *"leakage"* problem means that emissions would merely change location outside of the cap but be higher within, again resulting in a failure to achieve net reductions in overall GHGs.[101]

IV. AGRICULTURAL AND FORESTRY OFFSETS: POSSIBILITIES AND UNCERTAINTIES

With these design principles in mind, it is certainly important to note that legitimate offsets from agriculture and forestry can exist. Indeed, some of these possibilities are relatively straightforward. For example, animal manure lagoons emit methane into the atmosphere, a gas with heat-trapping qualities twenty-one times those of carbon dioxide.[102] This GHG can be reduced, however, by systems that capture and burn methane, sometimes for on-farm use as power in lieu of other GHG-causing power sources.[103] Projects that induce the use of such systems do not suffer from additionality problems because, currently, such systems are both expensive and relatively rare. Hence adopting such systems would constitute a change from the business-as-usual approach to manure management.[104] Similarly, a leakage problem would not exist; and one manure lagoon's methane reduction would not lead, directly or indirectly, to increased methane emissions elsewhere.

Other types of agricultural offsets might share similar attributes. For example, methane emissions directly from livestock (caused by enteric fermentation within the normal digestive processes of rumi-

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[100] *See, e.g.*, Wara, *supra* note 97.

[101] *See, e.g.*, CONG. BUDGET OFFICE, *supra* note 95, at 4 ("Offsets would need to be credited in a way that accounted for *leakage* in the form of higher emissions in other locations or sectors of the economy as a result of the offset activity.") (emphasis in original).

[102] JOHNSON, *supra* note 11, at 3 n.9.

[103] *See* Nicholas Smallwood, Note, *The Role of U.S. Agriculture in a Comprehensive Greenhouse Gas Emissions Trading Scheme*, 17 N.Y.U. ENVTL. L.J. 936, 940 (2008) ("manure management projects are a great opportunity for agricultural involvement in climate change mitigation; they are relatively straightforward; they provide additional non-GHG environmental benefits; and they provide an opportunity for landowners to reduce their use of fossil fuels").

[104] JOHNSON, *supra* note 11, at 7-8 (noting that initial capital costs of an anaerobic digester ranges from $500,000 to $1 million, causing their adoption, despite federal and state cost-sharing programs, to remain low – "accounting for only 1% of operations nationwide").

nant animals) may be reduced by changes in animal feed, adopted precisely for this purpose.[105] Similarly, nitrous oxide emissions from fertilizer use may be reduced by changing the timing or amount of fertilizer applications;[106] such changes could offer extra GHG benefits because nitrous oxide has *310 times* the heat-trapping qualities of carbon dioxide.[107] These offsets are potentially attractive because, as with the adoption of methane-capturing systems, they do not present immediate problems with additionality and/or leakage. That said, some scientific questions remain open, regarding our ability to quantify the amounts of GHG emissions any of these offsets might in fact produce.[108] Enforcement and administrative questions also remain, regarding error or fraud in implementation at thousands of different farm sites.[109]

But the major claims made about agricultural and forestry offsets involve the possibilities they offer for carbon sequestration. Within GHG-policy circles, the term, "carbon sequestration" refers to two different processes. The first type of carbon sequestration, sometimes also called "carbon capture and storage,"[110] refers to end-of-pipe technologies at fossil-fuel power plants (especially coal-fired plants) that separate carbon dioxide from the waste-gas emission stream, then process and inject it underground for permanent or very long-term burial.[111] Currently, such technologies are experimental[112] and are probably at least a decade or more from widespread use.[113]

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[105] *Id.* at 4 ("Methane emissions from livestock operations occur as part of the normal digestive process in ruminant animals . . . . Higher feed effectiveness is associated with lower emissions.").

[106] *See* Smallwood, *supra* note 103, at 939 ("Farmers can decrease nitrous oxide emissions through the implementation of soil management practices – in order to improve the amount, timing, and placement of nitrogen-rich fertilizers.").

[107] JOHNSON, *supra* note 11, at 3 n.9.

[108] *See, e.g.*, D. Giltrap et al., *DNDC: A Process-based Model of Greenhouse Gas Fluxes from Agricultural Soils*, 136 AGRIC., ECOSYSTEMS ENV'T 292, 295-96, 298 (2010) (reporting a model that finds significant differences in nitrous oxide emissions depending on soil moisture and other variables, noting for example that "Chinese farmers have started gaining [carbon] credits by incorporating more crop residue in their soils or resuming traditional manure fertilizer [but] when [the model] was used to simulate the effects of these practices, soil [nitrous oxide and [methane] increased across major agricultural regions in China.").

[109] *See infra* text accompanying notes 157-161 for discussion of mechanisms addressed to administrability problems such as these.

[110] *See, e.g.*, Howard Herzog & Dan Golomb, *Carbon Capture and Storage from Fossil Fuel Use*, *in* MASS. INST. TECH. ENCYCLOPEDIA ENERGY 277 (Cutler J. Cleveland ed., 2004), *available at* http://sequestration.mit.edu/pdf/enclyclopedia_of_energy_article.pdf (describing the processes of capture and storage).

[111] *See, e.g.*, Christine MacDonald, *Pipe Dreams: The Question of Clean Coal*, 20 E-THE ENVIRONMENTAL MAGAZINE 29 (Sept/Oct 2009) (generally describing

The second type of sequestration involves changes in land-use patterns that increase the amount of carbon stored in biomass and soils. This type of sequestration is ubiquitous and its near-term expansion more feasible. The most commonly referenced form of biomass storage involves forests. In the United States alone, forests sequester 200 Targograms ("Tg")[114] of atmospheric carbon annually, mostly through the photosynthesis involved in the growth of trees, with the potential to increase this by fifty to one hundred percent (to 100-200 Tg/year), both through maintaining larger amounts of acreage in permanent forests as well as through such forestry practices as lengthening the rotation period in tree harvesting.[115] In comparison, carbon sequestered in agricultural soils ("soil C") is currently estimated at only 11 to 21 Tg/year, but with the potential to increase six- to ten-*fold* (to 75-208 Tg/year) through such management techniques as reduced tillage, grazing land management/pasture improvement, livestock management, and manure management.[116]

It is worth pausing on forestry sequestration for a moment to appreciate how special-interest politics can even distort one of the more promising tools in GHG control. When experts allude to sequestered carbon in "agriculture and forestry," these experts usually are emphasizing mostly forestry. One study estimated that agricultural sequestration in the United States currently accounts for about 44

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carbon capture and storage); Herzog & Golomb, *supra* note 110.

[112] *See, e.g.*, Matthew Campbell & Mike Anderson, *Carbon Capture Needs Decade of Subside, Harvard Researcher Says*, BLOOMBERG, July 31, 2009, *available at* http://www.bloomberg.com/apps/news?pid=20601072&sid=aSoA17WaVcqs (explaining that it will take at least ten years to be technologically viable); Fereidoon P. Sioshansi, *De-carbonising Electricity Generation: It Won't be Easy, Cheap, Nor Enough*, 17 UTIL. POL'Y 217, 221 (2009) (many developments in carbon capture and storage have yet to be achieved and, as of now, CCS technology has not been proven to be technologically viable).

[113] Sioshansi, *supra* note 112, at 221; *see also* Victor B. Flatt, *Paving the Legal Path for Carbon Sequestration from Coal*, 19 DUKE ENVTL. L. & POL'Y F. 211, 213-14 (2009) (discussing issues facing regulators as they devise necessary regulatory regime for carbon capture and storage).

[114] One targogram of carbon equals approximately 3,000 tons of carbon. *See* Interview with Dr. Greg Gangi, Research Assistant Professor, Inst. for the Env't at Univ. of N.C. at Chapel Hill, in Chapel Hill, N.C. (Mar. 3, 2010) (on file with author).

[115] *See* Charles W. Rice, *Introduction to Special Section on Greenhouse Gases and Carbon Sequestration in Agriculture and Forestry*, 35 J. ENVTL. QUALITY 1338, 1338 (2006).

[116] *Id.* at 1338-39; *see also* Debra L. Donahue, *Livestock's Role in Climate and Environmental Change*, 17 MICH. ST. J. INT'L L. 95, 99 (2008) (noting how grazing cattle on marginal land adds relatively little to the food supply while, through mechanical disturbance of soils and their ability to sequester carbon, reducing the amount of carbon that could be sequestered).

million metric tons of "carbon-dioxide equivalent" whereas forestry accounts for over 1,100 million metric tons, meaning that ninety-five percent of current sequestration in the United States takes place through the "forestry" component.[117] The flip side of this equation is that deforestation, such as occurs when forests are converted to cropland, can contribute massively to GHG emissions. One source estimates that worldwide deforestation accounts for eighteen to twenty-five percent of global emissions.[118] In turn, there arises a well-recognized leakage problem in the design of GHG offsets. Even when forests in one area are set aside for their sequestration value, if market demand for agricultural land is strong forests elsewhere will be cleared and the land enlisted in what the market reflects to be its highest and best use. This leakage problem also has a "transboundary aspect," meaning that excess demand for agricultural land in one country will cause forests to be converted to cropland in others.[119] This phenomenon is "serious enough that a national carbon sequestration program could be largely dissipated over several decades."[120] Thus, when special-interest politics privileged corn-based ethanol in the ACES biofuels provisions, by forbidding EPA from considering the indirect, transboundary effects of corn ethanol on deforestation rates in the tropics (conversion of forestland to cropland), it was undermining the scientific understanding of leakage that is a crucial element in the sort of legitimate offset program that ACES, in another part of the legislation, was hoping to create.[121]

But setting aside offset-design issues in forestry, most experts look to agricultural practices as holding the greater potential for increased sequestration. In addition to changes in fertilizer[122] and ran-

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[117] JOHNSON, *supra* note 11, at 3 tbl.1.

[118] Andrew W. Mitchell, et al., *Forests First in the Fight Against Global Climate Change*, Global Canopy Programme (June 2007), http://www.globalcanopy.org/themedia/file/PDFs/Forests%20First%20June%202007.pdf.

[119] Kenneth R. Richards, *A Brief Overview of Carbon Sequestration Economics and Policy*, 33 ENVTL. MGMT. 545, 549 (2004) (citing Brent Sohngen & Robert Mendelsohn, *An Optimal Control Model of Forest Carbon Sequestration*, 85 AM. J. AGRIC. ECON. 448, 448-57 (2003)).

[120] *Id.*

[121] *See* RENEE JOHNSON ET AL., CONG. RESEARCH SERV., ESTIMATE OF CARBON MITIGATION POTENTIAL FROM AGRICULTURAL AND FORESTRY ACTIVITIES 17 (2009), http://www.nationalaglawcenter.org/assets/crs/R40236.pdf [hereinafter ESTIMATE OF CARBON MITIGATION] ("Biofuels policies and energy markets are likely to continue to influence U.S. and global crop production patterns and land use, including decisions regarding land retirement and other conservation-based land conversion (e.g., movement to pasture/range, timberland, and developed uses), as well as various conservation practices.").

[122] *See supra* notes 106-108 and accompanying text.

geland management,[123] perhaps the most discussed set of sequestration measures involve crop-growing techniques such as no-till farming. Tilling soil for weed control and planting preparation had "been fundamental to crop production for centuries."[124] Yet, among other things, tilling also increases carbon oxidation and causes significant releases ("fluxes") of GHGs from the soil.[125] Contrariwise, reduced- or no-till farming is often associated with reduced GHG fluxes from soils.[126] Since 1960, a no-till revolution has emerged as more farmers utilize herbicides to control weeks, in lieu of tilling. As of 2002, about twenty percent of U.S. acreage is planted using no-till techniques, which is up from six percent in 1990. In fact, in many U.S. agricultural counties, well over half of some crops are planted using no-till farming.[127] Overseas, some countries (e.g., Brazil, Argentina, Paraguay) produce fifty percent or more of their food by no-till methods, whereas worldwide, no-till farming accounts only for five to ten percent of food production.[128] It is often with increased use of no-till farming that some scientists claim "there is no greater potential for the sequestration [of] global carbon than the soil."[129] One study found that conversion of seventy-six percent of U.S. cropland to "conservation tillage" could sequester "as much as 286-468 million metric tons of carbon ("MMTCE") over 30 years,"[130] while another study

[123] *See* Donahue, *supra* note 116, at 100 ("According to one estimate, 'improving management on 279 million acres of poorly managed . . . rangelands [in the U.S. alone] would sequester 11 million additional tons of carbon annually.'") (quoting Justin D. Derner et al., *USDA-ARS Global Change Research on Rangelands and Pasturelands*, RANGELANDS, Oct. 2005, at 36, 36).

[124] *See* C. John Baker & Keith E. Saxton, *The "What" and Why" of No-Tillage Farming*, *in* NO-TILLAGE SEEDING IN CONSERVATION AGRICULTURE 1, 1 (C. John Baker et al. eds., 2d ed. 2007).

[125] *See, e.g.*, Don C. Reicosky & Keith E. Saxton, *Reduced Environmental Emissions and Carbon Sequestration*, *in* NO-TILLAGE SEEDING IN CONSERVATION AGRICULTURE 257, 258 (C. John Baker et al. eds., 2d ed. 2007) ("The large gaseous losses of soil carbon following mouldboard ploughing compared with relatively small losses with no-tillage . . . .").

[126] *See infra* notes 127-128.

[127] *See, e.g.*, Candace Pollock, *No-Till Pioneers Leave Legacy in Ag. Production*, OHIO ST. U. EXTENSION, June 23, 2003, http://www.ohio4h.org/-news/story.php?id=2558.

[128] *See* Baker & Saxton, *supra* note 124, at 1.

[129] D.J. Greenland, *Carbon Sequestation in the Soil: Knowledge Gaps Indicated by the Symposium Presentations*, *in* SOIL PROCESSES AND THE CARBON CYCLE 591 (Rattan Lal et al., eds., 1998) (cited in Donahue, *supra* note 116, at 100).

[130] Reicosky & Saxton, *supra* note 125, at 262 (citing J.S. Kern & M.G. Johnson, *Conservation Tillage Impacts on National Soil and Atmospheric Carbon Levels*, 57 SOIL SCI. SOC'Y AM. J. 200, 208-09 (1993)).

estimated global sequestration rates as high as 4900 MMTCE by 2020.[131]

No-till carbon sequestration has some potential advantages. Unlike the leakage problems involved in forestry-based sequestration (whereby acres locked up in forests in one area may contribute to increased development pressure on forests in other areas), adopting a GHG-friendly technique on land that is already being used in agriculture does not create perverse land-conversion pressures elsewhere. In addition, no-till farming has a variety of potential environmental co-benefits, including: reduced GHG emissions from farm machinery that otherwise would be used to till soil,[132] reduced erosion of topsoil caused by the breaking-up effect of tillage,[133] reduced pesticide and fertilizer run-off associated with tilled soils,[134] and reduced agricultural water consumption because of the increased moisture retention of no-till soils.[135]

No-till carbon sequestration also has some potential problems. As a matter of offset design, there is an additionality problem. Given the no-till "revolution" already underway, reasons independent of GHG-sequestration prompt farmers to adopt no-till methods. Therefore, counting these methods as an offset does not really change what otherwise would be the business-as-usual conversion to no-till outside of the cap while allowing for continued or increased GHG emissions inside the cap.[136] Indeed, to the extent some corn growers have shifted to no-till, specifically to meet the RFS's renewability standards for corn-based ethanol (reducing tractor emissions that would have been needed to till mechanically), a second payment for these efforts, as an "offset," would not add anything to the overall GHG balance.

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[131] R. Lal, *Residue Management, Conservation Tillage and Soil Restoration for Mitigating Greenhouse Effect by CO_2-enrichment*, 43 SOIL & TILLAGE RES. 81, 99 (1997).

[132] *See, e.g.*, Baker & Saxton, *supra* note 124, at 18-19 ("Tillage and harvest operations account for the greatest proportion of fuel consumption within intensive agricultural systems. [F]uel requirements using . . . no tillage are 78% [] of those used for conventional systems . . . .").

[133] *See, e.g.*, *id.* at 15 ("Soils relatively high in C, particularly with crop residues on the soil surface, very effectively increase soil organic matter and reduce soil erosion loss.").

[134] *See, e.g.*, *id.* at 16 ("Crop residues on the surface not only help hold soil particles in place but keep associated nutrients and pesticides on the field.").

[135] *See, e.g.*, *id.* at 15 ("[F]or some soil textures, for each 1% weight increase in soil organic matter, the available water-holding capacity in the soil increased by 3.7% volume.").

[136] CONG. BUDGET OFFICE, *supra* note 95, at 4 (The UN's Clean Development Mechanism requires projects seeking qualification as an offset to provide evidence of barriers to implementation of the proposed technique.).

This additional sale would also be a form of double-dipping, resulting in the farmers' unjust enrichment.[137] Moreover, no-till agriculture has some direct and indirect environmental co-detriments. Directly, the increased use of herbicides (such as atrazine) can pose environmental- and human-health risks.[138] Indirectly, no-till agriculture raises the potential risks involved with genetically modified crops that are designed specifically to be herbicide-resistant in a no-till world.[139]

Beyond these complicated and competing sets of issues, numerous and equally important scientific questions of valuation and calculation must be resolved before any particular no-till project can genuinely count as an offset.[140] Some soil types work better than others in sequestering carbon.[141] There is a time lag in some soils, when farmers switch to no-till, before carbon sequestration occurs.[142] All soils have a saturation point after which their ability to sequester additional carbon ceases.[143] Some soils reach this saturation point sooner than oth-

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[137] *See* ESTIMATE OF CARBON MITIGATION, *supra* note 121, at 16 ("The establishment of the RFS presents . . . obstacles in projecting available land for GHG mitigation activities. . . . the RFS itself requires that corn-starch ethanol . . . have lower lifecycle greenhouse gas emissions than conventional (fossil) fuels. Therefore, any emission reductions resulting from conservation practices used on feedstock-producing lands may be needed for compliance with the RFS. A key component of "additionally" is that for an offset to be valid, the practice being credited would not have been done in the absence of the offset market. Granting an offset in this case would effectively allow producers to double-count their emissions reductions – once to meet the RFS life-cycle standard and once for sale or credit as an offset.").

[138] *See, e.g.*, Hornstein, *supra* note 15, at 1569-73 (discussing scientific evidence of atrazine's potential risks to human health).

[139] *See id.* at 1576-77 (discussing evidence of increasing weed resistance from use of genetically modified herbicide-resistant crops).

[140] It is possible, however, if not preferable, also to create an offset system that rewards implementation within a "sector" of economic activity rather than on a project-by-project basis. *See* Richards, *supra* note 119, at 553-54.

[141] *See* A. Franzluebbers, *Soil Organic Carbon Sequestration and Agricultural Greenhouse Gas Emissions in the Southeastern USA*, 83 SOIL & TILLAGE RES. 120 (2005).

[142] *See, e.g.*, Susan Capalbo et al., *Sensitivity of Carbon Sequestration Costs to Economic and Biological Uncertainties*, 33 ENVTL. MGMT. S238, S241 (2004) (stating there is often a 5-10 year time lag before soil C accumulates enough to show improvements in soil productivity); Richards, *supra* note 119, at 555 (sequestration rates sometimes do not achieve peak uptake rates until 20-40 years after implementation begins).

[143] *See, e.g.*, PASTURES SYS. & WATERSHED MGMT. RES. UNIT, U.S. DEP'T OF AGRIC., FACT SHEET: SOIL CARBON SEQUESTRATION IN PASTURES, http://www.umaine.edu/grazingguide/Main%20Pages/2009%20ars%20fact%20sheets/USDA-ARS%20University%20Park%20Fact%20Sheets%20Posters%202009/Soil%20carbon%20sequestration%20in%20pastures.pdf (last visited Apr. 5, 2010) (converted soils from cropland to pasture generally accumulate C for 15-25 years then reach a saturation point where C inputs and losses are about

ers.[144] All soils give up their sequestered carbon if they are (even once) tilled, raising questions of permanence and accountability.[145] Accordingly, many regional cap-and-trade schemes emerging in the United States (such as the Regional Greenhouse Gas Initiative in the Northeast) did not accept agricultural offsets based on soil sequestration.[146] Existing cap-and-trade schemes overseas, such as the European Union's Emission Trading System, also did not accept agricultural offsets based on soil sequestration.[147]

As the ACES legislation moved through the House of Representatives, the House initially gave serious attention to the need for agricultural offsets to be based on scientific assurances that the proffered offsets were genuine. The bill's early versions required regulators to use guidance from independent experts on the authenticity of agricultural sequestration, including specifically guidance on questions of additionality.[148] In the same vein, soil-sequestration activities undertaken in the past would not be used to offset future, continued GHG emissions from sources within the cap and there was adequate enforcement authority to ensure compliance with practices for which farmers might receive offset payments.[149]

Enter last-minute politics. As the ACES legislation moved through the House of Representatives, and it became clear that support from the agricultural bloc was especially pivotal to its passage,[150]

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equal).

[144] *See, e.g.*, Keith Paustian et al., Consortium for Agric. Soils Mitigation of Greenhouse Gases, *Soil C Saturation: Determining Rates and Limits of Carbon Sequestration*, http://www.casmgs.colostate.edu/insider/vigview.asp?action=2&titleid =277 (last visited Apr. 5, 2010) ("[E]ach pool has its own dynamics and stabilizing mechanisms.").

[145] *See, e.g.*, Extension, *Why Is Continuous No-till Better Than Tilling a Field Every Two to Five Years?*, http://www.extension.org/faq/4609 (last visited Apr. 5, 2010) ("Tillage . . . will immediately cancel much of the benefits from the previous years of no-till cropping.").

[146] *See, e.g.*, SOIL CARBON CTR. AT KANSAS STATE UNIV. REGIONAL CAP-AND-TRADE PROGRAMS IN THE U.S. BEGINNING TO TAKE ACTION, http://soilcarboncenter .k-state.edu/originals/Regional_programs_page.html (last visited Apr. 5, 2010) (RGGI does not allow offsets based on agricultural soil sequestration).

[147] *See, e.g.*, Linda M. Young et al., *Carbon Sequestration in Agriculture: EU and US Perspectives* 6 EUROCHOICES 32, 33 (2007) (the EU has excluded agricultural soil sequestration from its carbon market).

[148] *See Economic Opportunities for Agriculture, Forestry Communities, and Others in Reducing Global Warming Pollution: Hearing Before the S. Comm. on Environment and Public Works*, 111th Cong. 4 (2009) [hereinafter Krupp] (statement of Fred Krupp, Environmental Defense Fund).

[149] *Id.*

[150] *See* Steven D. Cook, *Farm Groups Call for Climate Legislation to Allow Unlimited Agricultural Offsets*, 40 ENV'T REP. (BNA) 1286 (June 5, 2009) (citing Jon

farm groups began to press for changes in the offset provisions. Rather than providing an opportunity for EPA to consider the scientific integrity of agricultural offsets after input from an independent panel of experts, the agricultural lobby wanted a "list" of "farm and forestry practices that would be pre-approved as offsets after a brief review by the federal government."[151] Separately, farm groups sought that the U.S. Department of Agriculture ("USDA"), rather than the EPA, exercise regulatory authority over offset integrity.[152] Farm groups also wanted assurances that GHG-reducing measures taken in the past, or taken for other conservation reasons, would nonetheless be eligible under the offset provisions of the legislation.[153]

In the end, the House of Representative's ACES legislation reflected almost everything the agricultural bloc demanded about offsets. Not only did ACES appear to "codify" an extensive list of offsets without regard to the underlying scientific uncertainties over their integrity,[154] but it excluded any "express provision for deleting project types from the list, even if they are ever found to undermine the intent of the legislation."[155] The original provision for an expert Offset Integrity Board was replaced with a more generic advisory board without requirements "for any specific credentials, scientific or otherwise, [or] conflict of interest provisions."[156] Supervision over offsets was given to the USDA, rather than to the EPA.[157]

As of this writing, it is unclear whether a final climate bill will reflect all of these agricultural concessions. The principal Senate Bill, the "Kerry-Boxer Bill," was introduced September 30, 2009, and offers some evidence of retrenchment. It would delegate offset imple-

Scholl, President of the American Farmland Trust, as concluding that "the bill cannot pass without strong support from farm states").

[151] *Id.*

[152] *See Agriculture Groups Seek to Limit EPA Offsets Role in Climate Bill*, 3 CARBON CONTROL NEWS No. 23, June 8, 2009 ("Agriculture and forestry groups are ramping up lobbying efforts to revise pending House climate legislation by giving the Department of Agriculture, rather than EPA, authority over future greenhouse gas emissions offsets programs.").

[153] *Id.* (referring to recognition for "early actors" and for not barring "carbon offset projects from being included in other markets for environmental services").

[154] *See* Krupp, *supra* note 148, at 4 ("The House bill appears to codify an extensive list of project types, which is described as the minimum set of activities eligible for credit under the offsets program.").

[155] *Id.*

[156] *Id.*

[157] *See Climate Bill*, *supra* note 84, at 1 ("Energy and Commerce Committee Chairman Henry Waxman and Agriculture Committee Chairman Collin Peterson reached agreement under which the USDA, and not the EPA, would oversee an emissions offset program for farmers.").

mentation to "the President," rather than to either the USDA or the EPA, apparently in an effort simply to defuse the issue.[158] Kerry-Boxer: (1) calls for "consideration, but not necessarily adoption" of the range of agricultural offset projects listed in the bill;[159] (2) provides for regulators to examine the possibility of co-detriments in proposed offset types;[160] and (3) allows an advisory committee up to one year to issue its recommendations on offset integrity.[161] Of course, the Kerry-Boxer bill has not yet even moved to the Senate floor for consideration. And there are reports of language from competing Senate bills that would move policy back towards the version of ACES passed by the House[162] or that, as of Winter 2010, might drastically scale back any cap-and-trade program.[163]

V. CONCLUDING THOUGHTS: SURPRISINGLY, NOT AS DARK AS YOU MIGHT IMAGINE

In some ways, it is easy to conclude this Article pessimistically. Just as there is hope for a more fundamental and holistic environmental law of agriculture, the climate legislation considered in Summer 2009 showed too many signs of business-as-usual, special-interest distortions.

But there is also a more optimistic way to assay these developments. First, that politics is playing a role in any legislation can hard-

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[158] *See Senate Proposals May Foreshadow Battle Over Carbon Offsets*, 3 CARBON CONTROL NEWS No. 40, Oct. 5, 2009 (Kerry-Boxer punts key issues to the President, stopping short of farm state demands that USDA be given the lead role on agriculture and forestry offsets).

[159] *Id.*

[160] *Id.*

[161] *Id.*

[162] *See id.* at 2 (draft offsets language is being developed by Senator Debbie Stabenow and Max Baucus that would "establish clear authority for USDA to run the domestic offset program" and would require "adoption" initially of several listed offset types even in the absence of expert recommendations about their integrity); *see also* Noelle Straub & Allison Winter, *Climate: Lincoln Says Ag Panel Likely to Mark Up Climate Bill*, ENVTL. & ENERGY NEWS PM, Sept. 30, 2009, http://www.eenews.net/eenewspm/print/2009/09/30/4 (quoting Blanche Lincoln, newly installed Chair of the Senate Agriculture Committee, as saying, "Depending on how we designed a cap-and-trade system – I'm just saying I reserve the right to certainly make sure that anything that is designed is going to meet the needs of agriculture . . . ."); *see also id.* (Senator Klobuchar said "she wants to make sure the Senate bill includes all the measures [House Agriculture Committee Chair] Peterson negotiated for the House.").

[163] *See, e.g.*, Dean Scott, *Obama Says Senate May Have to Drop Cap-and-Trade, Focus on Energy Measures*, ENV'T REP. (BNA) (Feb. 3, 2010) (quoting Tennessee Senator Lamar Alexander, "I don't believe in an economy cap-and-trade [approach] and won't vote for one.").

ly be cause for surprise. But second, and more hopefully, the final legislation on both biofuels and agricultural carbon offsets at least began the larger project that Rachel Carson championed: of self-consciously seeking to connect environmental concerns with the underlying economic activity of agriculture.