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Recognizing the Link Among Climate Change, Food, and Poverty

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The United States must begin to meet in earnest the challenges that climate change poses to adequate nutrition for the poor and the hungry. Climate change is profoundly affecting agriculture and is expected to continue to do so, resulting in sometimes-sharp food-price fluctuations to which our government at all levels is unprepared to respond.¹ While those with resources may be able to cope with price volatility, those who are already undernourished are less able without government programs nimbly responding to fluctuations in food prices. Compounding the problem for U.S. households, the predicted cost increases of other necessities such as energy will leave low-income and underfed families with even less income to feed themselves. Governments, antipoverty and environmental advocates, and foundations must plan now to meet this enormous and complex challenge.

The Effect of Climate Change on Food Production, Prices, and Price Volatility

Climate change is happening, and its impact is real. It affects the variables, such as temperature and water supply, that are important to food production and security. North America has felt and will likely continue to experience significant temperature increases, which affect everything from planting to pollination. Also significant are changes in the timing, intensity, and geographical patterns of rainfall over the next several decades, increasing the frequency and severity of disasters such as drought, severe storms, and forest fires, as well as insect infestations, weed proliferation, and plant disease outbreaks.²

These factors profoundly affect domestic food production, in addition to food storage, processing, distribution, access, and utilization. Two examples begin to touch on the significance of the problem: U.S. production of corn, which accounts for about 40 percent of the global output, and the influence of the climate on California, which supplies about 50 percent of the nation's vegetables, fruits, and nuts and is a top dairy producer.³ Yields of corn, a heat-sensitive crop grown primarily in areas

¹See generally PETER BACKLUND ET AL., U.S. CLIMATE CHANGE SCIENCE PROGRAM & SUBCOMMITTEE ON GLOBAL CHANGE RESEARCH, THE EFFECTS OF CLIMATE CHANGE ON AGRICULTURE, LAND RESOURCES, WATER RESOURCES, AND BIODIVERSITY IN THE UNITED STATES (2008), <http://bit.ly/QKUY7j>.

²*Id.*

³Jeanne Merrill et al., California Climate and Agriculture Network, Ready ... or Not? An Assessment of California Agriculture's Readiness for Climate Change 6 (March 2011), <http://bit.ly/MWXtj1>. See generally Daniel Urban et al., *Projected Temperature Changes Indicate Significant Increase in Interannual Variability of U.S. Maize Yields: A Letter*, 112 CLIMATIC CHANGE 525 (2012).

that are expected to see increased variability in temperature, are projected to decrease by an average of 18 percent during 2030–2050 relative to 1980–2000 if the availability of arable land for corn production stays the same and business continues as usual without adaptation.⁴ Simultaneously corn yields are likely to become much more variable.⁵ The latest news from the corn belt is that, instead of the bumper crop that farmers expected, extremely hot temperature and drought are hurting 88 percent of the U.S. corn crop, with the government forecasting food price increases in the next year.⁶

In the meantime California is predicted to be among the regions in the United States most affected by climate change.⁷ For example, earlier snowmelt and heavy rainfall in the winter and spring will likely result in releasing reservoir water earlier in the season to avoid flooding, leading to reduced water supply during the growing season. By 2050 agricultural water supply—because of both changing climate and urban water use—may be 20 percent to 23 percent below levels of demand in California.⁸

Other than crops, climate change is altering the availability and stability of food resources such as livestock and fish. Higher temperature harms grazing and livestock operations, yielding lower livestock production in the summer season.⁹

Moreover, acidifying and warming oceans are less able to support the complex food chain and produce food, while overfishing and pollution have put unsustainable pressure on oceanic resources.¹⁰ The collapse of fisheries, including cod fisheries, and dead zones in the near-shore marine environment already attest to the disastrous consequences of such pressure.¹¹

In the coming decades, temperature is expected to accelerate; a recent study sounded alarm bells of abrupt and irreversible shifts in biological systems that would transform the Earth into a new state unknown to humans.¹² Even without crossing such a tipping point, food production is expected to be a daunting challenge, especially with a burgeoning world population expected to reach nine billion by 2050.¹³ Moreover, the world has to feed its growing population while allocating resources to mitigating and adapting to climate change.¹⁴

Not surprisingly the era of cheap food may end. Following fifty years of relative stability, global food prices jumped in the last decade and doubled from 2006 to 2008. Food price volatility is also expected to intensify.¹⁵ Corn price volatility, for one, is expected to increase in the next several decades, largely due to higher temperature in the corn belt. Climate change not only directly contributes to food-price volatility through increasing

⁴Urban et al., *supra* note 3, at 525.

⁵See generally *id.*

⁶Annie Lowrey & Ron Nixon, *Severe Drought Seen as Driving Cost of Food Up*, NEW YORK TIMES, July 25, 2012, <http://nyti.ms/PA6igT>.

⁷See generally Tim P. Barnett et al., *Human-Induced Changes in the Hydrology of the Western United States*, 319 SCIENCE 1080 (2008).

⁸Merrill et al., *supra* note 3, at 11.

⁹BACKLUND ET AL., *supra* note 1.

¹⁰See generally Ove Hoegh-Guldberg & John F. Bruno, *The Impact of Climate Change on the World's Marine Ecosystems*, 328 SCIENCE 1523 (2010).

¹¹Anthony D. Barnosky et al., *Approaching a State Shift in Earth's Atmosphere*, 486 NATURE 52, 54–55 (2012).

¹²See generally *id.*

¹³See generally H. Charles J. Godfray et al., *Food Security: The Challenge of Feeding 9 Billion People*, 327 SCIENCE 812 (2010), <http://bit.ly/OFTQE1>.

¹⁴John Beddington, *Food Security: Contributions from Science to a New and Greener Revolution*, 365 PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY, SERIES B: BIOLOGICAL SCIENCES 61, 65 (2010), <http://bit.ly/NR01Qs>; Godfray et al., *supra* note 13; John Beddington et al., Commission on Sustainable Agriculture and Climate Change, *Achieving Food Security in the Face of Climate Change* 3, 8 (March 2012), <http://bit.ly/OuuzKk>.

¹⁵Beddington, *supra* note 14, at 16.

temperature but also indirectly drives price fluctuations: grain-based ethanol mandates from the United States and the European Union to move away from fossil fuels to combat climate change are expected to increase the price volatility of corn by more than 50 percent in the next several decades.¹⁶

Connecting Climate Change and Food Insecurity for the Poor

Policymakers must take into account the disproportionate impact of climate change on the poor and communities of color. For example, the price of basic necessities such as energy and water, besides food, is expected to increase in the coming decades because of climate change.¹⁷ Low-income and minority households are at risk of spending more of their income on these necessities and thus becoming even poorer, with proportionately less to spend elsewhere. Already these families spend as much as 25 percent of their income on basic necessities.¹⁸ High energy costs have been documented to lead to a reduction in food spending: when energy costs rose more than 40 percent in the early 2000s, low-income families reduced their food spending by 10 percent.¹⁹ Higher costs of necessities can harm the long-term economic outlook for poor families by, for example, forcing them to reduce spending on education or to sell off assets such as livestock.²⁰

Climate change does more than reduce the assets of low-income households through price escalation. With higher tempera-

ture, the poor, who frequently work in low-wage jobs outdoors without shelter, are at an elevated risk for heat stroke and are exposed to increased smog pollution, which occurs with hotter temperature and already disproportionately harms the poor.²¹ Missed workdays and increased health care costs reduce the amount of income left for a poor family to spend on necessities such as food, not to mention the effect that the death of a wage earner has on the family's welfare.

At the same time hunger remains a problem unresolved despite impressive gains in agricultural productivity. In 2010, the last year for which data are available, 17.2 million households in the United States faced food insecurity, lacking consistent access to adequate food.²² We can hardly afford any delay in dealing with the consequences of climate change on food insecurity and poverty.

The U.S. government acknowledges that climate change, featuring increasing extreme weather events, stresses food systems; that biofuel production from grains competes directly with food availability; and that the connection between climate change and food is complex.²³ The federal government thus has begun to take action on climate change and agriculture. The U.S. Department of Agriculture (USDA), for example, is developing agricultural practices to deal with drought; USDA is working with farmers on water efficiency measures to grow more crops with less water.²⁴ USDA also runs a grant program for funding research and edu-

¹⁶Noah S. Diffenbaugh et al., *Response of Corn Markets to Climate Volatility Under Alternative Energy Futures*, 2 NATURE CLIMATE CHANGE 514 (2012).

¹⁷Rachel Morello-Frosch et al., *The Climate Gap: Inequalities in How Climate Change Hurts Americans and How to Close the Gap* 14 (n.d.), <http://bit.ly/MXclxH>.

¹⁸*Id.*

¹⁹David A. Super, *From the Greenhouse to the Poorhouse: Carbon-Emissions Control and the Rules of Legislative Joinder*, 158 UNIVERSITY OF PENNSYLVANIA LAW REVIEW 1093, 1108 (2010), <http://bit.ly/OxO2Xc>.

²⁰Thomas W. Hertel & Stephanie D. Rosch, *Climate Change, Agriculture, and Poverty*, 32 APPLIED ECONOMIC PERSPECTIVES AND POLICY 355, 372 (2010), <http://bit.ly/NR3FK0>; Beddington, *supra* note 14, at 8.

²¹See Morello-Frosch et al., *supra* note 17, at 11–12 (documenting deaths of California agricultural and construction workers from heat exposure).

²²Alisha Coleman-Jensen et al., *Economic Research Service, U.S. Department of Agriculture, Household Food Security in the United States in 2010*, at 4 (Sept. 2011), <http://1.usa.gov/NEhX3w>.

²³NATIONAL SCIENCE AND TECHNOLOGY COUNCIL, *THE NATIONAL GLOBAL CHANGE RESEARCH PLAN 2012–2021*, at 32 (2012), <http://bit.ly/MfTVW>.

²⁴*Id.* at 109; Interagency Climate Change Adaptation Task Force, *Federal Actions for a Climate Resilient Nation* 19 (Oct. 28, 2011), <http://1.usa.gov/Pe30A5>.

cation to “[k]eep American agriculture competitive while ending world hunger,” “[i]mprove food safety for all Americans,” and “[m]itigate and adapt to climate change,” among other priorities.²⁵

These efforts are certainly important in understanding how climate change will affect U.S. agriculture and how the country should adapt. But the government fails to make an explicit connection among climate change, food, and poverty and is thus missing a time-sensitive opportunity to formulate an integrated approach to the likely disproportionate climate-change effects on the poor. In the national strategic plan for global change, for example, poverty is merely subsumed within the definition of sustainability, without reference to food insecurity: “[b]alancing the needs of present and future generations while substantially reducing poverty and conserving the planet’s life support systems.”²⁶ Further, Executive Order 13514, which seeks “an integrated strategy towards sustainability in the Federal Government and to make reduction of greenhouse gas emissions a priority for Federal agencies,” does not mention poverty or food insecurity or connect the agricultural impact of climate change to food provision to the poor.²⁷ Unsurprisingly climate change’s poverty consequences, including food insecurity, appear not to be meaningfully handled at the federal level. No signposts point to any such efforts in the near future.

Benefits to Public Health and Welfare from Looking at the Big Picture

The failure to make the explicit link among climate change, food, and poverty has significant policy consequences.²⁸ Considering these factors together should

lead to more intelligent policy decisions by preventing policymakers from overlooking the full or unintended consequences of policy choices. For example, the failure to consider this connection when passing federal grain-based ethanol mandates has already harmed food security among the poor.²⁹ (On the flip side, we will not know for quite some time the unintended, long-term benefits of the world unrest following the rise in global food prices.) Policymakers who examine climate change, food, and poverty together review different alternatives; for example, among several alternatives for increasing agricultural productivity or water conservation, the one that least harms food security could be selected. If policymakers consider the connection among climate change, food, and poverty, their constituents may not only become educated about the issues but also offer ideas that might not have come to the fore. Such an interaction should lead to better decisions.

Connecting climate change, food, and poverty can likewise improve funding decisions and allocations. For example, the 2008 Farm Bill, formally known as the Food Conservation and Energy Act of 2008, underestimated the cost of food: actual outlays as of 2010 were expected to be more than 65 percent higher than estimated in 2008. Although the poor economy was a larger factor, one of the reasons for the underestimation was the failure of the government to anticipate food-cost increases.³⁰ While the underestimation did not result in displacing recipients of the Supplemental Nutrition Assistance Program (SNAP) because SNAP funding is mandatory, it did affect the federal budget and planning, if not poverty specifically, and will do so more significantly as prices climb.³¹

²⁵U.S. Department of Agriculture & National Institute of Food and Agriculture, Agriculture and Food Research Initiative: 2010 Annual Synopsis 3 (n.d.), <http://bit.ly/PggiM4>.

²⁶NATIONAL SCIENCE AND TECHNOLOGY COUNCIL, *supra* note 23, at 128.

²⁷Exec. Order No. 13,514, 74 Fed. Reg. 52117 (Oct. 8, 2009), <http://1.usa.gov/LZehlg>.

²⁸See Hertel & Rosch, *supra* note 20, at 380.

²⁹Carmen G. Gonzalez, *The Global Food System, Environmental Protection, and Human Rights*, 26 NATURAL RESOURCES AND ENVIRONMENT 7 (Winter 2012), <http://bit.ly/OgftUT>.

³⁰See JIM MONKE & RENÉE JOHNSON, CONGRESSIONAL RESEARCH SERVICE, R41195, ACTUAL FARM BILL SPENDING AND COST ESTIMATES 7 (Dec. 13, 2010), <http://bit.ly/QtXK71>.

³¹See RANDY SCHNEPF & JOE RICHARDSON, CONGRESSIONAL RESEARCH SERVICE, R40545, CONSUMERS AND FOOD PRICE INFLATION 27 (April 14, 2011), <http://bit.ly/MhmJEq> (citing mandatory nature of Supplemental Nutrition Assistance Program funding).

How nimbly can SNAP respond to volatile food prices? SNAP benefits are indexed yearly to the national average cost of food in the Thrifty Food Plan and thus can reflect the year-to-year volatility in consumer prices of food.³² But food prices vary by region, raising the question whether an index based on regional, rather than national, food prices better protects SNAP recipients against food insecurity.³³ A family of four in the East or West, where food prices are higher, can spend as much as \$32–\$48 more monthly on food than the U.S. average; a family in the South or Midwest spends \$12–\$28 less per month than the U.S. average.³⁴ Families living on the margins are vulnerable to higher food prices and price volatility, and these families living in regions with higher food prices could slip further into food insecurity.

The 2012 Farm Bill (the Agricultural Reform, Food, and Jobs Act of 2012), which was winding through Congress before it adjourned for a five-week recess, proposes severe cuts in SNAP benefits.³⁵ Notably the bill does not consider climate change, food, and poverty together.³⁶ Given the statute's essential role in agriculture, food security, and food assistance programs, the failure to consider this link is a grave loss of opportunity for planning, funding specific research, and protecting the vulnerable, instead of simply viewing food security as agricultural productivity for big agribusiness.

Collaboration Among Policymakers and Environmental and Antipoverty Advocates

Federal lawmakers have done too little to reduce U.S. emissions of greenhouse gas-

es. Since climate change disproportionately hurts the poor, antipoverty advocates must join environmental advocates in fighting for renewable energy and against climate change.³⁷ The voice of antipoverty advocates would make the environmental movement stronger: climate change advocacy should no longer be about just the environment. Fundamental human rights are at stake. Just as important, environmental advocates must collaborate with their colleagues in the antipoverty field. Such coordination should result in climate advocacy that does not hurt the already vulnerable.

Foundations and wealthy benefactors, too, have a role. They have funded work that has significantly reduced greenhouse gases.³⁸ Foundations could also fund local and regional work to reduce food insecurity in the warming world. State and local governments, as well as farmers, have a role not only in reducing greenhouse gases but also in advocacy to ensure food security.

Only by considering poverty along with food and climate change can we methodically ensure food security. The federal government's failure to integrate poverty considerations into agricultural and climate-change policies would exacerbate the disproportionate impact of climate change on our country's most vulnerable—families who cannot feed themselves. Antipoverty advocates should be joined by environmental activists, and funders must consider the human rights dimensions of climate change as well as the urgency of acting now to ensure proper planning.

³²*Id.* at 26.

³³See generally Christian A. Gregory & Alisha Coleman-Jensen, Economic Research Service, U.S. Department of Agriculture, *Do Food Prices Affect Food Security? Evidence from the CPS [Current Population Survey] 2002–2006* (April 28, 2011), <http://bit.ly/QhC2LV> (regional variability in U.S. food prices significantly affects low-income families with children).

³⁴*Id.* at 3.

³⁵Editorial, *Food Stamps and the Farm Bill*, *NEW YORK TIMES*, June 12, 2012, <http://nyti.ms/NiZ3JE>.

³⁶See *Agriculture Reform, Food, and Jobs Act of 2012*, S. 3240, 112th Cong. (2012), <http://bit.ly/NiZBPM>.

³⁷See Special Issue, *Climate Change and a Green Economy: New Advocacy Opportunities*, 44 *CLEARINGHOUSE REVIEW* 209–326 (Sept.–Oct. 2010).

³⁸See Barry Saxifrage, *Climate Change Stunner: USA Leads World in CO₂ Cuts Since 2006*, *VANCOUVER OBSERVER* (June 4, 2012), <http://bit.ly/OzvXeL> (citing Michael Bloomberg's \$50 million contribution to Sierra Club's Beyond Coal campaign).



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