ADAPTATION TO CLIMATE CHANGE: BUILDING RESILIENCE AND REDUCING VULNERABILITY

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Executive Summary

Given the far-ranging adverse impacts of climate change, adaptation must be an integral component of an effective strategy to address climate change, along with mitigation. Adaptation should be approached as an opportunity to rethink development as usual, and should be based on "upstream" interventions that will yield benefits regardless of specific, climate-related events in the future. This policy brief examines win-win strategies for development and adaptation in three key sectors—namely, ecosystems and natural resources, food and agriculture, and health—and focuses on interventions that will be valuable regardless of the uncertainties we face in determining precise climate change impacts.

Introduction

Climate change will have significant impacts on development, poverty alleviation, and the achievement of the Millennium Development Goals. Hard-fought progress made in achieving these global goals may be slowed or even reversed by climate change as new threats emerge to water and food security, agricultural production, nutrition, and public health. Countries and regions that fail to adapt will contribute to global insecurity through the spread of disease, conflicts over resources, and a degradation of the economic system.

Given the far-ranging adverse impacts of climate change, adaptation must be an integral component of

an effective strategy to address climate change, along with mitigation. The two are intricately linked—the more we mitigate, the less we have to adapt. However, even if substantial efforts are undertaken to reduce further greenhouse gas emissions, some degree of climate change is unavoidable and will lead to adverse impacts, some of which are already being felt. The world's poor, who have contributed the least to greenhouse gas emissions, will suffer the worst impacts of climate change and have the least capacity to adapt. Elementary principles of justice demand that the world's response strategies and adaptation funds give special priority to the poorest countries. Poor countries account for only 8 percent of global greenhouse gas emissions; yet 98 percent of those seriously affected by climate change live in those countries.

Adaptation is about building resilience and reducing vulnerability. Adaptation is not simply a matter of designing projects or putting together lists of measures to reduce the impacts of climate change. A national policy response should be anticipatory, not reactive, and should be anchored in a country's framework for economic growth and sustainable development, and integrated with its poverty reduction strategies.

Information is crucial to planning for adaptation to climate change. Countries need the capacity and resources to track meteorological patterns, forecast impacts, and assess risk in order to make good decisions and provide timely information to their citizens. Capacity for monitoring and forecasting climate change can significantly affect livelihoods. For farmers, for example, having access to technologies for adaptation and knowing early about abrupt changes in rainfall patterns or temperature can make the difference between a bountiful harvest and crop failure.

The science is clear: climate impacts are being felt today and greater impacts are unavoidable tomorrow. Adaptation is essential to reducing the human and social costs of climate change, and to development and poverty alleviation. Adaptation strategies abound that will yield benefits in their own right.

Rethinking Development

Climate change provides both an obligation and an opportunity to reconfigure development strategies so that they meet the needs of the present generation without compromising future generations' abilities to meet their needs. Adaptation strategies should be evaluated by the following four principles:

- Scale: Match responses to the growing numbers of people in danger.
- Speed: Waste no time because climate change is happening faster than predicted.
- Focus: Manage risk, build the resilience of the world's poorest people, and enhance the ecosystem functions upon which those people depend.
- Integration: Recognize the relationships between environment, development, and climate change, and manage synergies and trade-offs between mitigation and adaptation.

Development that can be sustained amid a changing climate must be enabled by building the adaptive capacity of people. Adaptive capacity results from reduced poverty and enhanced human development. One critical input to this new development process will be the production and dissemination of appropriate climate information, tailored to end-user needs and delivered in a timely manner.

While infrastructure such as new seawalls, dykes, and irrigation systems will be needed, the real adaptation needs of people are for education and knowledge; for political voices to articulate views and concerns; and for effective local governments efficiently connected to national governments. Many of these needs must be met at the level of people, their families and villages. So much work on climate change, even on adaptation, is done at the global level. These approaches need to be turned "upside-down" and institutions should be encouraged to begin at the local level.

Building Resilience

Climate change increases risk, particularly for those who rely on weather patterns, agriculture, water, and other natural resources for their livelihoods. The magnitude, timing, and location of these climate impacts are inherently unpredictable, but the threats are not likely to be new; they will, in most cases, be magnifications of existing threats.

Given these uncertainties, adaptation strategies should be based on "upstream" interventions that will yield benefits regardless of specific, climate-related events. Examples of such win-win strategies include developing more diverse crop strains tolerant of a variety of different conditions (heat, drought, salt, etc.); bolstering social capital and resilience; creating early warning systems and preparedness plans; improving public health infrastructure; and bolstering disease surveillance. These strategies will be valuable regardless of the exact impacts of climate change at a particular time or location.

The following highlights adaptation challenges in three key sectors that are crucial to sustainable development: ecosystems and natural resources, food and agriculture, and health. Because each of these sectors is closely intertwined, national adaptation and sustainable development plans should deal with them in an integrated manner.

Ecosystems and Natural Resources

Climate change will destabilize and degrade many ecosystems that are already threatened by destruction and overuse, and result in direct and severe impacts on those who depend on them for their livelihoods. Unlike the wealthy, poor people often lack access to alternative services and are highly exposed to ecosystem changes that could result in droughts, floods, and famine. The poor often live in locations that are vulnerable to environmental threats, and lack financial and institutional buffers against these dangers. Climate change can also lead to ecosystem failure and large-scale population displacement.

The Millennium Ecosystem Assessment (MEA), published in 2005, assessed the consequences of ecosystem change for human well-being and the scientific basis for action needed to enhance the conservation and sustainable use of those systems. The MEA made it clear that human actions are depleting Earth's natural capital, "putting such strains on the environment that the ability of the planet's ecosystems to sustain future generations can no longer be taken for granted."

Food and Agriculture

Climate change affects agriculture and food production in complex ways. It affects food production directly through changes in agro-ecological conditions and indirectly by influencing growth and distribution of incomes, and thus demand for agricultural products. According to the IPCC, the adverse impacts of climate change on agriculture will occur predomi-

nantly in the tropics and subtropics, in Sub-Saharan Africa, and to a lesser extent in South Asia. Yields from rain-fed agriculture in some African countries could fall by 50 percent by 2020. In some South Asian countries, a substantial reduction in crop yields from rain-fed agriculture could also occur. In Central and South Asia, crop yields could fall by up to 30 percent by 2050, and India could lose 18 percent of its rain-fed cereal production. In addition, freshwater availability in these regions is projected to decrease, and coastal areas will be at the greatest risk due to increased flooding. Sea level rise in Bangladesh, for example, is expected to affect more than 13 million people with a 16 percent reduction in national rice production.

Health

Global climate change threatens human health in ways that are numerous and profound. Many parts of the world will experience more extreme events such as droughts, heat waves, altered exposure to infectious disease, and more frequent natural disasters that will put added strain on an already overstressed health system. Moreover, climate change threatens the bases of public health around the globe: sufficient food and nutrition, safe water for drinking and sanitation, and secure homes to live in. It will make the MDGs that much harder to achieve.

Many low-income countries with populations at the greatest risk from climate change are already overwhelmed with existing public health challenges from treatable conditions such as malnutrition, diarrhea, acute respiratory infections, malaria, and other infectious diseases. Diverting limited personnel and resources away from these ongoing problems to address future threats from climate change could make things worse instead of better.

The greatest health impact of climate change may be its impact on global nutrition. It has been estimated that at least one-third of the burden of disease in poor countries is due to malnutrition, and roughly 16 percent of the global burden of disease is attributable to childhood malnutrition. Climate change is also expected to alter exposure to infectious disease, including waterborne disease outbreaks caused by a variety of organisms, and to increase food poisoning events. In addition, the distribution of vector-borne diseases, which affect nearly half the human population, is expected to change as a result of changes in temperature, humidity, and soil moisture. While there is some debate about the net impact of climate change on the distribution of these diseases, there is little debate that they are likely to spread into regions where they have not been historically endemic.

Financial Needs

Although there is uncertainty about the cost of adaptation, the scale of finance needed is significant. Several calculations, based on rough assumptions, have estimated the cost of adaptation in developing countries to range from $9 to $86 billion per year.

According to Article 4.4 of the UNFCCC, "developed countries are required to assist developing countries in meeting the costs of adaptation to the adverse effects of climate change." Developing countries regard funding for adaptation as indicative of historical responsibility and argue that resources for adaptation should be additional to Official Development Assistance (ODA).

However, one recent analysis found that developing countries have received less than 10 percent of the funds promised by developed countries to help them adapt to the impacts of climate change. This lack

of action has caused concern among international negotiators, who have warned that a new global agreement on climate change is at risk if developed countries do not make the necessary funding available to address adaptation in developing countries. The failure to act is fostering deep distrust between developed and developing nations, and adaptation funding is crucial to rebuild trust.

The concurrent global financial crisis and threat of a global recession have called into question the feasibility of raising significant financial resources for climate action, including adaptation, around the world. Climate change, however, will not wait for the resolution of the financial crisis. Besides, the financial crisis has shown that trillions of dollars of public funds can be mobilized in a very short time. What is required for climate action is on the order of tens of billions of dollars. A small percentage of the funding in national stimulus packages would go a long way toward addressing climate change now.

As some global leaders have pointed out, the financial crisis should not be used as an excuse for inaction on climate change. Addressing climate change at the requisite scale can be an integral part of the solution to the financial crisis. The transition to a low-carbon economy can support global recovery by creating new jobs and opportunities across a wide range of industries and services.

However, ODA and other public funds are unlikely to provide the "new and additional" resources required to finance the adaptation efforts of all developing countries. The current level of available funding is an order of magnitude below even the most conservative cost estimate. It is also scattered across different sources and is allocated with no clear coordination. Without a significant increase in financial support for adaptation and better coordination of international efforts, the world will fail to deliver what is urgently needed to cope with climate change in countries that are highly vulnerable to its impacts, such as the least developed countries (LDCs) and small island developing states.

Recommendations

In order to effectively adapt, national policy responses should anticipate the adverse effects of climate change and should be anchored in a country's framework for economic growth and sustainable development. National governments bear the responsibility to develop and implement integrated policies and programs that build the resilience and reduce the vulnerability of their populations, emphasizing preventive local actions, to manage the risks associated with the impacts of climate change. The following recommendations offer a suite of options to effectively meet the adaptation challenge in the developing world:

Rethink the Development Paradigm

Because climate change provides both an obligation and an opportunity to reconfigure development strategies, new thinking is needed at both the global and local level from national governments to development organizations. Guidance from the international level is needed from the Secretary-General of the United Nations who should establish a high-level task force to define a new vision for global sustainable development. This new vision must be based on a low-carbon economy and examine the interconnections between the crises the world has witnessed in recent years—financial, food, water, energy, and

climate—and the ability of global public policy and institutions to deal with them simultaneously.

Roles for Local, National and Global Policy

The highest political and organizational level should lead national policy coordination for adaptation, disaster risk reduction, poverty alleviation, and human development. Local institutions should have the main responsibility for supporting the poor and vulnerable and assisting them in building safe settlements, disseminating appropriate information, and moving resources efficiently from global and national to local levels.

Focusing on the local level does not in any way decrease the role of the national government. It suggests instead that national governments must be much better at connecting with remote areas and peoples. In addition, the instinct to rely on local people is correct, for they have been managing climate variability for centuries and have much pertinent knowledge and many necessary skills. Similarly, international organizations must become more skilled in reaching the local level directly and working through local governments and civil society organizations.

Without viable institutions and effective policy frameworks at the national level, progress on adaptation to climate change will falter. Disseminating information, building knowledge, articulating needs, ensuring accountability, and transferring resources—all are guided by and happen through institutions.

Take Advantage of Triple Win Policies in the Forestry Sector

Win-win policies can be designed that protect the climate and enhance ecosystems. For example, an initiative to reduce deforestation and to promote reforestation and the recovery of degraded lands would achieve multiple objectives: sequestering carbon from the atmosphere; strengthening ecosystems and biodiversity; expanding food production; and providing employment, principally to the poor and to indigenous peoples.

A large-scale international initiative to reduce deforestation and promote reforestation and the recovery of degraded lands should be launched and means for effective transfer of resources to local communities and people should be assured.

Build Local Capacity for Food Security

Climate change is primarily a multiplier of known risks, such as food insecurity, that have in the past rarely received sufficient attention or funding because they have fallen in the gap between disaster relief and development. The World Bank, for example, the largest investor in agriculture, has in the past paid little attention to food security. Similarly, the current architecture of the United Nations in addressing food security is weak and needs strengthening. There is much overlap between three UN agencies—the Food and Agriculture Organization (FAO), the International Fund for Agricultural Development (IFAD), and the World Food Programme (WFP)—leading to duplication of efforts.

On the other hand, the Consultative Group on International Agricultural Research (CGIAR) is a global partnership working on cutting-edge science to foster agricultural growth. CGIAR is well positioned to assist developing country farmers who face economic and environmental constraints given the impacts of climate change. Therefore, centers for

regional adaptation in agriculture to develop and widely disseminate technologies for adaptation (for example, salt- and drought-resistant crop cultivars) should be established by CGIAR, especially in Sub-Saharan Africa and South Asia.

Strengthen Public Health Infrastructure and Surveillance

The international community must make a serious commitment to help lower-income countries adapt to the health threats from climate change through improving basic health services. Doing so will have the added benefit of helping those countries address challenges that have been an ongoing scourge to their economies and their people even absent climate change. Though national governments bear the responsibility for the health of their populations, international financial support should be provided for strengthening developing countries', especially least developed countries', public health infrastructure and surveillance capabilities.

Approach Adaptation Finance With Both Short- and Long-term Goals

A number of new (and innovative) sources of funding have been proposed to finance adaptation needs. Three promising, possible sources that are "adequate, predictable, and sustainable" as called for in the Bali Action Plan are:

1. ***Auctioning International Emissions Trading Allowances*:** Norway has proposed that a small portion of allowances could be withheld from national quota allocation and auctioned by an appropriate international institution. Auctioning 2 percent of global allowances would generate between $15 and $25 billion per year. The resulting revenue could then be placed in a fund to support climate action, including adaptation in developing countries.

2. ***International Air Passenger Adaptation Levy:*** Maldives has proposed, on behalf of the LDCs, an adaptation solidarity levy on international air passengers. This levy would provide funding for adaptation activities in the poorest and most vulnerable countries and communities. The proposal is to establish a small passenger charge for all international flights—differentiated with respect to the class of travel ($6 per economy and $62 per business/first class trip)—which would raise between $8 billion and $10 billion annually for adaptation in the first five years of operation, and considerably more in the longer term.

3. ***International Maritime Emission Reduction Scheme (IMERS):*** IMERS is a "cap-and-charge" scheme as opposed to cap-and-trade, based on a carbon levy on fuel for international shipping that recognizes different national circumstances. Applied worldwide and collected centrally, IMERS would raise approximately US$10 billion annually for climate action in developing countries while reducing currently unregulated carbon dioxide emissions from international shipping. The levy would be set at the average market price of carbon. The anticipated impact of the scheme on final consumers is only a percent increase in the price of imports to developed countries.

In the short term, $1 to $2 billion of additional ODA should be provided immediately by developed countries to help LDCs (especially in Africa), selected small island developing states (below a certain GDP), and other most vulnerable developing countries that are already suffering from climate impacts. The funds should be used for the implementation of National

Adaptation Programs of Action (NAPAs) that have already been developed. Funds should flow to community-level organizations, women's groups, and NGOs. This would help narrow the "trust gap" between developed and developing countries and serve as a building block toward a long-term approach to adaptation within the context of a new and comprehensive agreement on climate change.

In the longer term, a climate fund (or funding mechanism) should be established in conjunction with a new and comprehensive climate agreement to support developing countries' actions for mitigation and adaptation. Starting at $10 billion and growing to $50 billion per year, in addition to ODA, it should consist of innovative and predictable sources of funding, including auctioning revenues from carbon markets and global market-based levies, such as from international air travel and maritime emissions reduction.

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