



## **Climate Change and Vulnerable Societies: Achieving Sustainable Security**

Statement before the U.S. House of Representatives Foreign Affairs Subcommittee on Asia, the Pacific and the Global Environment on “From L’Aquila to Copenhagen: Climate Change and Vulnerable Societies”

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Thank you Chairman Faleomavaega, Congressman Manzullo, and distinguished members of the subcommittee for inviting me to participate in today’s hearing.

We’re here today to talk about climate change and vulnerable societies, so I’d like to begin with one of those societies—India. As Robert Kaplan and others have recently reported, a steadily rising sea level has already driven thousands of people off the islands of the coastal Sundarbans region shared by India and Bangladesh (Kaplan, 2008; Sengupta, 2007). Since 1980, India has suffered huge damage from bad weather: over 1,000 people killed and over 20 million affected annually by floods, and nearly 40 million affected every year by droughts.

It is possible to paint an even grimmer picture for the next 40 years. My colleague, Bill Cline, a senior fellow at the Center for Global Development and the Peterson Institute for International Economics, finds that India’s agricultural productivity could fall by 35 percent or more by 2080 if global warming progresses unabated (Cline, 2007).

And in a study I am completing with colleagues at the World Bank (Wheeler, et al., 2009), we find that India could lose as many as 50,000 lives to flooding, hundreds of millions could be seriously affected by droughts, and the number of drought-related hardship cases could mount into the billions by 2050. But we also find that these numbers have not been cast in stone by fate. If we successfully cap and then start reducing global carbon emissions during the next few years, India's climate-related losses will be lower. And even in the face of some inevitable warming from past global carbon emissions, we find that India's losses can be significantly reduced by measures that India itself can take. Continuing its rapid economic and human development will make India much more resilient, drastically lowering the incidence of losses from flooding and droughts relative to today's levels, even in the face of significant climate change.

This lesson from India is my primary message today: even if some climate change is inevitable (and we should do our utmost to slow or halt it), its impact on vulnerable developing countries is largely in their hands—and ours, because many cannot afford to take the needed measures in time unless we're willing to help. Our fate is tied to theirs, because the impact of their unchecked carbon emissions will strike us directly through more destructive floods, droughts, forest fires, violent storms, and sea-level rise. Senator Lugar said earlier this week in a hearing on climate change and national security that climate change projections indicate greater risks of drought, famine, disease, and mass migration, all of which could lead to conflict and global instability. And the destructive impact of the same forces in developing countries may pose additional threats to our own security, as millions of people become environmental refugees, as climate-related stresses

create more flash points like Darfur, and as the resulting hostility focuses on the U.S. as a major carbon emitter.

## **CLIMATE VULNERABILITY AND DEVELOPMENT**

For clarity in this context, it's useful to distinguish three kinds of vulnerability.<sup>1</sup>

The first relates to the destructive impact of climate change itself: more frequent floods in some areas, droughts in others, and more dangerous storm surges as a rising sea level interacts with more powerful hurricanes in coastal areas. On this front, life is simply unfair—new research shows that some places will be hit much harder than others. For example, a one-foot rise in sea level, which we will probably see within 30 years, will start putting a large area of the Nile Delta, Egypt's breadbasket, under water (Dasgupta, et al., 2009b). Millions of people in low-lying areas of Manila will be in critical danger from typhoon storm surges (Dasgupta, et al., 2009a).

A second meaning of vulnerability relates to resilience in the face of adversity. And this kind of vulnerability, unlike random weather events, can be affected by human effort. Last year, Oxfam International published a report titled *Rethinking Disasters: Why Death and Destruction is not Nature's Fault but Human Failure*. At first glance the title may seem cruel or ill-advised, since many thousands of people die every year in floods and droughts. But common-sense observation supports Oxfam. For example, Haiti and the Dominican Republic share an island and experience the same weather conditions. But year-in, year-out, Haitians are more than twice as likely to die from floods as Dominicans. And an examination of the record shows that this is no accident. Over time, the Dominican Republic has invested more in flood prevention and disaster

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<sup>1</sup> For a more detailed discussion, see Buys, et al. (2007).

preparedness, and the results clearly show. If this difference persists, who can doubt that Haiti will suffer more from climate change than its neighbor?

A third meaning of vulnerability relates to poverty and human development, which affect both carbon emissions and resilience to climate change. On the emissions side, developing countries can ill afford the extra cost of low-carbon technologies, so countries like India, China, and South Africa keep burning coal despite plentiful renewable power resources (Buys, et al., 2007). In a similar vein, poverty drives a major part of the forest-burning in Indonesia, Brazil, and other rainforest countries.

On the climate-impact side, poor families are more vulnerable because they can only afford to live in flood-prone areas where danger makes the rents cheaper. Poor countries find it harder to fund adequate disaster preparedness, and new research indicates that disaster resilience is much lower in areas with low education levels, particularly for women (Toya and Skidmore, 2007; Wheeler, et al., 2009).

To summarize, in thinking about climate change and development we need to be aware of three facets of vulnerability: worsening weather, investments in preparedness, and the inevitable tradeoffs associated with poverty.

## GLOBAL IMPLICATIONS FOR SUSTAINABLE SECURITY

### *We Will Win or Lose This Struggle in the Developing World*

Thanks to research by thousands of climate scientists, we have a reasonably good idea about some things that are going to happen during the next several decades: It will get steadily warmer, the sea level will keep rising, and the climate will exhibit more variability, with more intense rainfall in some places and more intense droughts in others. Sometimes floods and droughts will occur in rapid succession in the same place, as generally-drier conditions are interspersed with periods of intense rainfall (IPCC, 2007). We suspect that coastal storms will also intensify, since the ocean will be warmer. This will interact destructively with sea-level rise, pushing water further inland and creating more potential for damage (Dasgupta, et al., 2009a). Agricultural productivity is also likely to be hard-hit in many areas (Cline, 2007). *All of these effects will strike developing countries more severely than developed countries, for two reasons: they are in higher-risk areas, and they are more vulnerable because they are less developed.*

We also have a reasonably good sense of the probable course of atmospheric emissions during the next several decades. Absent heroic efforts at mitigation which do not seem to be in prospect, the atmospheric concentration of CO<sub>2</sub> will continue to rise for a long time. *Developing countries have already surpassed developed countries in total emissions, and their cumulative emissions will probably account for half of global warming by 2030 (Wheeler and Ummel, 2007).* Before the current recession, global emissions were actually rising faster than the worst-case IPCC projection, and even with the slowdown they are probably tracking the worst-case projection.

To summarize, the global climate struggle will be won or lost in the developing world. For the United States, it immediately follows that a sustainable security strategy means greater development assistance on two fronts: reducing developing-country carbon emissions as quickly as possible, and countering the impacts of climate change that have already become inevitable.

### ***Where Are We on Emissions Limitation?***

The Copenhagen conference on climate change is imminent, and the unfortunate truth is that we have yet to see significant movement toward the needed reductions in greenhouse emissions. Without a credible U.S. commitment to significant emissions reduction, China, India, and other major developing-country emitters will not commit to limitations. Even if Congress enacts cap-and-trade legislation this fall, there will be no track record for our negotiating partners to evaluate. So at Copenhagen, developing countries are almost certain to reject commitments to emissions reduction unless they include binding commitments from developed countries to cover the cost. This applies to both fossil-fuel combustion and forest-burning, the two biggest sources of carbon emissions. Accelerating the transition to low-carbon development is within our reach, but it will only happen if rich countries agree to such measures. *And there is no doubt that we need them, since two more decades of emissions growth at the current rate are quite likely to sink us.*

### ***Adapting to Climate Change***

In my introduction to this testimony, I noted that the coming decades will hold the prospect of increasing damage from sea-level rise in coastal developing countries, and adverse weather in all developing countries. In the preparations for Copenhagen, one of

the liveliest debates focuses on how much it will cost to finance the adaptive measures that will neutralize the effects of expected climate change. Since this debate has major implications for U.S. foreign assistance, it is extremely important to consider a few basic facts. First, as my India example shows, we don't have to wait for the future to witness climate catastrophes. They occur every year, as floods and droughts kill many thousands and seriously affect the welfare of millions in developing countries. But recent research has shown that knowing which countries are potentially vulnerable to these climate disasters tells us very little about the damage they actually suffer. Among developing countries, there are great differences in losses from floods and droughts, even when weather conditions are similar. And thanks to recent research, we're getting a clearer picture of the reasons why (Toya and Skidmore, 2007; Wheeler, et al., 2009).

Part of the difference is clearly due to economic development, since richer countries have greater willingness and ability to pay for protective measures. But a major part of the difference is also attributable to *human* development policies. Countries whose policies have focused on making their people healthier and better-educated suffer much less climate-related damage than otherwise-similar countries whose policies have not been as progressive. Part of the difference in results reflects an underlying commitment to public welfare that translates to better disaster preparedness. But a major part also reflects the resilience and capabilities of people who are healthier and better educated. And, as research and experience have taught us over and over again, this is particularly true for women. Show me a poor country that is educating and empowering its women, and I'll show you a country that is significantly more resilient than its less-progressive neighbors when bad weather strikes.

### ***The Uncertainty Factor***

Although we know that global warming will bring more adverse conditions generally, the climate modelers remain very uncertain about specifics. Most of the additional damage from sea-level rise will come from surges during randomly occurring storms. Away from coastlines, most models agree about rising temperatures, but the future pattern of rainfall is much less certain. There are nearly two dozen global climate models in operation, and they often disagree about whether it will rain more or less in specific areas during the next several decades. This uncertainty is critical, because rainfall has a major impact on water supplies, agriculture, and the incidence of catastrophic flooding or droughts. We must take the high uncertainty level into account when thinking about U.S. foreign assistance policy.

### **IMPLICATIONS FOR U.S. FOREIGN ASSISTANCE POLICY**

To summarize briefly: On the one hand, climate-related conditions are going to get worse, but unpredictably. On the other, climate-related conditions are already very bad in some countries, but vulnerability is much lower for countries whose policies have fostered economic growth and human development, particularly for women. Countries that have adopted these policies have more resources to cope with climate shocks, greater willingness and ability to pay for protection, and a public that is much easier to mobilize because it is healthier, better educated, and more empowered.

For U.S. assistance policy, all of these factors point in the same direction: *The best path to sustainable security is sustainable development.* If we act wisely, our assistance policy can make a critical contribution to both reducing greenhouse emissions and increasing resilience to the climate change that is already inevitable. We can also help

with carefully targeted assistance in two critical areas: clean technology promotion and forest conservation.

### ***Clean Technology Promotion***

The goal for clean technology promotion has to be cost parity with coal, as quickly as possible, so that private investors can participate in rapidly reducing the power-sector carbon emissions that account for over 25 percent of total global emissions. In practice, this means focusing billions of dollars on achieving scale and learning economies in commercially promising clean energy technologies (Ummel and Wheeler, 2008; Neij, 2009). Donor countries have recently responded to this imperative with a Clean Technology Fund, administered by the World Bank, but its charter remains too unfocused for truly effective action and its resources remain quite limited.<sup>2</sup> The Obama administration's stated commitment to support for the CTF includes only \$400 million for the next fiscal year. The Waxman-Markey cap-and-trade bill, recently passed by the House, includes provisions for financing clean-technology development, but they fall far short of the needed resources.

Transparency is also critical in this context. Taxpayers in the U.S. and other donor countries will only support such programs if their claims are credibly supported by observable progress in reducing carbon emissions. To sustain credibility, we need publicly accessible systems to monitor developments on the ground. The Center for Global Development (CGD) is contributing to this effort with a prototype public disclosure system, CARMA (Carbon Monitoring for Action),<sup>3</sup> which reports CO<sub>2</sub> emissions from power plants and power companies worldwide. CARMA is only a start;

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<sup>2</sup> For the CTF's founding statement, see Paulson, et al. (2008). For my previous testimony to Congress on this issue, see <http://blogs.cgdev.org/globaldevelopment/2008/06/cgds-david-wheeler-outlines-st.php>.

<sup>3</sup> CARMA is accessible online at [www.carma.org](http://www.carma.org).

we believe that the United States has an excellent opportunity to lead in this area by promoting an international disclosure system that tracks carbon emissions from power plants, motor vehicles, and manufacturing. Such a program is technically feasible, and it would not be costly. It only requires the political will and a few million dollars for implementation.

### ***Forest Conservation***

Forest-burning is another enormous source of global warming, contributing about 20 percent of annual greenhouse gas emissions. Most forest-clearing occurs in developing countries that have limited resources and regulatory capacity. Since these countries also focus on poverty alleviation, their support for forest conservation will be weak as long as forested land has a higher market value in other uses. Under these conditions, many proprietors will continue clearing their forested land unless they are given conservation payments that match or exceed the opportunity cost of the land. This economic insight has led the UN to establish UN-REDD (Reducing Emissions from Deforestation and Forest Degradation in Developing Countries), a program that helps countries prepare for an eventual direct compensation scheme for forest conservation. The first prototype for REDD operations is the World Bank's Forest Carbon Partnership Facility (FCPF), launched at the UN's Bali conference on climate change in December, 2007. Target capitalization for this prototype facility is over \$300 million. However, the UNFCCC estimates that full conservation of remaining forests in the tropics and subtropics will require \$12.2 billion annually.

A compact negotiated this year in Copenhagen may support an expansion of UN-REDD to this scale, because carbon emissions abatement from forest conservation is

much lower-cost than abating emissions from fossil fuels (Stern, 2006). The UNFCCC's estimate of CO<sub>2</sub> emissions from forest-burning (5.8 Gt) implies an average abatement cost of only \$2.10/tonne (at an annual payment of \$12.2 billion).

U.S. contributions to this effort have been modest thus far. The Waxman-Markey bill contains provisions for financing forest conservation at a scale that could reach \$1 billion or greater. It will be critical for the Senate to maintain these provisions, and, if possible, to provide for even more support.

Sustained international support for such large payment flows will hinge on the operational credibility of REDD programs. For accountability, the global community will need access to a monitoring system that provides detailed, accurate, and timely identification of deforestation in conservation-payment areas. To assist the international community in meeting this challenge, CGD is building and testing a prototype system called FORMA (Forest Monitoring for Action).<sup>4</sup> But this is only the beginning; we need to move rapidly to an internationally supported global monitoring system. With its leadership in satellite-based remote sensing technology and commitment to transparency, the U.S. can play a lead role in this effort. We believe that a fully operational global system for monitoring tropical rainforest destruction can be maintained for no more than a few million dollars a year. It is not the financial requirement that is holding us back at this point—just a lack of vision and political will.

### *Supporting Adaptation to Climate Change*

Careful targeting of resources will also be critical for U.S. support of adaptation. Some problems are foreseeable: large, vulnerable populations in storm-prone, low-lying

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<sup>4</sup> An introductory preview of FORMA is available at <http://www.cgdev.org/content/article/detail/1422370/>.

coastal areas are simply going to get hit harder, and we will need to help. But we need to target carefully on populous areas that are actually the most vulnerable.<sup>5</sup> Similarly, there are some regions of the world where the global climate models line up consistently behind forecasts of more rain or more drought. Where that is true, it makes sense to plan for new protective infrastructure. But, to reiterate, careful targeting will be necessary. From my own experience of nearly two decades at the World Bank, I can attest that such targeting goes strongly against the grain. Conventional assistance policy leans strongly toward spreading aid around, rather than focusing it cost-effectively on specific targets. On the adaptation front, our limited resources will not be truly effective unless we are willing to target them.

We also need to acknowledge a fundamental truth about vulnerability to dangerous climate change. Wherever and whenever it occurs, we can be sure of one thing: the most resilience will be displayed by countries that have paid serious attention to sustainable economic and human development, particularly for women. When the chips are down, they will need far less help than neighboring states whose suffering from adverse conditions owes more to neglect of institutional and human resources than to relative poverty.

So the ultimate message here is very clear, and very consistent with what we have known for a long time about development: by focusing our assistance on human and institutional development, and particularly on educating women, we will take out very powerful insurance against catastrophes that could otherwise afflict poor countries as inevitable climate change occurs. Rededicating ourselves to these clear, attainable

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<sup>5</sup> For detailed evidence on the relative vulnerability of urban areas in developing countries, see Dasgupta, et al. (2009a).

objectives will probably do more to reduce climate vulnerability than anything else we can do. And it will also be the most cost-effective approach, because it will promote flexibility in the face of future uncertainty. Better to have healthy, well-educated, well-organized communities that can adapt quickly to unforeseen events, rather than large protective structures, the climatic equivalent of the Maginot line, that may be positioned for the wrong battle, against the wrong forces.

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