

Section 5: Agriculture and Rural America

“A nation that destroys its soils destroys itself.”

– Franklin Delano Roosevelt

As the United States begins the necessary transition to a sustainable energy economy, it will launch a rural renaissance. We will not drill our way out of our dependence on foreign oil; we will grow our way out, harvesting energy not only from the soil and from woodlands, but also from the wind and sun. Rural America will capture new jobs, industries and tax revenues.

As the PCAP proposes, by 2020, the United States should cut its oil consumption in half, increase the average fuel efficiency of new cars to 50 miles per gallon, reduce greenhouse gas emissions by 30% and produce 30% of its electricity from renewable resources. Rural America will be the key to achieving these goals.

Rural biorefineries will turn farm-grown feed stocks into ethanol, biodiesel and an array of consumer products now made from petroleum. Feedlots and landfills will convert methane to electricity. Open lands will host solar arrays and wind farms, harvesting free energy to be sold as electric power. Farmers will earn cash by using production techniques that keep carbon stored in plants and soils and by selling greenhouse gas offsets. Home-grown biofuels will power farm equipment.

Rural lands will provide energy crops and carbon storage, as well as wildlife habitat, food, fiber and building materials. By some estimates, farm income from renewable energy projects will increase by \$37 billion by 2025, and 5.1 million new jobs – mostly in rural areas – will be created.¹ The chief challenge in rural America

¹ Renewable Energy Roadmap: Rural American Can Prosper, Report from the University of Tennessee, December 2006. www.renewableenergyaccess.com/rea/news/story?id=46961.

will no longer be dealing with economic depression and the out-migration of young people. It will be to balance the competing demands on land, water and forests in ways that sustain rather than deplete natural resources.

Climate change will bring other challenges, too. The agricultural industry will have to adapt to the effects of global warming. The impacts will be different by region. Some will have too much rain while others have too little. Temperatures will shift, altering what farms can grow. Livestock will need protection from heat. Rangeland and forage grasses may change. New pests will appear and old pests no longer will be controlled by cold temperatures or the natural predators that have moved north. Competition between farms and cities for water supplies will intensify where rainfall declines. And insofar as they rely on fossil fuels, farmers will contend with higher energy prices.

Meeting all these demands will require us to revisit the way we farm, the way food comes to our tables, the way farmland is used – and the way federal policies relate to agriculture, forestry and rural development. As in other sectors of the economy, policy should help rural America reduce its greenhouse gas emissions while adapting to the climate changes already underway.

Reducing greenhouse gas emissions: Agriculture accounts for 6% of America's greenhouse gas emissions. While carbon dioxide is the most familiar and longest-lasting of the gases that cause global warming, agriculture is responsible for only 1% of America's CO₂ emissions, primarily from fossil fuels used in production and transportation. Most of agriculture's emissions are methane (CH₄) and nitrous oxide (N₂O). Methane's heat-trapping properties in the atmosphere are 23 times more potent than those of CO₂. One ton of N₂O has the warming equivalent of 310 tons of CO₂, and 74% of national N₂O emissions come from agriculture.

Reducing these emissions will require switching to nonpetroleum fuels for farm equipment and nonpetroleum fertilizers, adopting more fuel-efficient tillage and harvesting methods and capturing methane from animal wastes for fuel. We will want to find more efficient ways to move food from field to table and less need to move it long distances.

² S. Greenhalgh and A. Sauer, "Awakening the Dead Zone: An Investment for Agriculture, Water Quality, and Climate Change," issue brief, World Resources Institute, 2003.

Another way to reduce emissions is to sequester greenhouse gases. Healthy plant communities, forests, virgin soils and untilled fields all have the ability to store greenhouse gases so they do not enter the atmosphere. Conventional farming techniques release gases by disturbing or destroying these natural sinks. The nation's agricultural soils have lost, on average, one-third of the carbon they contained before wide-scale cultivation began in the 1800s. Among the practices that will increase carbon sequestration are conservation tillage and residue management (49%), improved cropping systems (25%), land restoration (13%), land use change (7%) and irrigation and water management (6%). If moderate incentives were available, farmland could sequester up to 70 million metric tons of carbon.³

Adaptation: Climate change is expected to influence crop and livestock production, hydrologic balances, input supplies and other components of agricultural systems; the types, frequencies, and intensities of various crop and livestock pests; the availability and timing of irrigation water supplies; and the severity of soil erosion.⁴ Some of these changes are underway and will require that agriculture and rural communities adapt.

Strategies for Public Policy

Public policy should help rural communities and agriculture and forest managers address each of these challenges and opportunities. It should:

- **Focus on reducing emissions of the two most prominent agricultural greenhouse gases – methane and nitrous oxide – through improved efficiency in fertilizer use, anaerobic digestion, better manure management and high-quality pasture rotation.**
- **Maintain and intensify carbon sequestration in soils and in living plant material, including commercial forests, with widespread use of low-till and no-till cultivation. The agricultural industry should set a goal to contribute 20% to the nation's total reduction in greenhouse gas emissions,⁵ more than triple its contribution today.**

³ R. Lal et al., *The Potential of U.S. Cropland to Sequester Carbon and Mitigate the Greenhouse Effect* (Chelsea, Mich.: Ann Arbor Press, 1998).

⁴ R. Adams et al., "Effects of Global Climate Change on Agriculture: An Interpretative View," *Climate Research* 11 (1998):19-30.

⁵ This goal was among recommendations developed by 40 national experts in agricultural and natural resource stewardship at the National Leadership Summit for a Sustainable America, held in December 2006, at the Johnson Foundation's Wingspread Conference Center in Racine, Wis.

- **Participate in market- and incentive-based approaches to climate stabilization, including greenhouse gas offsets.**
- **Ensure that farmers, ranchers and rural communities have adequate information, capital and flexibility to innovate and adapt.**
- **Build upon existing policies and programs to elevate the profile of climate change.**
- **Encourage greater collaboration between state and federal agencies, university extension offices and rural farming cooperatives, farms and urban development. Stakeholders should share resources to help rural communities cope with, adapt to and capture the opportunities presented by changes in the climate and the marketplace.**

Presidential Actions

1. **Raise the visibility of rural America’s crucial role in energy and climate security.**

The President should issue a proclamation recognizing the significant contribution agriculture and rural America can make to national security. The President should encourage agricultural and rural leaders to become the driving force behind the nation’s goals for renewable energy and energy independence and pledge the Administration’s support. The President should keep attention focused on rural America’s crucial role by participating in agricultural conferences and similar events.

2. **Invest in the new rural energy economy.**

Federal programs should help capitalize the plants, equipment and infrastructure needed for rural America’s contribution to energy and climate security and promote local ownership of these projects. The President should:

- **Direct that the low-interest loans offered by the U.S. Department of Agriculture’s Rural Utility Service be redirected from the construction of coal-fired power plants to investments that equip rural America to be the nation’s principal supplier of green energy (see PCAP Section 3). Encourage the nation’s rural electric cooperatives, which**

reportedly plan to invest nearly \$30 billion in new coal plants over the next decade, to invest instead in efficiency programs, renewable electric generation and infrastructure that help meet the nation's climate and energy security objectives.

- Champion USDA's proposal to invest \$50 million over 10 years to encourage new private markets to supplement existing conservation and forestry programs.
 - Propose an investment tax credit of 50% to encourage climate-related conservation improvements by farmers, ranchers and forest landowners.
3. Help agriculture sequester greenhouse gases.
- Increase funds appropriated to the U.S. Forest Service's State and Private Forestry Program.
 - Remove financial barriers that prevent farmers from converting marginal agriculture lands to permanent grassland or forest.
 - Repeal or retool incentive programs that subsidize inefficient land uses.
 - Extend existing tax credits for permanent easements beyond 2008 to keep forested land in forests.
 - Modify forestry programs to promote management practices that improve carbon sequestration. Practices such as thinning, increasing harvesting rotation periods and reforestation are potentially lucrative avenues for increasing carbon sequestration.
 - Direct USDA and DOE to quantify the contributions that reducing urban sprawl can make to sustaining forested lands, grasslands and pastures as a carbon sequestration measure.

4. Encourage agricultural participation in emissions offset and trading programs.

The President should direct USDA and the Environmental Protection Agency to develop criteria for agricultural and forestry practices that are legitimate, verifiable and productive opportunities for funding from carbon offset programs. The agencies work with agricultural organizations to:

- **Develop standardized metrics for issuing greenhouse gas credits to agriculture.**
- **Promote partnerships between agricultural operations and potential greenhouse gas credit purchasers.**
- **Educate farmers and rural landowners on the opportunities and risks in emerging carbon markets.**
- **Direct USDA to establish clear and rigorous inventory and reporting mechanisms for carbon storage.**
- **Require more specific reporting for National Resource Inventory and tie it to management strategies that improve the inventory's modeling capabilities.⁶**

5. Strengthen connections between agricultural practices, water quality and greenhouse gas emissions.

Direct EPA to quantify the connections between water quality and greenhouse gas emissions. The agency should identify emissions that degrade water quality and practices that sequester carbon and improve water quality, such as grass buffer strips or improved tillage practices. It should:

- **Make recommendations based upon its pilot projects that allow polluting industries to purchase nutrient credits from farmers who implement practices to reduce nutrient runoff on their farms, and give priority to practices that simultaneously sequester carbon.**
- **Integrate greenhouse gas language into water-quality regulations (for example, reducing nitrous oxide emissions as a side benefit of reducing nutrient runoff).**
- **Consider No Net Loss wetland policy when calculating land conversion options.**

⁶ Ibid.

- **Include offsets from functional wetland creation or restoration in standards for greenhouse gas offset programs.**
- **Extend compliance requirements for receipt of commodity payments to include nutrient management requirements in Total Maximum Daily Load (TMDL) non-attainment watersheds. Create a pilot project for the Chesapeake Bay or the Upper Mississippi River Watershed, with joint USDA/EPA jurisdiction.⁷**
- **Tie payments for voluntary programs to standardized quantitative measures of environmental performance⁸, and fund a pilot program to better tie these measures to payment allocations. Such measures can reveal changes in soil erosion, nutrient losses, greenhouse gas emissions and water usage.**

6. Manage the evolution of ethanol fuels.

Direct USDA to focus research, development and education programs on mitigating the environmental damage from grain ethanol production and improving its net-energy and net-greenhouse gas profile, while facilitating a transition to cellulosic ethanol.

- **Fund pilot projects to demonstrate new production technologies that improve the emission and energy performance of grain ethanol production, including the use of renewable energy for power and heat.⁹**
- **Through incentive programs, nutrient management plan requirements and farmer outreach, promote precision management of nitrogen fertilizer use (including conservation tillage) in corn production.¹⁰**

⁷ E. Marshall, "Thirst for Corn: The Imminent Environmental Impacts of Corn Production to Meet Burgeoning Ethanol Demand," World Resources Institute Policy Note, Energy and Biofuels, no. 2 (2007); see www.wri.org/publication/thirst-for-corn#.

⁸ Greenhalgh and Sauer, "Awakening the Dead Zone."

⁹ Corn ethanol now reduces greenhouse gas emissions by 15-20%. One facility in Canada has linked an ethanol plant with a large feedlot and anaerobic digester, which supplies heat and power for the plant. The digester captures and burns methane, while the ethanol plant closes the loop by providing distilled dry grains to the feedlot, creating an operation that is essentially GHG neutral. USDA should research similar positive examples and disseminate them to agricultural operators and ethanol producers.

¹⁰ E. Marshall and S. Greenhalgh, "Beyond the RFS: The Environmental and Economic Impacts of Increased Grain Ethanol Production in the U.S.," World Resources Institute Policy Note, Energy and Biofuels, no. 1 (2007), see www.wri.org/publication/beyond-rfs-environmental-and-economic-impacts-increased-grain-ethanol-production-u-#.

- **Direct USDA not to allow farmers penalty-free early outs from their Conservation Reserve Program (CRP) contracts to meet ethanol demand.**
 - **Develop standards for growing, harvesting and processing energy crops to ensure that biofuels retain their green attributes.**
 - **Instruct USDA and DOE to make sure that farm and energy policies are coordinated at both the state and federal levels to provide incentives for the production, harvest and delivery of a variety of feedstock to biorefineries.¹¹**
 - **Increase funding for R&D to better support research into cellulosic ethanol production.**
 - **Work with Congress to fund existing grant programs for biomass development in the Healthy Forests Restoration and the Energy Policy Acts, including full appropriation of loan guarantees for cellulosic refineries and the biorefinery grant program under the Energy Policy Act of 2005.**
 - **Encourage Congress to expand Section 9010 of the 2002 Farm Bill to create a pilot transition assistance program for farmers, ranchers and forest landowners to produce biomass feedstocks for cellulosic ethanol plants.¹² Create incentives for the next generation of bioenergy crops. Offer long-term contracts for following sustainability guidelines in the production and harvest of perennial, native, cellulosic feedstocks on agricultural lands.**
 - **Expand the Conservation Security Program, fund it fully and extend eligibility to all U.S. farmers. Add enhancements that shift existing row-crop acreage to sustainable bioenergy feedstocks and encourage the cellulosic feedstock production in a targeted region to entice new bioenergy plants.**
7. Help rural America reduce the nation's greenhouse gas emissions.
- **Expand renewable energy portfolio standards to include thermal process energy systems for biorefineries.**

¹¹ J. Hettenhaus, *Achieving Sustainable Production of Agricultural Biomass for Biorefinery and Feedstock* (Washington, D.C.: Biotechnology Industry Organization, 2006), www.bio.org/ind/biofuel/SustainableBiomassReport.pdf.

¹² See "Charting America's Energy Future," a summary of the 25x'25 Action Plan, February 2007, www.25x25.org/index.php?option=com_content&task=view&id=58&Itemid=148.

- **Promote local ownership of energy production facilities by helping communities with planning and financial assistance and by establishing purchasing, grant, licensing and loan preferences for locally produced bio-based energy and products.**
 - **Conduct regular, systematic assessments of marginal agricultural land to quantify the potential for wind and solar power development.**
 - **Expand the availability of anemometers to rural landowners to measure wind.**
 - **Provide sufficient funding to the National Renewable Energy Laboratory (NREL) to regularly update its resource data to reflect changes in rural renewable energy production due to climate change. Funding should allow NREL to develop resource maps in enough detail to assist farmers, forest managers, investors and others in adapting to climate change.**
 - **Give high priority to promoting the reduction of nitrous oxide from farm fertilizer use.**
8. **Anticipate and manage the budget impacts of climate change on the Federal Crop Insurance Program.**

Since 1980, the taxpayers' exposure under the Federal Crop Insurance Program (FCIP) has increased 26-fold to \$44 billion.¹³ Crop losses due to drought, excessive precipitation or pests are among the predicted effects of climate change. The President should direct USDA to:

- **Estimate future exposure levels for the FCIP based on assessments of the Climate Change Science Program, the Intergovernmental Panel on Climate Change and other highly regarded assessments of climate impacts.**
- **Analyze implications for the federal budget, insurance rates and the continued availability of insurance.**
- **Assess and prioritize climate adaptation measures based on their potential to reduce insured crop losses.¹⁴**

¹³ Climate Change: *Financial Risks to Federal and Private Insurers in Coming Decades Are Potentially Significant* (Washington, D.C.: U.S. Government Accountability Office, March 2007).

¹⁴ Ibid.

9. Increase the profile of Climate Change in the Farm Bill¹⁵.

Direct USDA to review congressional action on the 2007 Farm Bill and work with Congress on legislation to add any of the following features not yet incorporated into law:

- **List greenhouse gases explicitly as a resource of concern for air quality.**¹⁶
- **Identify CH₄ and N₂O as emission-reduction priorities for agriculture.**
- **Identify and reward carbon sequestration opportunities and perennial biofuel production in incentive programs.**
- **Require that environmental trade-offs be assessed when evaluating applications for payment through farm bill programs. Establish protocols to standardize these assessments.**¹⁷
- **In the Conservation Title, make carbon sequestration and greenhouse gas reductions a priority in allocating resources, establish a clear link between conservation programs and private carbon markets and recognize the critical role played by forests in the carbon cycle.**
- **In the Energy Title, factor in life-cycle greenhouse gas benefits when providing incentives; encourage the development of bioenergy, with an emphasis on cellulosic ethanol; and significantly increase funding for energy efficiency and renewable energy projects by farmers, ranchers and forest landowners.**¹⁸
- **In the Research Title, quantify the environmental service benefits of proposed activities, analyze the impacts of potential changes to subsidy programs and allocate funds to appropriate adaptation measures and to study the resiliency of farms to climate change.**
- **In the Commodity Title, expand the conservation compliance provisions to include greenhouse gases.**¹⁹
- **Strengthen and fully fund the Environmental Quality Incentives Program (EQIP), Conservation Security Program (CSP) and Conservation Reserve Program (CRP).**

¹⁵ Ibid, Wingspread.

¹⁶ E. Branosky and S. Greenhalgh, "Agriculture and Climate Change: Greenhouse Gas Mitigation Opportunities and the 2007 Farm Bill," World Resources Institute Policy Note, Climate and Agriculture, no. 1 (2006), www.wri.org/publication/agriculture-and-climate-change-2007-farm-bill#.

¹⁷ Ibid.

¹⁸ The 25x'25 campaign has proposed that funding for the Energy Title be increased by \$1 billion.

¹⁹ All of the Title recommendations come from Wingspread.

- **Create a Biofuels Reserve Program²⁰ and/or a new Working Lands Conservation Reserve Program to offer a high enough premium to encourage farmers to enroll outgoing CRP acres in sustainable biomass production rather than planting them into corn or other monoculture crops.**
 - **Shift agriculture export subsidies away from traditional commodities to bioenergy in the form of regulatory and financial incentives.²¹**
 - **Support state bioenergy policy innovation and coordination.²²**
10. Support research on agriculture and climate change.
- **Ensure that USDA and the National Science Foundation have ample funds to study agriculture's ability to mitigate and adapt to climate change. (For example, the GRACENet program conducted by the Agricultural Research Service is conducting double-blind trials of alternative farm management practices and, based on results, is advising farmers on how to reduce their carbon footprints.)**
 - **Provide the National Oceanic and Atmospheric Administration with sufficient funding to develop more accurate regional six-month to one-year climate forecasts to help farmers plan which crops to plant and when and where to plant them.**
 - **Ensure that adequate funds are included in the federal Climate Change Science Program to increase the understanding of climate impacts at the local scale so that farm and forest operators are better able to plan adaptation. (See PCAP Section 11)**
 - **Increase R&D funding for research into biochar²³ and other low-cost technologies that simultaneously reduce greenhouse gas emissions and contribute to sequestration.**

²⁰ The National Wildlife Federation has proposed that the CRP be amended to allow lands coming out of the program to be re-enrolled into a modified Working Lands Conservation Reserve Program, which would allow limited harvests of biomass feedstock crops that meet minimum sustainability standards while still enhancing wildlife habits. This program would provide long-term contracts to farmers for sustainable production of perennial, native bioenergy crops.

²¹ See publications from the Energy Futures Coalition, www.worldwatch.org/node/1442.

²² States can help lead the way in effective policies and programs for sustainable bioenergy production. Legislation introduced in Minnesota in 2007 provides an array of mechanisms to promote a sustainable bioenergy sector. Other states are working on similar policies. Federal policy should support these types of state-based innovations and learn from their successes and failures.

²³ J. Lehmann, "A Handful of Carbon," *Nature* 447, no. 7141 (2007): 143-144.

11. Mobilize the USDA Cooperative Extension services for technical assistance.

Direct USDA, through the Cooperative Extension System, to:

- **Help farmers balance bioenergy feedstock production with sequestration.**
- **Teach sequestration-related production techniques to agricultural operators.**
- **Identify and provide information as needed to promote the production of nonfood farm crops that serve as feedstocks for products now made from petroleum.**
- **Identify drought-tolerant, disease-tolerant and pest-tolerant native species for forestation.**
- **Help rural leaders with infrastructure, workforce, programs, technology and resource development.²⁴**
- **Equip the Cooperative Extension Service to educate rural landowners on the potentials for and legal/business dimensions of leasing land for wind power and solar electric farms.**

²⁴ G. Crosby and D. Hamernik, *Exploring New Opportunities for Extension* (Washington, D.C.: CSREES, 2002).