



SCENE SETTER

DEVELOPMENT IN THE BALANCE: HOW WILL THE WORLD'S POOR COPE WITH CLIMATE CHANGE?¹

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Imagine a place where rain stops falling, crops start failing, and people begin dying by the hundreds of thousands. Millions of people living in ethnically diverse subsistence farming communities—who already perched precariously on the edge of existence in extreme poverty—fall into the abyss of violence, systematic rape, and genocide. Survivors live in daily fear of lawless militias and child soldiers roaming the countryside to kill, mutilate, or rob the innocent. Millions flee their homes seeking refuge in equally impoverished adjacent communities that are ill-equipped to help. Conflict and misery spread. The UN Secretary General implores action by the Security Council and the broader international community, but the international community brings neither peace nor justice. Meanwhile, scores of respected scientists discover a link between humanitarian nightmares of this type and pollution from the world's major economies. Although world leaders express concern, they

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fail to marshal an effective global response to either the immediate suffering or the environmental crisis that may have fueled it. This plot may seem to be from the latest George Clooney blockbuster, but this is in fact the story of Darfur. This is the story of how climate change could leave global development in the balance.

Lifting the lives of the poor and solving the climate crisis are the defining challenges of our time. Each is compelling in its own right. In a world where remote threats can rapidly metastasize into immediate emergencies, the fight against global poverty has become a fight of necessity. Extreme poverty exhausts governing institutions, depletes resources, weakens leaders, and crushes hope—fueling a volatile mix of desperation and instability. And with 1.6 million children dying every year from diarrhea, mainly as a result of inadequate sanitation, water supply, and hygiene, the stakes couldn't be higher.⁴

Climate action is no less a moral imperative. It is as much an issue of life and death as malnutrition, disease, and economic despair. The planet is warming at an alarming rate, primarily as a result of fossil fuel use, deforestation, and other human activity. Avoiding unacceptable risks of catastrophic interference with the Earth's climate system will require nothing short of a fundamental transformation of the world economy. The adverse impacts of climate change are already being felt across the globe. Because greenhouse gases warm the planet for many years after they are emitted, additional climate change and harmful impacts are guaranteed. Thus, while we must cut emissions dramatically and start doing so immediately to avoid the risk of a climate catastrophe, it is already too late to avoid horrific climate change consequences. The challenge now is to manage the unavoidable and avoid the unmanageable.

The awarding of the Nobel Peace Prize in 2007 to Al Gore and the Intergovernmental Panel on Climate Change plunged the climate crisis into the mainstream. No longer merely the exclusive purview of learned scientists, the fight against global climate change has become the hottest ticket on the international agenda. In many countries, "going green" has moved from the fringe to center stage.

For years, global poverty eradication and climate change mitigation have been two prominent but very separate struggles. Indeed, poverty and climate change are similar in many ways. Both challenges will take decades to overcome. Politically feasible first steps seem trivial compared to the magnitude of the actual need. And daunting obstacles on each front can deflate the will to act. Weaknesses in governance systems at all levels impede effective global responses to these crises. Poverty solutions and climate solutions will come from philanthropists and financiers, scientists and social entrepreneurs, no less than national budgets and international treaties. The suffering of future generations and distant strangers are at a disadvantage in the competition for attention with countless immediate pocket-book issues that are more concretely felt in the lives of the middle class.

But those seeking a sustainable climate and broadly shared development must do more than learn from each other; they must work with each other to succeed together—or risk failure apart. For choices surrounding climate will greatly determine the fate of the poor

⁴ World Bank, *Global Development Report 2007*.

just as choices on the path out of poverty will greatly influence the fate of the climate. Increasingly, climate and development are two sides of the same coin.

The links between development and climate are significant. While global climate negotiations properly seek to assign the greatest responsibility to those nations who have both contributed most historically and are most capable of testing solutions at scale, there is no sustainable long term solution to climate without the full participation of today's poorer countries. While developed countries have been responsible for the majority of industrial emissions to date, developing nations account for roughly half of global emissions and are expected to contribute most of the growth in the years ahead. Thus, *how* these nations grow will be decisive. But *whether* these countries grow will also be critical in determining their wherewithal to both mitigate and adapt. Equally decisive will be the choices of today's poor in determining the fate of the world's carbon sequestering forests.

In turn, the evolution of our climate has enormous implications for the lives of the poorest. Already, soaring demand for biofuels in rich countries has helped reverse decades of progress on food security for the poor. Looking forward, the poorest of the poor, those who have done the least to contribute to the climate crisis, will be on the front lines of the ravages of climate. The impact of climate on water, agriculture, migration, and health will make each of the millennium development goals harder to reach. Climate proofing development interventions will not be enough. To build true resilience, climate will need to be embedded into the very DNA of development.

Despite these connections, the climate change and global development communities have tended to view each other with a mix of indifference, suspicion, and envy. For most of the past twenty years, the two agendas proceeded independently. Climate experts have focused primarily on mitigating emissions in developed countries rather than on bolstering climate resilience and encouraging sustainable development. Development experts have viewed climate change as marginally relevant to their anti-poverty agenda. Even governments failed to make the connection. Neither the Millennium Development Goals (MDGs) nor the official indicators of progress towards these goals mention climate change, for example. In turn, global development has been an afterthought in the Kyoto Protocol. Early in this decade, the climate community pined for the public attention and financial resources of the development community. Environmentalists were green with envy as they watched rock stars and activists join forces to "make poverty history" and secure debt relief for the poor. The roles are now reversing with climate change in the spotlight after *An Inconvenient Truth* and the Nobel Peace Prize, and with all eyes looking toward a new global climate agreement in 2009. Indeed, *Vanity Fair* has now done two "green issues" and only one devoted to Africa.

Moreover, the policy and funding priorities of the two communities have been at odds for years. Many climate experts have feared the environmental consequences of the development community's quest to raise living standards with the attendant demands for energy. Many development experts see in climate-related efforts to grow biofuels and conserve forests a major cause of rising food prices and land rents, both of which pose immediate challenges for the poor. Some development advocates worry that the financial strain of responding to the climate crisis will "hijack" official development assistance, diverting much needed funding away from traditional development programs.

But some see ways in which climate protection and poverty alleviation can be mutually reinforcing. Growing carbon markets should provide new opportunities to mobilize financing for global development, to mitigate emissions from developing nations, to provide incentives for forest conservation, and to reduce the climate vulnerability of the poor. If structured properly, these market-based approaches could prove more reliable than traditional official development assistance and ensure financial additionality so that development funding is not compromised.

One thing is clear. The world's inability thus far to integrate poverty alleviation and climate protection strategies is a formidable threat to sustainable development and the future of our planet. As the world cannot afford to choose between these goals, we must find a way to pursue both in tandem. Climate solutions must empower the poor to thrive by improving livelihoods, health and wellbeing. And poverty alleviation itself must become a central strategy for both mitigating emissions and reducing global vulnerability to ruinous climate impacts.

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The 2008 meeting of the Brookings Blum Roundtable will explore these themes, drawing on the perspectives of climate and development thought leaders, decision makers and practitioners. By examining common challenges—accountability, effective deployment of resources, agenda-setting, mobilizing the public and financial resources, and achieving scale and sustainability—this year's Roundtable is designed to develop innovative solutions, spur action and establish foundations for collaboration among the expanding field of environment and development players who share a commitment to lifting the lives of the world's poor and safeguarding the planet.

On the first day, Session I will set the stage for the three days of discussion by exploring the link between climate change and human development. It will delve into the adverse impacts of climate change on the world's poor, including food and water security, health, living standards, migration, natural disasters, and the loss of traditional cultures and livelihoods. Session II will segue into pro-poor climate solutions, which will dominate the remainder of the roundtable. This session will examine mitigation efforts with a particular emphasis on forestry and energy sectors in developing countries. It will assess the policies and incentive structures needed to help emerging economies mitigate greenhouse gas emissions while promoting sustainable economic growth. It will also examine how mitigation strategies can create opportunities for the poor, strengthen local communities, and improve livelihoods.

On the second day, Session III will focus on promoting climate change resilience, focusing on solutions to address the underlying drivers of human vulnerability, managing climate risk, and building response capacity. Using the agriculture, water, and health sectors as case studies, we will examine how governments, NGOs, philanthropists, social entrepreneurs, and technologists must fundamentally integrate climate change into their poverty-alleviation strategies to help the poor buffer themselves against the ravages of climate change. Session IV will focus on new strategies the development community must advance in order to facilitate disaster preparedness as well as post-disaster reconstruction in

the face of sea level rise, severe storms, and increased natural resource scarcity. Responding to these new threats will be integral to enhancing climate resilience in the developing world and safeguarding against new global security threats.

The final day of the roundtable will focus on mobilizing funds and galvanizing the public in the developed and developing worlds around the twin concerns of climate change and poverty alleviation. Session V will analyze which sources of adaptation funding hold the most promise—both public and private flows. And Session VI will examine strategies to enable a variety of different development players to raise awareness, mobilize communities, alter public policy and change private behavior. Fittingly, the Brookings Blum Roundtable will end with a call to action.

SESSION I: WHAT'S IN STORE FOR THE WORLD'S POOR

The science behind our understanding of how human activities produce greenhouse gas emissions that warm the atmosphere, alter the climate and harm the poor is quite complex. Multiple processes interact with each other through many interconnected feedback loops (see figure 1 in the appendix). Yet, in conceptual terms the impacts of climate change are easy to describe. Climate change will manifest itself through (i) changes in actual climate conditions (such as changes in global average temperatures, average precipitation, ocean circulation, ocean acidity and ice caps), (ii) changes in climate variability (in temperature and precipitation), (iii) changes in the frequency and magnitude of extreme events (such as cyclones, heat waves, droughts and floods), and (iv) changes in sea levels.⁵ While many of these primary climate impacts threaten the poor directly, they will also trigger an even broader range of secondary adverse impacts, including loss of traditional lifestyles, loss of ecosystem function and biodiversity, agricultural decline and other economic loss, famines, conflicts, casualties and disease.⁶

According to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), climate change will inflict damage on every continent, but hit the world's poor disproportionately hard. What's in store for the poor, of course, will depend a great deal on how much climate change the world allows to occur. Figures 2 and 3 (located in the appendix) from the IPCC illustrate how the impacts intensify in alarming ways in each region of the world and economic sector as climate change progresses.

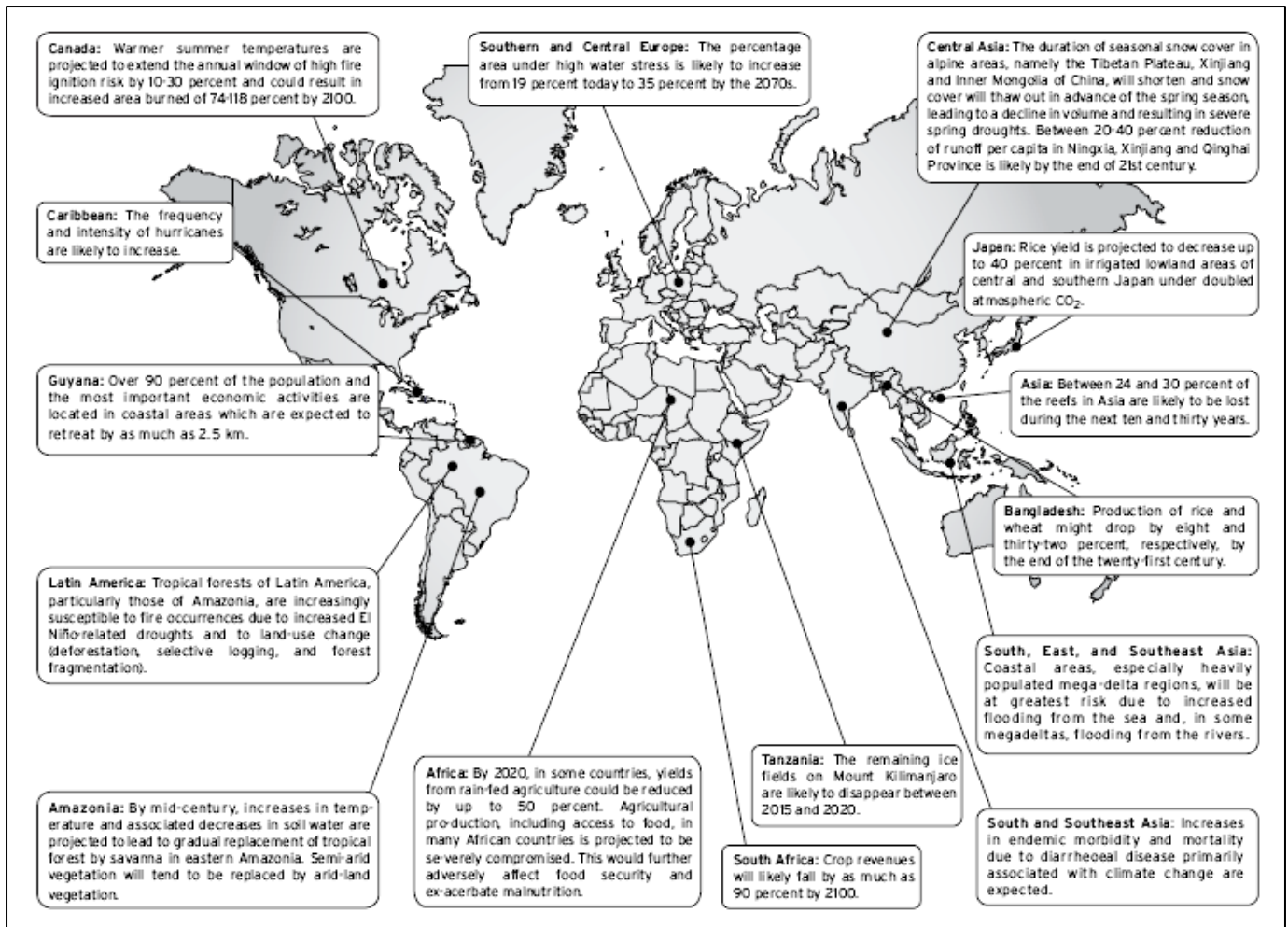
Even under the best emissions mitigation scenarios, aggregate impacts are likely to result in the movement of large populations across and within borders. Climate change induced floods may reach as many as 94 million people by the end of the century. Those pushed off their lands by rising seas and lakes will have no choice. Others may simply find that surrendering to change is simply easier than adapting in place. Investments in abandoned places will be lost and those left behind will become increasingly marginalized in dysfunctional communities. On the flip side, communities that attract climate migrants are likely to feel the social, political, and economic strains of burgeoning populations.

⁵ UNFCCC. 2007. Climate change: impacts, vulnerabilities and adaptation in developing countries.

⁶ Ibid.

Many climate impacts, in addition, will be regionally concentrated (see map 1). Migration from sea level rise, for example, will be most prevalent in the river delta lowlands of Bangladesh, Egypt, and Vietnam (see map 2). Small island developing states (SIDS), while less populous, face an even graver situation—rising seas and extreme weather events threaten their very existence. By mid-century, climate change is projected to deplete potable water resources on many islands to the point that they may become insufficient to meet demand during periods of low rainfall. Single extreme storms have the potential to destroy entire nations. But it is perhaps Africa that will suffer the most by virtue of its size, population and poverty. By 2020, in some African countries yields from rain-fed agriculture could be reduced by up to 50 percent. By 2080 wheat production in Africa may cease. By 2020, between 75 and 250 million people are projected to be exposed to increased water stress due to climate change, with Africa suffering disproportionately.

Map 1



Source: Figures compiled from the Fourth Assessment Report of the IPCC

Map 2



Source: Fourth Assessment Report of the IPCC

Though the human costs of climate change will be tallied primarily in developing countries, the developed world will also suffer. The economic cost of climate change will be high in developed nations because they have made more costly capital investments, which will be at risk. The poor in the developed world are still vulnerable to major environmental changes, as Hurricane Katrina illustrated in 2005. But developed nations will also feel the effects of climate change on the global poor. Interdependent developed country economies and financial markets may tumble after climate-related economic disruptions in developing nations. Imagine the impact on U.S. imports and the U.S. economy more broadly if megacyclones hit China's major ports and coastal manufacturing centers. Of course, climate impacts in the global South will undermine the North's global development agenda by washing away the progress achieved in the way of poverty alleviation over the past few decades. Also, climate change impacts in developing countries will have major security implications for the entire world (to be taken up in Session IV). The old adage goes that when U.S. sneezes, the world catches a cold. The climate corollary might be that if major developing countries catch a fever, the world will also sweat.

Key Questions:

- ❖ *How should we think about the distributive consequences of climate impacts both across and within countries?*
- ❖ *Among the poor, which groups are most vulnerable and who will become newly poor?*
- ❖ *What is the best way to approach the key climate impacts considering their time scales and likely incidence in order to advance solutions?*

SESSION II: ENGAGING THE POOR TO MITIGATE EMISSIONS

While accepting that rich nations must move meaningfully and immediately on mitigation, the climate crisis cannot be tamed without mitigation by developing nations. As Nick Stern has pointed out, the math is clear: the goal of sustainable climate stabilization simply cannot be reached without participation by developing nations. The poor are deeply dependent on what rapidly industrializing developing nations do in this regard. The contributions of developing nations to mitigation will work through two main channels: by pursuing alternative development pathways on energy consumption and by conserving forests.

CONSERVING FORESTS

Changing the equation on forestry holds enormous promise for both the climate and lifting the lives of the poor. Forestry, agriculture and other terrestrial sources account for over 50 percent of emissions in developing nations with deforestation by far the largest single source. Land-use and land-use change, mainly tropical deforestation, account for roughly 20 percent of global greenhouse gas emissions, a share greater than either the global transport or industrial sectors. It is worth dwelling on this—deforestation is doing more to deepen the climate crisis than all the automobiles in the world. Unlike new hydrogen cars and carbon capturing coal-fired power plants, no new and as yet unproven technologies are necessary to conserve and restore forests.

Global carbon markets and other financing mechanisms, moreover, provide cost effective ways to both reduce emissions and generate income for impoverished forest-dwelling communities and forest-rich developing countries. Leading economic studies predict that costs to reduce emissions from deforestation are equal to or less than costs of most other emissions mitigation strategies, although these studies offer quite a range of predictions. With World Bank estimates of \$5 per ton of forest carbon,⁷ the cost of forest conservation would be only one eighth the cost of non-forestry carbon securities today in Europe. The gap between the cost of avoiding deforestation in the tropics and the price of carbon in global markets illuminates the potential sustainable development returns of forest conservation and sustainable forest management to developing countries and rural communities. Today, the forest carbon market is less than \$100 million, only 0.16 percent of the \$64 billion worldwide market for carbon-denominated assets.⁸ If current estimates are right, scaling up these forest carbon markets could yield annual transfers of over \$30 billion a year to developing nations.⁹

⁷ The Stern Review estimates a cost of \$2/tCO₂. The Intergovernmental Panel on Climate Change's (IPCC 2007) predicts reducing carbon emissions from deforestation will be more costly and estimates that at least 50 percent of emissions from deforestation could be mitigated for less than \$100/tCO₂. The World Bank believes the opportunity cost of forest conservation is under \$5/tCO₂ in several major developing countries (Chomitz 2007). The variation is attributable to technical differences in underlying modeling assumptions.

⁸ Hamilton et al. 2008; Capoor and Ambrosi 2008.

⁹ Kinderman G. E., M. Obersteiner, E. Rametsteiner, I. McCallum. 2006. Predicting the deforestation-trend under different carbon-prices. *Carbon Balance and Management*. 1(15): 1-17.

Forest conservation can also be a vital strategy for reducing the climate vulnerability of the poor.¹⁰ The World Bank reports that 90 percent of the poorest of the poor—those living on less than a dollar a day—depend on forests for part of their food, fuel, or livelihoods. Forests tend to soak up rainwater and release it slowly, thereby acting as a natural defense against flooding and drought. Forests can improve water quality by filtering harmful pollutants, pathogens, and sediment that can cause illness in people or livestock. Forests also provide other less tangible benefits to poor communities. In the Amazon basin, for example, indigenous groups consider forest conservation essential to the preservation of their cultures, traditional livelihoods, and religious practices.

Despite the multiple reasons to conserve forests, tropical forests—which hold most of the world's forest carbon—are disappearing at an alarming rate of five percent per decade globally. Each year more than 13 million hectares of forest is lost along with countless, largely unknown species and ecosystem functions.¹¹ And the problem is very concentrated: Indonesia and Brazil together are responsible for 50 percent of global deforestation, as a result of which, these two countries are among the top five sources of climate pollution. Well over 90 percent of global deforestation occurs in two dozen tropical forest countries.¹²

The major drivers of tropical deforestation and forest degradation today are agriculture and logging—with agriculture (farming and ranching) accounting for 75 percent of deforestation, if not more.¹³ Market pressure is increasing to convert native forests to agricultural lands. Paradoxically, European and American initiatives to promote biofuels for transport is increasing pressure to convert remaining forests to other uses. Absent a dramatic change of course, by the middle of this century, only fragmented islands of tropical forest may remain amid an ocean of ecological change, with potentially devastating consequences for the poor and the planet.

Fortunately, major opportunities exist to conserve forests to the benefit of the poor and the climate. First, the international community is gearing up to include the forest sector fully in the global climate agreement that will cover the period after 2012, when the Kyoto Protocol expires. This will address a major deficiency of the Kyoto agreement, which provides no incentives to reduce deforestation (Kyoto does provide modest incentives to reforest land but not to conserve it in the first place.) Second, key national and regional climate programs are moving towards provisions that would generate sizeable new resources for conservation of carbon rich tropical forests in developing nations. Several bills pending before the U.S. Congress would mobilize billions of dollars a year for forest conservation. California has already enacted climate legislation that creates economic incentives for forest conservation, including potentially in the tropics. After a decade of resisting the integration of the forestry sector into climate policy, Europe is now showing early signs of opening up its enormously influential European Emissions Trading system to tropical forestry projects.

¹⁰ Forest conservation also provides key benefits beyond climate at the global level, including stemming the alarming and irreversible biodiversity loss, with 70 percent of known terrestrial species living in forests, mostly in the tropics.

¹¹ These United Nations figures probably underestimate emissions from the forest sector because they do not account for forest degradation – such as the conversion of a rich primary forest into less vegetated, sparsely-wooded ecosystem.

¹² UN Food and Agriculture Organization, Annual Report on Forests, 2006.

¹³ Butler 2008; Geist and Lambin, 2001.

ALTERNATIVE DEVELOPMENT PATHWAYS FOR ENERGY

While forests may provide the best near-term avenue to engage the poor in the global emissions mitigation effort, most of the growth in emissions in rapidly developing nations will come from consumption of fossil fuels, mainly coal, gas and petroleum. Already half of the world's greenhouse gas emissions come from developing nations and non-OECD carbon dioxide emissions will almost double by 2030 compared to 2005.¹⁴ The increase in China's annual emissions alone over the next several years will be greater than the current emissions produced by either Great Britain or Germany.¹⁵ Fossil fuel consumption accounts for 42 percent of developing countries emissions but 67 percent of emissions in rapidly industrializing nations such as China and India. Emissions from power generation and transportation are rising fastest in these new global economic superpowers.

Although the public in some developing countries is growing more concerned about the adverse impacts of climate change, most still attach a higher priority to promoting economic growth and poverty alleviation than they do to reducing climate vulnerability. For the foreseeable future, therefore, developing nations are unlikely to mitigate emissions if doing so would constrain their ability to raise living standards and provide access to energy.

And then there's the question of international equity. While energy consumption is rising in developing nations it remains far below industrialized nations in per capita terms. India and other equity-minded developing nations argue that their citizens have an equal right to pollute the atmosphere. Most developing nations did very little to cause climate change and few have the financial or technical capacity to adopt cutting-edge energy technologies and energy efficiency practices. In political terms, this translates into a refusal by developing nations to accept the burdens associated with emissions mitigation until developed nations have substantially reduced their emissions.

Nonetheless, often spurred by concerns about rising oil and gas costs and dependence on resource rich suppliers as well as pollution, some developing nations are taking important steps to improve the carbon-intensity (emissions/GDP) of their economies despite resistance to taking on obligations. For example, China has made praiseworthy inroads towards greater efficiency of coal-fired power plants and has adopted stringent automobile efficiency standards. It has begun to take steps to phase-out remaining subsidies for fossil fuel use. Indeed, the energy efficiency of many developing countries is improving faster than those of developed countries, although the latter remain far ahead.

For reasons of equity, however, developing nations are looking to the developed world to help finance their emissions mitigation actions. The new G-8 endorsed Clean Technology Fund, as well as the pre-existing Global Environment Facility (both of which are housed in the World Bank), provide examples of how donor nations can use foreign aid to subsidize the adoption of clean energy technologies in the developing world, sometimes called "technology transfer." The Kyoto Protocol's Clean Development Mechanism (CDM) is an earlier illustration of a market-based mechanism that was designed to achieve the same

¹⁴ EIA.

¹⁵ Auffhammer and Carson, University of California, Berkeley, March 2008.

end. The CDM creates incentives for polluting companies in developed countries that are parties to the Kyoto agreement to finance cost-effective mitigation in the developing world. Over 60 percent of the roughly \$5 billion generated by the CDM so far has gone to China, while Africa's share has been well below 5 percent, suggesting that market-based approaches may not align well with broader development goals. While helpful, these existing market mechanisms and foreign aid-based approaches do not operate at an effective scale and are unlikely to do so as long as they remain project-based. In connection with global climate change treaty negotiations, the international community is actively considering the creation of other financial mechanisms that could mobilize far more resources to assist developing nations mitigate emissions effectively, for example, by moving to sector-wide approaches. While new mechanisms could be more environmentally- and cost-effective, they are likely to require substantial new sums from public and private sources.

Ultimately, an effective mitigation effort by the international community cannot be achieved without the participation of developing nations. While economic research has shown that growth itself is a key contributor to a society's commitment to take on certain types of environmental challenges, the climate challenge will require that the world explore uncharted pathways of growth. Clearly, the richest nations are in the best position and have the greatest responsibility to act as first movers in pioneering new energy paradigms, but the largest and fastest growing developing nations soon need to follow in order to attain climate sustainability.

Key Questions:

- ❖ *What immediate actions can be taken to conserve, restore and manage forests for climate and poverty benefits?*
- ❖ *What strategies are needed to transfer clean energy technologies to rapidly industrializing nations?*
- ❖ *How can we make sure that the least developing nations don't get left behind?*

SESSION III: GREENING THE DEVELOPMENT PARADIGM

Even under the most hopeful scenarios, climate change will have enormous consequences for the poor. With food security, clean water, livelihoods, health, and migration all in the balance, it is not too soon to start building climate resilience into the very DNA of development. Recognizing that poverty exacerbates vulnerability to adverse climate impacts, alleviating poverty must be a central objective of the world's adaptation agenda. At the same time, development players must factor in the likely impacts of climate change so as to avoid unwise investments, sometimes called "mal-adaptation." In short, the climate and development communities must fundamentally integrate climate change into poverty-alleviation strategies while continuing the drive to scale-up development efforts in order to help the poor buffer themselves against the ravages of climate change. A number of promising initiatives are in early stages, but more sustained and systematic attention and funding will be required at greater scale to effect the necessary changes in development planning and operations.

Coordinating mechanisms at the supranational level are forcing governments to take stock of their vulnerabilities and develop national action plans to cope with climate impacts. For example, top down efforts like the United Nation's National Adaptation Programs of

Action (NAPAs) serve as vehicles for national governments in the least developed countries to identify priority adaptation activities across sectors and government agencies. The logical next step would be to integrate these analyses into national development planning perhaps through the Poverty Reduction Strategy Papers (PRSPs) process to ensure that developing countries fully integrate climate concerns into the participatory process for planning macroeconomic, structural, and social policies to promote growth and reduce poverty.¹⁶ Similarly, assessment of progress towards the MDGs should be systematically refined to include climate impacts where such matters are most relevant.

Bottom up efforts at the grassroots level are responding to near-term adaptive necessities. In three case studies across Sub-Saharan Africa, the International Institute for Environment and Development finds that local communities are addressing environmental degradation by using available resources more efficiently and raising their capacity to cope with unpredictable future changes. Local adaptations include responses to specific climate trends (such as fishing with finer-meshed nets in drier rivers), but also new mechanisms to strengthen social-safety nets (like micro-insurance and banking).¹⁷

Many delivery NGOs, foundations, and social entrepreneurs are recalibrating their core competencies to build climate resilience into their development activities. The Rockefeller Foundation and others are creating and disseminating robust action models and advocating for increased climate resilience funding for the poor. Teaming up with the Bill & Melinda Gates Foundation, Rockefeller is also financing the Alliance for a Green Revolution in Africa, an association of farmers, agricultural business, scientists, and research institutions, to increase the productivity of small-scale farmers in Africa. Increasing agricultural productivity, though not a direct climate-proofing intervention, will build the resilient and reliable crops needed to cope with future uncertainties.

Despite the progress made and lessons learned to date, the work that lies ahead is far grander in scale. Below we focus on two areas—agriculture and health—where the potential and value of building resilience is particularly great. While the private sector has turned its attention to the considerable opportunities associated with mitigation, their engagement on adaptation lags far behind. And only a handful of the International NGOs have integrated climate into their operating models. Neither most developing nations nor most donor institutions (be they bilateral or multilateral) have truly integrated climate change sensitivity into their basic and primary operations. A recent study, for examples, concludes that the World Bank and other multilateral development banks have done relatively little to integrate mitigation or adaptation planning into their primary operations.¹⁸ Some of the failure to integrate climate and development can be attributed to a lack of political will. Many developing nations, for example, worry that new climate change mandates on foreign aid will limit their ability to pursue their own development goals. The world is just starting the long

¹⁶ See Atiq Rahman, “Integration of Climate Change into Development: Multiple Benefits of Mitigation and Adaptation,” paper presented at the annual Brookings Blum Roundtable, Aspen, Colorado, August 1-3, 2008.

¹⁷ Sonja Vermuelen, Krystel Dossou, Duncan Macqueen, Dominic Walubengo and Everhart Nangoma, “Springing back: climate resilience at Africa’s grassroots,” IIED Sustainable Development Opinion, May 2008.

¹⁸ Smita Nakhota, “Correcting the World’s Greatest Market Failure: Climate Change and the Multilateral Development Banks,” World Resources Institute, June 2008.

and challenging journey toward truly green development. The challenge of integrating climate change in agricultural and human health programs help illustrate this point.

AGRICULTURE

Changes in global agricultural output will acutely affect poor households in the developing world as well as developing country economies. Steep declines in the world's food supply could substantially increase global food prices. For the world's poor—many of whom spend as much as 80 percent of their income on food—increased food prices would have dire consequences. But rioting and instability may be only part of the outcome. Malnutrition and famine could also follow. So could new types of state weakness. Agriculture accounts for about 30 percent of GDP in developing countries. In Sub-Saharan Africa, a region heavily reliant on agriculture for overall growth, reduced crop yields could dramatically reduce government coffers, thereby placing greater strain on already-fragile infrastructures and services.

Many of the world's poor live in low latitudes, where climate change is likely to reduce agricultural productivity and presumably income. According to the economist Robert Mendelsohn, reductions will be especially acute in rain-fed crop farming (rather than irrigated farming or livestock management). For example, Chinese farmers on rain-fed farms will likely lose annual net revenue of \$95/ha per °C.

Raising yields will require action on numerous fronts. As outlined by Mendelsohn, stimulating economic growth in non climate-sensitive industries will be critical, as will government investment in critical infrastructure. Privatizing property could boost investment in natural capital—that is itself climate sensitive (e.g. forests and grasslands). Efficient adaptations at the household level will require people to move from crops to livestock management, installing irrigation, and switching crop types or livestock species. For example, in Latin America, farmers would benefit in moving production to squash and fruits away from soybeans. Similarly, in Africa, farmers would benefit from switching crops from maize and groundnut to millet, fruits, and vegetables.¹⁹

Such fundamental shifts in traditional outputs will require domestic planning and investment, as well as robust action by the development community across multiple fronts. Agronomists and biotechnologists have critical roles to play in promoting responsive crop management practices and innovating crop genetics (e.g. drought resistant varieties). The private sector will be integral in bringing new technologies to market. And delivery NGOs must help communities develop local buy in and requisite capacity.

Historically, strong agricultural productivity growth has been a consistent feature of countries that have successfully managed to reduce poverty. GDP growth generated in agriculture, on average, is four times more effective in benefiting the poorest half of the population than growth generated outside agriculture.²⁰ Building resilience within this sector should therefore be integral to any poverty reduction strategy.

¹⁹ See Robert Mendelsohn, "Development in the Balance: Agriculture and Water," paper presented at the annual Brookings Blum Roundtable, Aspen, Colorado, August 1-3, 2008.

²⁰ World Bank (2007), *World Development Report 2008*.

HEALTH

Climate change will affect human health in at least three major ways—by altering the conditions for i) physical traumas, ii) infectious diseases, and iii) non-infectious drivers of health. Physical trauma might be thought of as the most direct link between health and climate impacts. Extreme weather events like heat waves, cyclones, hurricanes, and floods have direct physical consequences. Yet climate changes also impact pathogens and disease-vectors that play key roles in epidemiology. Finally, changes in agriculture, air quality, and water stress figure into human nutrition, immunology, toxicology, and physiology. These non-infectious drivers of health will be influenced greatly by climate change.

The ability to provide security from climate change health impacts will, of course, vary from place to place. This variability highlights the need for strong public health systems with broad expertise and deep capacity. Fortunately, much can be accomplished through incremental changes of existing approaches. This is because the projected health impacts of climate change are bound up in the problems that the development community is already grappling with, such as emergency relief, malaria, dengue fever, malnutrition, and pollution.

In some cases—perhaps those stemming from physical trauma—replicating and expanding successful responses may yield great results. For example, Bangladesh had done much to make its citizens less vulnerable to storms and flooding. Sharing best practices globally holds promise. But this approach will not work for challenges linked with infectious disease. Many climate-related diseases are both site-specific and path-dependent. Thus, intervention policies must be supplemented with local knowledge and expertise. Building capacity and resilience to climate change on the infectious disease front will thus best be aided by increases in monitoring and early warning systems.

Public health responses to climate-related nutritional and toxicology impacts will require careful balancing with other policy objectives. Agricultural practices—crop varieties, pest control and irrigation methods—have impacts on nutrition and sanitation. Evolving mitigation and energy technologies may present new types of environmental pollutants.

Finally, development actors may need to fundamentally change the timeframe within which they respond to health impacts. Normal cycles of problem identification, solution finding and decision-making may not occur quickly enough when environmental “tipping points” are reached.²¹

Key Questions:

- ❖ *What strategies are working to integrate climate and development?*
- ❖ *What integration challenges seem the most important to address and how can they be overcome?*
- ❖ *How best to engage the private sector to bring its considerable capabilities to bear on the challenges of resilience and adaptation?*
- ❖ *What can be done to make official development assistance more climate change intelligent?*

²¹ See Kristie Ebi, “Public Health Adaptation to Climate Change in Low-Income Countries,” paper presented at the annual Brookings Blum Roundtable, Aspen, Colorado, August 1-3, 2008.

SESSION IV: DISASTERS AND INSTABILITY: COPING WITH CLIMATE CATASTROPHES

Regrettably, a warmer world will be a more violent and dangerous one. That violence will come from nature itself, in the form of extreme weather events, as well as from fragile societies, which are more likely to implode under the additional stresses created by climate change. By straining vulnerable societies, weak governments, and degraded environments, climate change increases the risk of severe humanitarian crises, mass migration and armed conflict over scarce natural resources, while also contributing to economic malaise that can breed despair, violence, and terrorism.

As Joshua Busby notes, natural disasters are already a major obstacle to development.²² The Asian tsunami of 2004, though unrelated to climate change, was a tragic reminder of the destructive capacity of nature. In 2005, Hurricanes Katrina and Rita, more plausibly potentially linked to climate change, demonstrated that even rich countries are vulnerable to extreme weather. Between 1990 and 1999, an estimated 188 million people per year were affected by extreme weather, droughts, floods, and other such disasters, six times more than the 31 million annually affected by armed conflict. Immense storms, like the massive cyclone that destroyed much of coastal Burma earlier this year, uproot millions of people from their homes. Disaster victims and environmental migrants are particularly vulnerable, not only to the immediate physical and socio-economic effects (such as disease, malnutrition, and loss of income), but also to dislocation, often ending up in make-shift camps or dysfunctional communities that are plagued by crime and violence.

While loath to connect particular weather incidents to climate change, scientists are growing confident that climate change will produce more extreme (and potentially more frequent) storms, droughts, and floods (IPCC Fourth Assessment). In physics, heat is a measure of energy, which itself predicts the power of a system. For the Earth's weather systems, more heat translates into more destructive power. Indeed, given how much climate change has already occurred, the phrase 'natural disasters' now seems somewhat misleading, for today humanity is toying with the other forces that shape our world.

The security implications of climate change will create vexing challenges for the international community. Global appreciation of the climate and security link has increased dramatically in recent years. Consider events in 2007 and 2008 alone. The United Nations Security Council debated the issue, and the UN secretary general Ban Ki-moon publicly and controversially linked the conflict in Darfur, Sudan to climate change. The world's preeminent prize for peace, not science, went to Al Gore and thousands of climate scientists. A host of reports from intelligence agencies, military officials, and scholars highlighted in dramatic language the emerging risk to peace and security. As retired 4-star general Anthony Zinni and other retired senior U.S. military officers concluded recently, climate change is a "threat multiplier" for conflict and even state failure.

Once again, poor countries and poor communities, particularly in Africa and Asia, face the gravest disaster and security risks. These countries lack the capacity to respond to severe flooding, drought, storms, extreme heat waves, water scarcity, and other

²² Joshua Busby, "The Climate Security Connection: What it Means for the Poor," paper prepared for the 2008 Brookings Blum Roundtable, July 2008.

consequences of climate change. Their vulnerability is partly an accident of geography; as places near the equator, the poles, and along coasts are likely to experience the most pronounced climate impacts. The susceptibility of the poor is also a function of weak governance and societies already plagued by sectarian strife. Failed and failing states—those with weak institutions, poor control over their borders, repressed populations, or marginal economies—stand a higher risk of being destabilized by climate change. These states by definition will not be able to manage the new challenges that come their way. Authoritarian states are also at greater risk. More than twenty years ago, economist Amartya Sen noted that democracies do not produce famines. North Korea is able to produce nuclear weapons but remains unable to meet its people’s basic nutritional needs.

Given the security and disaster implications of climate change, the world now needs to move beyond predictions to solutions. The international community must develop appropriate actions, strategies and policies to minimize both the immediate humanitarian toll of unavoidable climate-related natural disasters, and the predictable and potentially even more devastating consequences of associated societal conflicts. Solutions are likely to come in many forms. We must improve early warning systems (for extreme weather, water stress, food stress, sectarian violence and state failure). Crops, urban infrastructure, human settlements, water supplies, and other critical resources need to be made less vulnerable to natural disasters, sea level rise and other climate impacts. Insurance instruments and social protection systems need to be developed. Just as the United States needed to be able to fight two major wars simultaneously in the Cold War (and does so again in the post 9-11 era), the international community must be equipped to respond forcefully to several major humanitarian and security crises at a time. All those involved in post-disaster and post-conflict responses and reconstruction will need to augment their capacity, including NGOs, governments, international agencies, advocates and the private sector. Preventative diplomacy will be a key too. Early diplomatic engagement bolstered by substantial food and other aid can help prevent bad situations from becoming unmanageable nightmares. The role of climate change in international peace and security must be integrated into ongoing planning related to multilateral peacemaking and humanitarian intervention.

Key Questions:

- ❖ *What lessons have NGOs, business, and governments learned from recent large-scale disasters?*
- ❖ *What preventative and early warning strategies need to be in place?*
- ❖ *What response capacities and institutions are needed?*
- ❖ *How can we make sure that poor communities are centrally involved in these efforts?*

SESSION V: FINANCING ADAPTATION – FOOTING THE BILL

In many cases the social benefits of adaptation programs will greatly exceed their costs. And often, the social costs will be smaller the sooner adaptation investments are made. Despite this, financing adaptation is likely to be very difficult, requiring as it does substantial transfers to distant poor communities and to future generations—both of which are very challenging politically. Success depends on forging an international consensus and substantial political will on the answers to difficult and politically charged questions. How much adaptation should be undertaken? Who should pay? How should those funds be generated? Should the

donors or the affected countries and communities govern the allocation of the new monies? How should impact be evaluated?

The cost of adapting to climate change will depend greatly on the extent of global warming, which today is highly uncertain. If nations move swiftly to mitigate emissions the world will still need to adapt but less so and at a far reduced cost than if emissions keep rising. Uncertainty about mitigation makes predicting the cost of adaptation extremely difficult. Moreover it is impossible to disentangle adaptation programs from traditional development efforts and that complicates cost calculations immensely. Within the context of this great uncertainty, several global studies peg the likely cost of climate adaptation in developing nations at tens of billions of dollars per year.²³

With G8 pledges to increase development assistance by \$50 billion still unmet, the prospects of mobilizing an even greater amount on top of that for climate adaptation is daunting. Disagreements about mechanisms to mobilize additional resources and modalities for allocating them abound. Global vertical funds are the modality of choice for public goods problems such as climate change or infectious diseases. However, if recent experience is any guide, many donors mobilize greater resources for national funds relative to global funds, as for instance with PEPFAR relative to the Global Fund. Indeed, individual donors have established a multiplicity of separate climate funds in just the last 18 months. Moreover, given the desire to mobilize large sums of money on an annual basis over a sustained period of time, resource mobilization mechanisms that have some degree of automaticity, such as a tax on international transactions or an automatic share of carbon revenues have considerable appeal in principle, although not much of a track record in practice. On the allocation side, different considerations come into play. Since adaptation planning and implementation must be done across sectors at national and local levels (at the regional level on issues such as water and migration), assistance must be provided horizontally and must be integrated with national development planning in order to be effective. Moreover, for recipients to be active stakeholders, they should have considerable say over the allocation of the funds in principle, which is difficult to achieve in practice.

Indeed, moving away from mechanism design to current realities, assigning responsibility for meeting adaptation costs is a hotly debated issue in the international community. Most developing nations believe polluters should pay for the consequences of their pollution. In contrast, while developed nations have agreed to help developing nations adapt, the former are eager to see climate change incorporated into developing country national budgets and existing official development assistance programs.

Manish Bapna and Heather Gray describe how these stark differences in perspective have given rise to divergent views about how adaptation funding should be generated.²⁴ China, for instance, has proposed that developed countries should allocate 0.5 percent of their GDP to support actions taken by developing countries to tackle climate change. This would currently amount to \$185 billion per year for mitigation, technology transfer and

²³ UNDP 2007:192-194; Agrawala and Fankhauser 2008:69

²⁴ Manish Bapna and Heather Gray, white paper on public financing for climate adaptation prepared for the 2008 Brookings-Blum Roundtable, July 2008.

adaptation together.²⁵ In contrast, in both the United States and the European Union, policy makers are considering legislative proposals to create new adaptation funds that would be capitalized by revenues from auctioning emissions rights to polluters under national and regional cap-and-trade programs. The Boxer-Lieberman-Warner bill, introduced in Congress in May 2008, would have generated approximately \$3 billion annually for international adaptation in the first three years of the program (one percent of total auction revenues), increasing to as much as \$25 billion per year over time (up to seven percent of total auction revenues).²⁶ In Europe, annual auction revenues from the Emissions Trading Scheme (ETS) are estimated at €75 billion (\$113 billion) in 2020, of which 20 percent, or €1.5 billion (\$2.3 billion), would be dedicated to climate-change related activities including adaptation.²⁷

Taxes on international air travel and shipping represent potential new sources for adaptation funding that would be more predictable than yearly appropriations. Establishing a levy of seven dollars on each international flight, for example, would result in \$14 billion in additional revenues annually.²⁸ By way of precedent, France now collects an 'international solidarity contribution' on international flights to generate revenues for international efforts to fight infectious disease. There are other proposals for taxes on carbon market transactions, building on the two percent tax on carbon offsets under the Kyoto Protocol's Clean Development Mechanism. Bapna and Gray note that total income generated by sale of Kyoto's carbon offsets could be in the range of US\$160-950 million or more by 2012.²⁹

Once funding is generated, it has to be channeled to those who need it. This is a significant challenge, given the broad spectrum of activities that may be affected by climate change, as well as location specific needs. The structure and governance of new adaptation funds has proven very controversial, as demonstrated earlier this year by the uproar within the climate and development communities over the World Bank's new G8-endorsed Climate Investment Funds. Those funds were originally intended to be managed by donors in accordance with traditional World Bank rules. Developing nations, which view adaptation assistance as compensation by polluters to which they are entitled, insisted that allocation decisions be made by national governments or, at a minimum, by global bodies in which developing countries have majority representation. For now an unstable truce holds but these different perspectives are resurfacing in global climate talks.

Meanwhile, while debates continue at the international level, a handful of market players are starting to incorporate climate resilience into their own operations and product offerings. Climate insurance expert Ian Burton identifies three such approaches.³⁰ First, perhaps the greatest opportunities for profit might be public-private partnerships (PPPs) whereby governments would subsidize costs or share risks with the private sector. Importantly, governments and the private sector now have opportunities to shape climate change policy frameworks in ways that would encourage such innovation. The development of insurance instruments holds particular promise for building climate resilience, although

²⁵ Müller 2008: 8

²⁶ Bapna and Gray (2008).

²⁷ Müller 2008

²⁸ UNDP 2007:195

²⁹ UNDP 2007:189 (footnote 62)

³⁰ Ian Burton, white paper on private financing for climate change and the poor prepared for the Brookings-Blum Roundtable, July 2008.

this will depend critically on the right enabling policy environment. A number of climate-related insurance derivative products are being tested across the globe, including in Ethiopia, Malawi and India. In some cases, insurance products offered at the household level insure against crop losses based on easily verifiable weather events. Second, investors can ensure that the development projects for which they are responsible are not themselves vulnerable to climate change and that they do not induce or facilitate a pattern of development that would represent mal-adaptation. Third, the private sector can help by making corporate responsibility investments, although few companies so far have made major social responsibility investments in climate change adaptation. However, private sector efforts on adaptation are still at early stages, and will require some time and careful structuring of incentives to fully unleash the power of the market.

Key Questions:

- ❖ *What is the ideal mix of government and private sector financing for climate change responses?*
- ❖ *What are the best strategies for creating robust private markets for climate insurance?*
- ❖ *What role should micro-finance play in promoting adaptation?*

SESSION VI: MOBILIZING FOR IMPACT
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Mounting an effective global response to the intertwined scourges of global poverty and climate change will require substantially more public mobilization in both developing and some developed nations than has occurred to date. Though individuals in the developing world are attuned to their changing climate, many are often unaware of the anthropogenic origins of climate change and its likely long-term impacts. Climate coverage is lacking in developing countries. For example, at the Bali climate conference, only 9 percent of the journalists registered to cover the summit came from the developing world.³¹ According to a 2007 Gallup Poll, 56 percent of respondents surveyed in 12 Sub-Saharan countries (including Benin, Burkina Faso, Cameroon, Ethiopia, Kenya, Malawi, Mozambique, South Africa, Tanzania, Uganda, Zambia, and Zimbabwe) agree that water is getting harder to find. Majorities of respondents in most countries also believe that their lifestyles will deteriorate if the climate changes.³²

Even in developed countries where understanding and concern regarding climate change has grown significantly over the past decade, many people do not understand the policies and behaviors that are needed to solve the climate crisis. Even fewer understand how climate change will impact the global poor. Climate change and poverty alleviation, moreover, are not top tier political issues in most developed countries in the sense that few voters make ballot decisions based on these factors.

Fundamental transformation of the global economy and human activity are required to stabilize the Earth's climate and do so in ways that improve livelihoods for the poor. Seeing those transformations through will require enormous political will and that in turn will depend on public support. Some climate change activists believe that changing private behavior, public policy and global financial flows requires the creation of a global mass

³¹ This figure does not include host-country journalists who made up 25 percent of those registered (James Fahn, "Rescuing Reporting in the Global South," *Nature Reports Climate Change*, vol. 2, July 2008).

³² Magali Rheault, "Africans May be Noticing Effects of Climate Change," Gallup Poll, December 2, 2007.

movement of a type the world has not seen before. Major climate action campaigns are underway in several countries, including the United States through the Alliance for Climate Protection.

Seven elements are crucial to the success of these campaigns. First, they need to define the problem in ways that ordinary people can understand. In part, that means giving the issues a human face. To many, climate change seems cold and clinical—endlessly complex and ever changing assessments of atmospheric concentrations of invisible gases. But the climate and poverty crises are really about innocent children in Somalia, hungry families in India, unemployed youth in Afghanistan, and vulnerable girls in refugee camps in Chad. Second, the campaigns need to connect the problems of climate and development to target audiences by making them local and personal. This means accentuating the moral dimension of urgent action. It also means showing how inaction could create problems that hit close to home—by exacerbating local vulnerability to climate change and by augmenting the local insecurity from international vulnerability. Third, while maintaining a sense of urgency, the campaigns must demonstrate a clear pathway to success. Without the promise of easily understood near-term solutions, the threat of catastrophe creates resignation and despair.

Fourth, the campaigns must do more than merely refine the message; they also must get the word out. In developing countries, this will require improvements in the capacity of journalists and media outlets to cover stories about climate vulnerability and related development solutions. Fifth, the campaigns need to create a broad political coalition for action. A genuinely diverse set of societal voices is needed to make a compelling case for action across the political spectrum. Success will not come so long as climate change and global development are viewed as the concerns solely of narrow, elite special interests. Sixth, climate and development campaigns must engage the private sector by creating credible opportunities for profit. Harnessing the energy and influence of entrepreneurs is essential not only to changing policy but to changing societal behaviors. Finally, the campaigns must overcome the North-South divide by fusing the priorities of the North (mitigation and environmental protection) with those of the South (development and poverty alleviation). We must re-imagine the climate and development crises as a single global challenge that unites the world in the quest to alleviate human suffering and protect the planet for future generations.

Key Questions:

- ❖ *What mobilization strategies and players produce the largest returns on investment?*
- ❖ *What communication technologies are most important?*
- ❖ *What audiences are the most important to mobilize?*
- ❖ *What concept best describes the climate and development nexus?*

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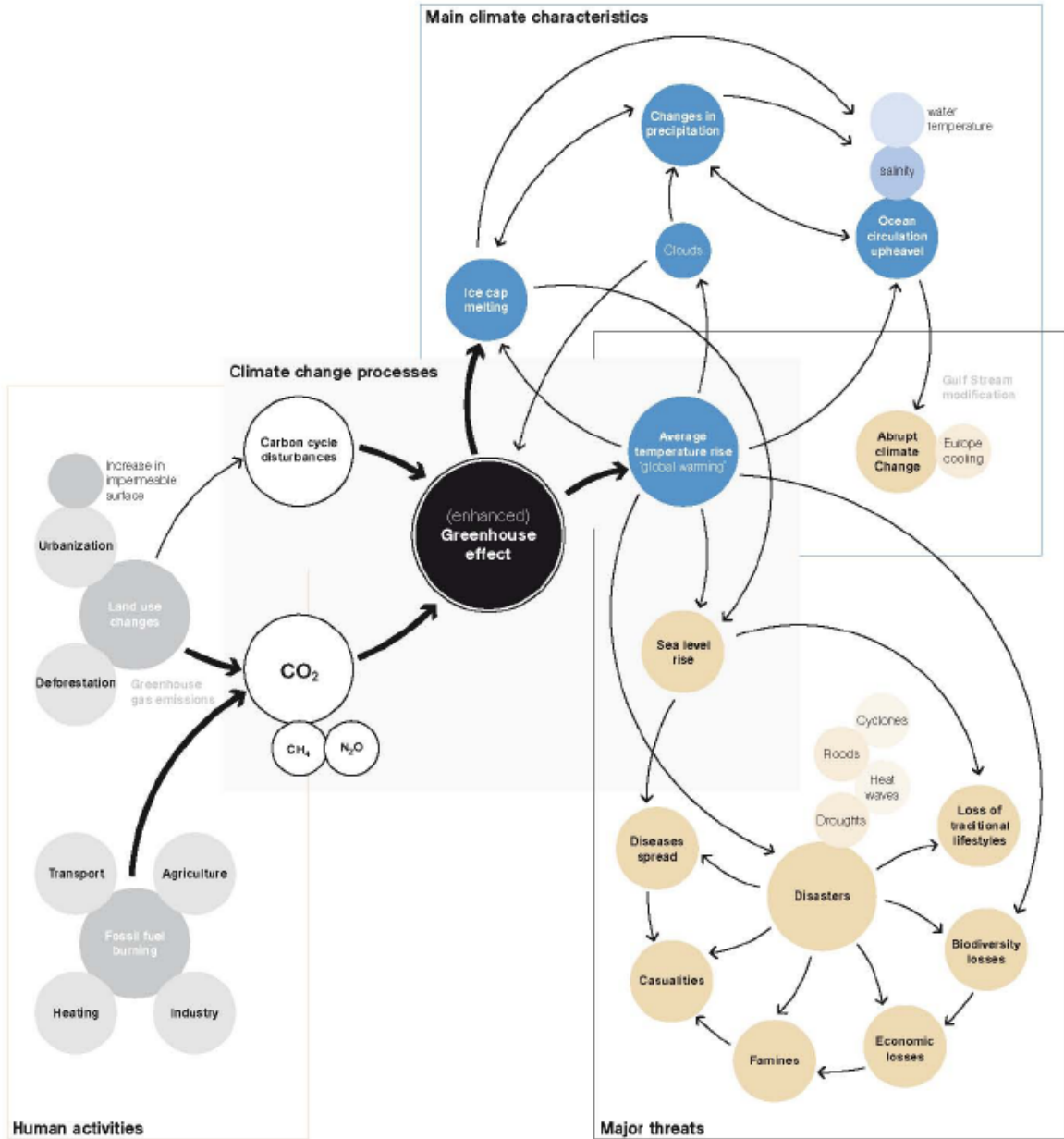
When it comes to climate change and development, the world has three choices: mitigate, adapt, or suffer. Climate change has already progressed sufficiently that every society must engage in some adaptation and, regrettably, a good deal of suffering. Yet, right now – for one brief, final moment – humanity has the power to decide the balance among

these three. In this global African stone game, the poor have the most wagered and the fewest pieces remaining. Unfairly, those who did the least to contribute to climate change have the smallest say in how the game will be played, the least capacity to adjust to its outcome and, by a cruel curse of geography and development, the biggest risk of losing everything. The global course so far is shortsighted and self defeating: neither mitigation nor adaptation.

But that can change. The preceding analysis reveals just how much could be done to turn the challenge of climate change into opportunities for sustainable development. By promoting clean energy technologies and sound forestry we can involve the poor in an urgent global effort to mitigate emissions, and do so in ways that improve livelihoods and reduce climate vulnerability. We can weave climate change into the fabric of development to avoid mal-adaptation and improve the resilience of the poor. With planning and aforethought, we can minimize the impact of inevitable natural disasters and manage global security risks effectively. We can marshal public and private financial resources to help the poor adapt to climate change and pursue sustainable development. Our success will depend on educating and mobilizing the public around the world. These challenging but critical tasks will require a coordinated global effort that involves governments, business, and labor leaders, local communities, advocates, social entrepreneurs, and many others. Each of us has a role in meeting the twin challenges of climate and poverty.

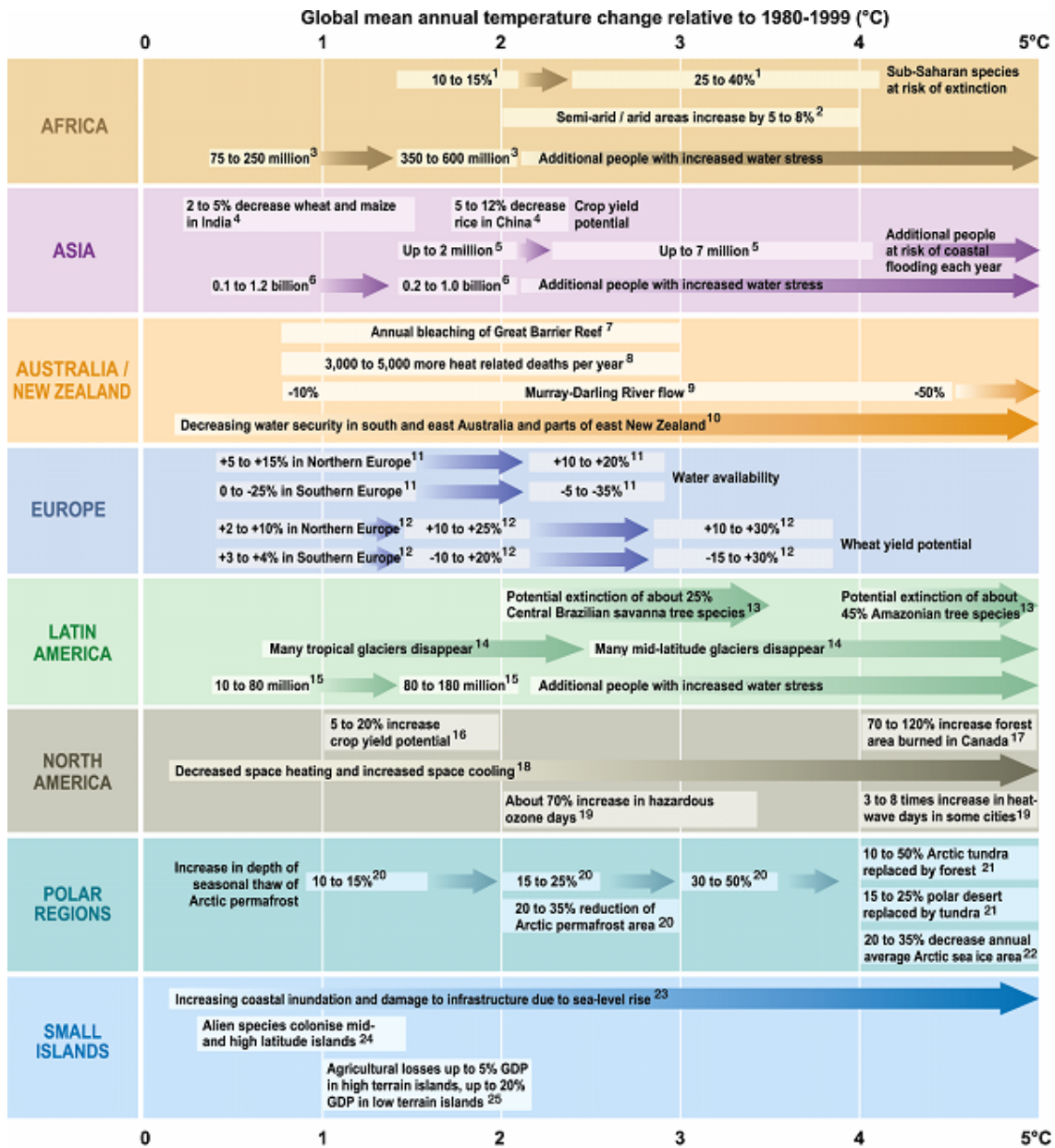
APPENDIX

Figure 1.



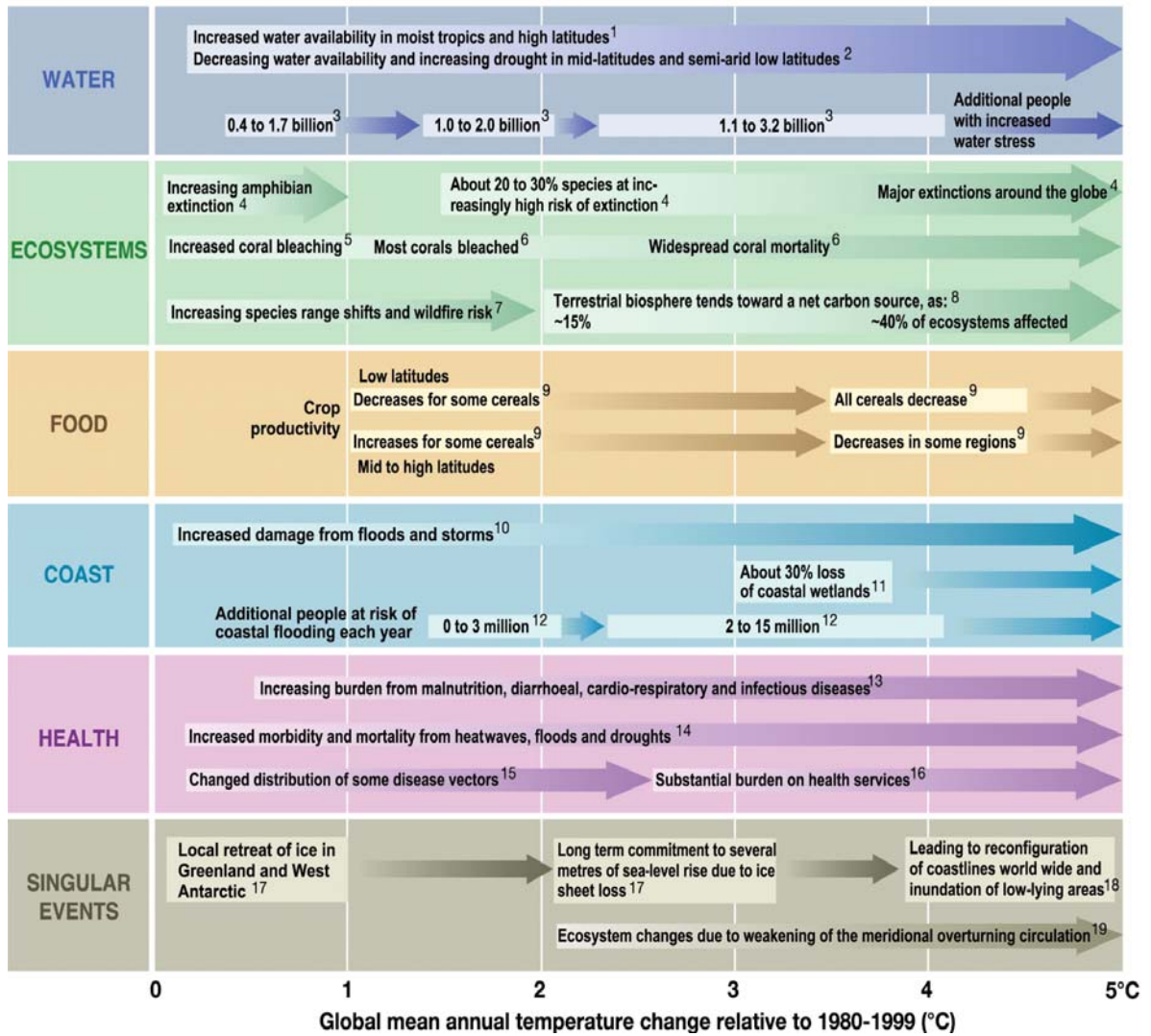
Source: UNEP/GRID-Arendal, 'Climate change processes, characteristics and threats', designed by Philippe Rekacewicz, UNEP/GRID-Arendal Maps and Graphics Library, 2005. <http://maps.grida.no/go/gm/pls/c/climate_change_processes_characteristics_and_threats> (Last accessed 10 October 2007)

Figure 2.



Source: IPCC Fourth Assessment Report

Figure 3.



Source: IPCC Fourth Assessment Report