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Taking Action on Climate Change: The Forecast for Cancun and Beyond

Katherine Sierra
Senior Fellow, Global Economy and Development at Brookings

Nathan Hultman
Nonresident Fellow, Global Economy and Development at Brookings

Sarah Puritz Milsom
Senior Research Assistant, Global Economy and Development at Brookings

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The Brookings Institution
1775 Massachusetts Ave., NW
Washington, DC 20036

Negotiators to the 16th Conference of the United Nations Framework Convention on Climate Change (UNFCCC) will meet in Cancun (COP16) November 29 to December 10, 2010. The Mexican hosts have tried hard to avoid the overblown hopes of last year's meetings in Copenhagen—and expectations remain modest. Instead of striving for a master agreement, delegates in Cancun will look to agree on the building blocks that tackle key issues for global cooperation. Nevertheless, while there is no expectation for a binding international treaty, elements of these individual building blocks remain contentious, and success in negotiating a balanced package of actions therefore remains uncertain.

What to Watch in Cancun

Can the delicate balance achieved under the Copenhagen Accord be maintained? The Copenhagen Accord provided a means for both developing and developing countries to declare emission reductions. This was combined with pledges of significant financial support for developing countries along with the creation of a Copenhagen Green Fund. But the Accord is under pressure because of disagreements, most notably between the United States and China, on the Accord's provisions for transparency of monitoring, reporting and verification (MRV) and in renewed questions about equitable burden-sharing under an eventual emissions regime. Unless these issues can be resolved, it will be difficult to move toward fulfilling pledges of long-term finance. And, the less contentious and therefore more likely agreements in the areas of forestry, technology and adaptation might be stuck waiting in the wings.

What to Watch Beyond Cancun

- **From Climate Change to Green Growth.** Stronger links between climate change and green growth are crucial. Look for the reframing of the climate change challenge toward a positive agenda of energy security, competitiveness and job creation driven by innovation.
- **Innovations in the Carbon Markets.** With poor prospects for an extension of the Kyoto Protocol, international regulatory uncertainty is growing. Look to uncoordinated but innovative regional, country and local emission trading schemes, and a debate on pathways for eventual convergence.
- **Delivering on Climate Change Finance.** Continued work to design innovative funding sources—many of which will depend on either a carbon tax or emission trading—will be critical. In the United States, policymakers may need to reconsider policies that price carbon as part of its deficit reduction strategy. From all contributing countries, expect a strong focus on results- and performance-based funding, and new tools to leverage the private sector.
- **Showing the Way in Forestry.** Significant progress has been made in defining approaches to reduce emissions from deforestation and land degradation which could show how commitments and funding can be combined on the ground with MRV. And look to an extension of this approach for agriculture and land use as well.
- **Focusing on Innovation.** Expect strong momentum in building technology cooperation which focuses on knowledge partnership and innovation networks.

- **Recognizing Adaptation as a Development Challenge.** With consequences of a changing climate already impairing developing country growth prospects and impacting the poorest and most vulnerable, expect continued movement toward building climate-resilience and national adaptation plans into core development strategies.

Changing the Conversation

Irrespective of the outcome in Cancun, actions will continue to be taken from the bottom-up by national and local governments and through bilateral and pluri-lateral cooperation, private sector initiatives and civil society. If progress under the UNFCCC continues to be halting, some efforts may shift to other institutions beyond the UNFCCC, such as the G-20, Montreal Protocol and the WTO, to pursue discreet parts of the climate agenda. And expect debate on more radical approaches that might entail moving away from a single treaty toward a suite of sector agreements, or which build on the GATT experience to forge agreements among interested countries on emission reductions and compliance targets. The challenge will be to build on bottom-up initiatives that develop new tools and instruments, but simultaneously balance the need for international goal-setting on climate policy outcomes and burden sharing.

Setting the Stage: The Copenhagen Accord

At COP15 in Copenhagen, hopes were high for a historic, legally binding, comprehensive international treaty on climate change. But these hopes proved to be without foundation, and the cause of the meeting's near collapse went well beyond disagreement over agendas, dueling texts and logistics. It signaled that fundamental issues on emission caps, financing, monitoring, reporting and verification (MRV), governance structures and even the form of the agreement were unresolved. In the meeting's final hours, the impasse was broken with the Copenhagen Accord,[1] a political declaration negotiated by heads of state.

The Copenhagen Accord was crafted as a way to side-step the difficulty of legally binding emission targets, instead providing a mechanism for both developed and developing countries to declare their level of ambition for emission reductions. The Accord included pledges for $30 billion in "Fast Start" finance by 2012 and long-term finance of $100 billion per year by 2020 for mitigation and adaptation support in developing countries. Linked to this was very careful language on MRV in an attempt to bridge expectations of mitigation actions by developing countries and finance from developed countries. Less contentious topics which might have been agreed upon in Copenhagen, if not for the fundamental discord, were also set out as future agenda items under the Copenhagen Accord—such as REDD+, a technology framework and a framework for adaptation. Because it was blocked in the final plenary by a handful of opposing countries, the Copenhagen Accord was not given any official status under the UNFCCC. However, 183 countries have associated themselves with the Accord as of May 27, 2010. In addition, 90 of these countries have either submitted actions or targets for reducing greenhouse gas emissions.[2]

For most developed country parties, most prominently the United States, implementation of the Accord should be a priority. Todd Stern, the U.S. special envoy for climate change, underscored the importance of a balanced package of decisions in Cancun, stating "the danger is that many countries are arguing that we should capture the so-called 'low-hanging fruit'—the 'easier' issues on which there is less discord." He continues to argue that

postponing actions on the "harder" issues of mitigation and transparency is a "non-starter for the United States."[3] The importance of a balanced package has been highlighted by Europe as well, with the issue of transparency also cited as critical.[4] Other countries, with China being cited most often, have been seen as retreating from the Accord's delicate balance in their negotiations of the basic texts that form the official negotiating instruments under the UNFCCC.[5] This difficult dynamic, coupled with the weakened U.S. political capital and leadership on climate change post-midterm elections, has many pessimistic about potential progress to be made in Cancun. If little is achieved and decisions are again postponed to the next conference slated for South Africa in 2011, calls for alternatives to the UNFCCC processes may get more currency.

Toward a Balanced Package: The Building Blocks

Negotiators in Cancun will be focusing on the key building blocks for climate change action: emission reductions, climate finance, forests, technology, and adaptation. Some of these are still highly contentious, while negotiators are close to agreement on others. Success in Cancun will depend on whether they can be combined into a balanced package. Whatever the outcome, beyond Cancun we can expect movement under parallel initiatives. The points of continued discord and growing convergence, and the policy challenges and opportunities going forward, are outlined below.

Emissions Reductions

The Copenhagen Accord recognized the urgency of limiting global temperature increases to 2 degrees Celsius above pre-industrial levels to substantially reduce the risk of irreversible changes to the world's climate. The Accord also signified some progress in that both historic emitters and rapidly industrializing countries pledged emission reductions. While these pledges fall short of what is needed to stay below 2 degree Celsius, their implementation would be a positive start that could set the stage for the steeper reductions, which will be required in the future. In addition, major players, including Europe and Japan, have signaled their willingness to go beyond their Copenhagen Accord pledges if other major emitters offered stronger reductions.[6]

In particular, the world is watching China and the United States—China because it has now become the largest absolute emitter and the United States because it is the largest historic emitter.

China has pledged to reduce energy intensity by 40–45 percent relative to a 2005 baseline. It is aggressively investing in renewable energy technologies, expanding its nuclear energy program and implementing energy efficiency programs. Coal will continue to be an important part of China's energy balance, and it is investing in R&D for carbon capture, storage and reuse. China is also developing a domestic cap and trade program. Despite these examples of progress, China resists making their efforts binding in the international arena, instead characterizing its emission intensity reduction pledge as voluntary.

The U.S. pledged to reduce emissions by 17 percent below 2005 (3 percent below 1990 levels) in Copenhagen. But with cap and trade legislation dead for at least the next two years and poor prospects for new energy bill in the current Congress, the Obama administration will have to rely on existing EPA authority and other federal programs as well as state action. According to a study by the World Resources Institute, the most aggressive

scenario suggests that these actions could result in a reduction of 14 percent below 2005 emission levels.[7] Given this outlook, the United States will be in a weakened position in Cancun as it seeks to maintain the link between emission pledges, transparency of implementation and climate change finance.

Despite strong rhetoric between China and the United States at the level of global negotiations, bilateral technology cooperation between the two countries is very productive. Examples of collaboration include the U.S.–China Energy Resource Centers initiative, the U.S.-China Renewable Energy Partnership and the U.S.-China Energy Cooperation Program.

What to watch in Cancun

Transparency. A key negotiating point will be whether the broad transparency principles for MRV set out in the Copenhagen Accord are translated into a system to track country progress toward delivering on their emission reductions. The United States and others will be looking for a system that includes all country emission reduction actions to be under the MRV, not just those supported by finance, the latter being the Chinese position.

The Kyoto Protocol's Fate. The Kyoto Protocol is set to expire in 2012. Some major players, most notably Japan, have signaled that they are not prepared to agree to a second commitment period unless the U.S. and other major emitters such as China agree to legally binding targets under the UNFCCC, setting the stage for an impasse. Uncertainty surrounding the Kyoto Protocol contributed to a substantial slowdown in CDM activity. However, recent clarifications issued by the UNFCCC have increased confidence that while the emissions trading targets of Kyoto end in 2012, the Kyoto Protocol and CDM architecture will remain in place after 2012 unless supplanted by a new treaty. This is significant not only because the CDM has registered over 2,400 emission reduction activities in developing nations; but because the CDM provides significant support for the Adaptation Fund, which is financed by a 2 percent levy on certified emission reduction credits (CERs) issued by the CDM. In addition, the EU has indicated that some kinds of CERs will be allowable for compliance under the EU ETS, although the details on which CERs qualify and how many can be used remain under discussion. As such, given the retention of the CDM architecture and the continuation of the CER demand driver, there will continue to be investments in at least some CDM project types even absent substantial progress at Cancun.

Beyond Cancun

Green Growth. Political difficulties in reaching agreement are in part linked to the failure to frame the climate change challenge within a positive agenda. Such an agenda can be presented as targeting energy diversification

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and national security, economic competitiveness, and job creation driven by innovation. This positive agenda is behind the actions of many newly industrializing nations, affirmed by leaders at the G-20 Seoul Summit and will be the main agenda item at the upcoming Rio +20 conference slated for 2012.[8] Competitiveness through innovation has also energized policies and investment at the state and regional levels in the United States. It may also offer the best chance to re-engage climate change policy discussions at the national level. However, doing so necessitates a level of public understanding and support that current education systems (and public education strategies) in the U.S. and many other countries have failed to produce. Policies for substantial investments in R&D, leveraging public procurement and modernizing the nation's infrastructure could help drive the private investment that will be needed to move to a low-carbon future.[9] These policies will need to be linked to deficit reduction strategies; the removal of fossil fuel subsidies, as agreed by the G-20, will only go part way.[10] Re-opening the debate on carbon pricing as a way to provide market signals and incentives for a deeper transformation, while also generating resources to tackle the deficit, should also be on the table.

Carbon Markets. Despite weak prospects for a global agreement and an uncertain international regulatory environment, the trend toward decentralized approaches is expected to continue. This will include a continuation with the EU Emissions Trading Scheme at the regional level and the possible roll-out of new domestic initiatives. Emission trading schemes are also under consideration in countries like China, and at the local levels in cities like Tokyo and Bangkok. In the United States, proposals for state and regional trading schemes would test these approaches. Research will be needed to learn from these initiatives and to consider ways to link them over time into a global market. Prospects for the Clean Development Mechanism remain uncertain, although the CDM architecture will remain in place beyond 2012 and the EU ETS has indicated that it will likely continue to accept certain kinds of CDM credits (as yet undetermined) into the post-2012 period.

Measuring Outcomes. The Copenhagen Accord did a service by showing a way to encourage countries to submit voluntary emission reduction pledges in ways that respond to their national conditions. But it has also pointed to the need to find new metrics to measure and compare progress. Further research—like the research from Brookings scholars, which suggests focusing on the implicit carbon price of pledged actions—or approaches that offer ways to measure concrete and verifiable outcomes will be important.[11]

Climate Change Finance

The Climate Change Finance Commitment. The Copenhagen Accord pledged $30 billion in finance for mitigation and adaptation between 2010 and 2012, with longer-term public and private finance of $100 billion a year to be in place by 2020. The expectation is that this is additional to traditional official development assistance (ODA).

Meeting these commitments is crucial to building the trust needed for global cooperative efforts and is critical to help developing countries move to low-carbon and climate resilient pathways. Finance for mitigation is a contribution to a global public good—as all countries everywhere will benefit from the reduction of greenhouse gasses emitted into the atmosphere. Adaptation, on the other hand, provides local or regional public goods. Therefore adaptation finance should be treated differently. While developing countries expect adaptation

finance as "compensation" for the damages from a changing climate caused by historic emitters, developed countries count this assistance as part of their contribution to broader development and poverty alleviation goals, recognizing that the impact of climate change will significantly drive up those costs.[12]

Raising $100 Billion Per Year. Developed country plans show that, at least on paper, they can meet their $30 billion Fast Start Finance (FSF) commitment.[13] While developing countries will maintain pressure to ensure FSF commitments are actually delivered in a timely way, most of the focus in Cancun will be on longer-term finance. To help move this discussion forward, the U.N. Secretary General's High Level Advisory Group on Climate Change Financing (AGF) concluded in November that raising $100 billion each year by 2020 was "challenging but feasible."[14] While careful to not make any specific recommendations, an analysis of the most likely options show that revenues from emission allowances or direct taxes, taxes on international transportation fuels, and redeployment of fossil fuel subsidies or other carbon-based mechanisms could raise $50 billion per year. Add to this the net flows from private investment that, enhanced by public investments like guarantees, could raise $10-20 billion per year (total private investment that could be leveraged by this would be in the order of $100-200 billion) and net flows from the carbon markets of $10 billion per year. Another $11 billion per year could be raised by providing increased resources to the Multilateral Development Banks (MDBs). Taken together, these could total $80-$90 billion per year, with traditional public finance from budget appropriations covering the remaining balance.

The AGF report emphasizes that raising these sums has to be part of a broader package of meaningful mitigation actions, along with transparency of implementation. A key assumption is that innovative sources of finance will depend on either carbon taxes or cap and trade and offset instruments. The second assumption is that the Copenhagen Accord's emission reductions targets would result in a price on carbon of $20-25 per ton of CO_2 equivalent.[15]

Fiscal Challenges. As the AGF also concluded, the fiscal stress in many advanced countries coupled with the complex implementation of the mechanisms will make progress challenging. In the face of strong opposition at the mid-term elections, the Obama administration has dropped its plans to pursue cap and trade policies for now. But if the kinds of innovative sources of finance contemplated by the AGF are to be implemented in the U.S. by 2020, carbon taxes or cap and trade schemes will have to be part of the equation. As argued in the previous section, these will have to be framed as part of a deficit reduction, energy security and competitiveness package if they are to have a chance to succeed politically.

What to Watch in Cancun

Building Trust. Closely linked to the challenge of raising climate change finance is finding agreement over its delivery. Developing countries will want more specific assurances on public sources, while developed countries will focus on longer-term innovative sources given the difficult fiscal situation in many advanced economies. They will also emphasize raising private finance. Developing countries want the Copenhagen Green Fund, also anticipated in the Copenhagen Accord, to be the major channel of funding with a tight link to the UNFCCC. Developed countries will be looking for lighter oversight by the convention, with more decision-making at the

level of a Fund Board. These countries also expect to provide funds through multiple channels, including bilateral support. Both groups agree that the Copenhagen Green Fund should have balanced governance between developed and developing countries, but this is interpreted in different ways as well.

Program Delivery. In terms of implementation of programs, developed countries look to the capabilities of the MDBs and the U.N. agencies like the United Nations Development Programme and the United Nations Environment Programme. They will be looking to the MDBs to build on the experience of the Climate Investment Funds and align support with other development flows and to leverage the private sector. On the other hand, developing countries want to have the option to bypass these institutions and have direct access to the funds. Whatever the outcome of this debate, developed countries will need mechanisms and criteria that will provide for strong fiduciary standards, ensure that funds are used in environmentally and socially sustainable ways, and provide transparency of implementation and results; whereas developing countries will need assurance of consistent and predictable financing that also provides the political space needed to use funds in a way that allows for local capacity building.

These issues are not insurmountable, especially if the MRV provisions anticipated under the Copenhagen Accord for mitigation to satisfy developed countries and for finance to satisfy developing countries are maintained. If this happens, then the next step on climate change finance would be agreement in Cancun on the high level principles for and a process to design the Copenhagen Green Fund.

Beyond Cancun

From Financial Flows to Results. Much of the climate change finance debate has focused on the power politics of who controls the financial flows. It is now time to turn to impact and results. The last two years have seen a strong growth in scaled-up action with new mechanisms like the Adaptation Fund, Clean Technology Fund (CTF), the GEF's Earth Fund, the Pilot Program on Climate Resilience (PPCR) and coalitions of support in the area of forest financing. The financing pledges under the FSF also point to a long list of bilateral programs and projects at the country level. And multilateral, bilateral and NGO resources are supporting the development of low-carbon and climate-resilient strategies, often using different methodologies and approaches. Research should turn to assessing the most promising strategies to achieve transformation on the ground. Given the importance of the country strategies as a foundation for future programming, understanding best practices in developing and implementing these strategies will be important. Critical assessment of innovative tools, like performance-based schemes and payment for environmental services, and the potential for climate budget support operations or sector-wide approaches may set the stage for driving scaled-up results. Given that several multilateral and many bilateral channels will coexist, benchmarking of the quality of their contributions could speed up institutional learning and innovation while providing accountability through measurement.

Leveraging the Private Sector. Whatever the sources of public finance, given the scale of the challenge, maximizing private investment in low-carbon and climate-resilient solutions will be essential. Further development of risk mitigation or revenue enhancing instruments that can crowd-in private capital that otherwise would not invest will be on the agenda. A number of proposals are being developed, originating from thought leaders like those involved with Project Catalyst, the P-8 and the World Economic Forum, and building on in-

novations in the International Finance Corporation of the World Bank and other MDBs. Players in the carbon market space are developing proposals to keep the market in place until international regulatory uncertainty is reduced. Given the need to deploy public sector funds for these instruments, the research agenda should focus on assessing the most cost-effective strategies to maximize leverage while ensuring integrity of public funds.

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Reducing Deforestation

Why Forests Matter. The maintenance of forests is an essential element to addressing climate change. Forests store approximately 25 percent of the carbon in the terrestrial biosphere and the destruction of these forests is responsible for between 12 percent and 17 percent of greenhouse gas emissions currently released into the atmosphere each year—roughly the same amount produced by the entire global transportation sector.[16] More than 1.6 billion people around the world depend to varying degrees on forests for their livelihoods, of which an estimated 60 million are indigenous people that are almost completely dependent on forests.[17]

In considering the main drivers of deforestation—agricultural expansion, logging and infrastructure development—it becomes clear that the key issue is the lack of economic incentives to undertake forest management. Under current conditions, forests often appear to be worth more when harvested rather than preserved; this sentiment is especially true in least-developed countries that rely heavily on the forest product industry for economic growth, on wood for heating and cooking and on land for grazing.[18]

About REDD+. REDD+ refers to the reduction in emissions from deforestation and forest degradation, with the "plus" indicating the inclusion of conservation, sustainable management of forests and enhancement of forest carbon stocks. The concept behind REDD+ is to implement an incentive structure that changes the way forest resources are used by creating financial value for the carbon stored in trees and incentivizing forest management.[19]

Any REDD+ agreement will need to deal with its high costs and the links with climate change finance are therefore critical. The governance and structure of a REDD+ mechanism and MRV to ensure all countries are adhering to agreements and to manage policies more effectively. Governance is especially important because governments have only limited control over the main drivers of deforestation. Poor governance could lead to "leakage," for example, where reducing deforestation in one place might lead to increased deforestation in another place. And REDD+ must be undertaken in a socially responsible way that is cognizant of the potential impacts forest action might have on the millions of people who depend on them. It was largely agreed upon in Copenhagen that communities, and in particular indigenous communities, are brought into the decision-making process for REDD+.[20]

The provisions behind REDD+ have been developed through several recent parallel activities to the UNFCCC negotiations: The UN-REDD Programme, the Forest Carbon Partnership Facility (PCPF), the Forest Investment Program (FIP) and the REDD+ partnership.

The UN-REDD Programme, a collaboration between the U.N., UNEP and the FAO, was launched in 2008 in an effort to assist developing countries in the preparation for implementing REDD strategies. The program's policy board has currently approved $42.6 million for eight program pilot countries. The Forest Carbon Partnership Facility (FCPF) was launched following the 2007 Bali climate negotiations. It is a global partnership, facilitated by the World Bank, which through the Readiness Fund and the FCPF Carbon Fund, support the preparation of national REDD+ strategies as well as piloting and testing. The World Bank and regional development banks also support developing countries' efforts to preserve forests through the FIP with a current level of pledged financing at $558 million.

The core objective of the REDD+ Partnership, formed following the Oslo Climate and Forest Conference in May 2010, is to serve as an *interim* platform for the partners to scale-up REDD+ actions finance. In the five months since its inception, developed country partners have pledged $4 billion in initial public financing over the 2010-12 period, as a component of their collective fast start fund agreements in the Copenhagen Accord; the United States recently committed $1 billion toward the partnership.[21]

What to Watch in Cancun

Building on Momentum. Among the building blocks under negotiation in Cancun, REDD+ seems to offer the highest degree of consensus and therefore is one of the more likely possibilities for agreement in Mexico. Yet here again it is not clear that the United States would sign on to a REDD+ deal in the absence of a balanced package, despite its own commitment to the issue of forests. Even in the absence of an agreement, some forest nations seeing the significant funding already coming from bilateral sources may be less inclined to push for a REDD+ deal in Cancun if it means compromising on other agenda items. With or without an agreement, political and programmatic momentum on REDD+ is significant, in both the formal channels of the UNFCCC as well as those parallel channels discussed above. Forward movement on forestry can make a positive contribution to emission reductions by testing the effectiveness of strategies in this complex sector, developing new approaches for payment of environmental systems and breaking ground by showing MRV in practice.

Beyond Cancun

From Forests to Landscapes. Until recently, climate negotiations have focused mainly on deforestation and not on other related sources of greenhouse gas emissions—agriculture and land use changes. About 15 percent of global greenhouse gases come from agricultural and land use practices. Strategies aimed at soil carbon sequestration, for example through improved crop and grazing management and restoration of degraded lands, will yield mitigation benefits but also contribute to enhanced agricultural productivity. The benefits for poor small farmers would be especially important, particularly if their efforts would be recognized in the carbon markets. In addition, these same improved agricultural practices will build in resilience to the impact of climate change, which is again critical for the rural poor. Like REDD+, issues of monitoring and verification will be

complex. Approaches that consider landscapes more broadly and provide a more coherent strategy linking land use changes with forests and agriculture will be important. Financing, and in particular consideration of soil carbon into emerging carbon markets, could offer important incentives.

Innovation and Technology

From Transfer to Innovation. Technology has a long history in international discussions. In the past, when technologies were developed primarily in the OECD countries, the locus of these discussions was "technology transfer" from those who had it to those who did not. While this traditional approach to technology transfer carried with it a large amount of overall support from both the developed and developing worlds, challenges arose in the details of execution. Payment, ownership and intellectual property rights were just a few of the obstacles to developing a robust technology transfer regime. Today, with innovative capacity and technological expertise spread more broadly across the developed world, emerging economies and even some developing countries, the more pressing question with technology has shifted away from this unidirectional flow of knowledge and devices. Instead, the major obstacles to technological development are now institutional and include: access to capital and financing, access to markets and the integration of entrepreneurial risk takers with technical experts. Any new technological initiative within the climate change negotiations should address these new areas.

Negotiators at COP15 in Copenhagen were fairly close to an agreement on technology and the main outlines of this agreement have been refined for consideration at Cancun. The so-called Technology Mechanism is currently conceived as having two dimensions. The first dimension is a Climate Technology Center and Network (CTCN), which would likely involve a physically based center for climate technology research. The second dimension is a Technology Executive Committee (TEC) that would serve as the governing board for the CTCN and would perhaps have other political functions in convening participants and setting technology strategy.

Important parallel efforts are underway outside of the formal negotiations. The July 2010 Clean Energy Ministerial hosted by the United States brought together 23 countries and the European Union and resulted in establishment of a series of technology partnerships. These ranged from an action group on carbon capture and storage, establishment of clean energy solution centers, an electric vehicle initiative, and initiatives related to smart grids, wind, solar, and hydropower and energy efficiency.[22] Specialized knowledge centers are being implemented like the Global Carbon Capture and Storage Institute.[23] The Consultative Group on International Agricultural Research is redirecting its research to include a focus on agriculture and climate change.[24] Another example is the Asia Pacific Partnership on Clean Development and Climate which has for several years provided a framework for collaboration on a number of different energy technologies for the U.S., Canada, Korea, Japan, Australia, India and China.

What to Watch in Cancun

While some consensus appears to exist over this two-part Technology Mechanism, important obstacles remain before agreement. The exact remit of the CTCN is not settled—for example, should it be a single location, or virtual, or spread across several countries? What is the niche of the CTCN with respect to existing research

infrastructure in universities, national laboratories and the private sector? Who will provide funding for the CTCN and for what purposes? Similarly, questions remain about the mandate for the TEC. Complicating the picture are the widely divergent views on how to understand technology and how government—in this case international institutions—can most effectively encourage the development of new technologies. This latter question may well be sidelined as negotiators in Cancun try to find common ground by focusing on the "plumbing" and not the substance of the Technology Mechanism.

Beyond Cancun

Negotiators are holding out some hope that an agreement can be reached at Cancun. However, even if this round of negotiations does not produce a decision on technology, the topic has attracted considerable support over the past few years—with some reason. Compared to the contentious and divisive issues related to equitable sharing of emissions reduction burdens, technology provides a relatively benign platform around which the different interests in the climate change negotiations can gather. It represents, therefore, a one element of the "positive" reframing of climate issues discussed earlier. Developed countries, key emerging economies, oil producers and the least developed countries can all see potential benefits from increased technological cooperation. Technology, therefore, will continue to attract both attention and funding.

The central question with technology cooperation, however, is how best to situate this collective interest in an international institution, or indeed whether any international institution will be able to foster innovation more effectively than domestic or private sector initiatives. In short, it is easy to agree that countries should cooperate to fund and develop cutting edge technologies, but substantial questions about financing levels, governance and intellectual property present substantial obstacles to success in any international innovation center. The current negotiations on the Technological Mechanism have only begun to address such questions. Nevertheless, despite this uncertainty, international interest remains high and encouraging institutional innovation in this area could undoubtedly yield benefits if an effective organizational model can be developed. To that end, pursuing multiple models in parallel—in other words, both within the UNFCCC and under other frameworks like the APP or bilateral agreements—could provide some valuable insights as to how best to harness this interest toward developing a viable international strategy to increase the rate of innovation in low-carbon technologies.

Adaptation

The Need to Adapt. While much uncertainty still surrounds the extent of the risks and losses associated with a changing climate, there is growing consensus that unmitigated climate change makes sustainable development impossible. But the impacts of climate change are not distributed evenly. The countries with the least resources and located in the most vulnerable places will be hit hardest. It is estimated that developing countries will bear between 75 and 80 percent of the costs of the damages associated with climate change. And this figure is based on countries reaching the 2 degree Celsius stabilization–an unlikely feat given that the mitigation pledges submitted after Copenhagen are far below the emissions reductions required to meet this target.[25] Without closing this gap, the costs to developing countries could be much greater and threaten to reverse the development progress already achieved.

The estimated costs to effectively adapt to a changing climate are unprecedented even if we were to successfully stabilize global temperature increases within the 2 degrees Celsius scenario. The World Bank estimates adaptation costs under this 2 degrees Celsius scenario to be between $70-100 billion on an annual average over the next 40 years.[26] The current country pledges submitted post-Copenhagen have us on a trajectory at or above 3 degrees Celsius. So unless more can be done to mitigate emissions, the cost of adaptation will likely be much higher. Clearly, adaptation is closely linked with finance and any adaptation action agreed upon in Cancun will inherently depend on at least some progress on climate financing.

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The Copenhagen Accord provides only a mention of the substantive issues that frame the adaptation debate: historical responsibility; the intricate link between climate adaptation and effective development strategies; and the equal allocation of Fast Start Funds between mitigation and adaptation. But building on the earlier Bali Action Plan, COP15 had been making progress on defining an adaptation framework. The latest round of negotiating text has taken up some of this earlier work and seems to have clarified a handful of complicated issues that have historically proven difficult. These issues include: a commitment and acknowledgement to the principles guiding enhanced adaptation action, agreeing that action should be "country-driven, gender-sensitive, participatory and fully transparent;" more clear understanding of "eligible" activities; and a more distinct plan for creating regional centers and networks to facilitate regional level adaptation implementation.[27,28]

What to Watch in Cancun

Institutional Arrangements. Despite progress, many questions still need to be answered regarding operations, organization and financial support. Developing and developed countries have differing views on what are the appropriate institutional arrangements for adaptation. Many developing countries have requested a new, less fragmented adaptation governance structure and have proposed the creation of an adaptation committee, advisory committee or subsidiary body for adaptation. Many developed countries, on the other hand, prefer to keep the framework within current structures.

Insurance Mechanisms. A second and more controversial issue that will need to be addressed is that of an international insurance mechanism. Given the concern for increased frequency and severity of extreme weather events, effective adaptation will require risk management as well as compensation for loss and damages from the gradual onset of climate change. The Alliance of Small Island States (AOSIS) has made this element a primary demand for the adaptation framework; and other developing countries are also pushing for the establishment of such a mechanism. From the developed country perspective, there is concern of incalculable future costs and these countries are instead agreeing to recognize "the need to strengthen international cooperation and expertise

to address [social, economic and environmental] loss and damage associated with climate change impacts…;"[29] but do not go as far enough to say that one should be established in the next round of negotiations.

Resource Allocation. Not all barriers to agreement stem from differing views between developed and developing countries. Some developing countries, for example, are concerned with the recent prioritization of certain vulnerable countries.[30] The Copenhagen Accord, in calling for enhanced action on adaptation, listed least developed countries, small island developing states and Africa as being "particularly vulnerable." This wording excludes many developing countries that are also threatened by the potentially devastating impacts of climate change. Afghanistan and Tajikstan call for greater attention to mountainous regions, and others, such as Pakistan, Guatemala and Grenada, question this new definition of vulnerability.

While these issues represent significant barriers to agreement, by far the most significant, and most challenging will be that of adaptation finance arrangements. Effective adaptation efforts require predictable, reliable and adequate financing and will be a key element of negotiations in Cancun.

Beyond Cancun

Adaptation as a Development Challenge. Poor countries are already struggling with the adaptation challenge, whether it is Bangladesh threatened by increasing impacts of floods, changing drought and flood patterns in African nations, or small island states whose very existence is threatened. The scope of the problems requires more than isolated project-based responses. Instead, it will require solutions that build resilience into the fabric of the country and local development agendas, at both the macro and sectoral levels. Research should include assessing strategies for integration of adaptation and resilience into development strategies, building on the case studies now underway in programs such as the Pilot Program for Climate Resilience as well as capacity building interventions such as those supported by the Adaptation Fund.[31] It should turn to assessing whether the emerging Adaptation Framework and the governance and funding criteria and modalities are achieving results at scale. The resilience agenda will also be closely linked to disaster prevention and education strategies, which impart new knowledge and skills for making informed decisions about how to adapt individual lives and livelihoods as well as ecological, social or economic systems in a changing environment.[32] As the social impacts of climate change become more acute, understanding strategies for building resilience of vulnerable groups and the links to conflict and displacement in fragile states will also be important.

Looking Ahead

Given the wide, and perhaps widening, divergence on several key areas, agreement in Cancun on a balanced package that brings together all or some of these building blocks seems uncertain. Indeed, the ongoing UNFCCC negotiations, last year in Copenhagen and the run-up this year to Cancun, have demonstrated that a global climate change deal will not be reached easily or quickly. Is it time to pursue other avenues more vigorously?

In the near term, we are likely to see a world that while still striving for a global deal, will make progress toward emissions reductions through parallel "bottom-up" actions.

Countries will pursue the actions outlined in the Copenhagen Accord with more or less vigor depending on their own calculation of national costs and benefits. Many bottom-up collaborative actions are already emerging, such as the REDD+ partnership framework, bilateral and pluri-lateral technology transfer deals, programs that capitalize on the fast start funding and emergence of local carbon markets. These will contribute, but eventually they will need to be scaled up to get the kind of transformation that is needed to drive down global emissions.

Other international institutions may prove to be useful venues for pursuing agreement on specific issues. Some seek a stronger role for the G-20 to nurture the required leadership at the highest levels, while also tackling discrete parts of the climate puzzle, like removal of fossil fuel subsidies. Others are advocating the use of the Montreal Protocol. And the WTO may be pressed to consider more forcefully the trade-related aspects of climate change—tackling issues such as border taxes, treatment of national subsidies to spur innovation in clean technologies and incentives for trade in environmental goods.

Alternatives to a single global agreement could also be investigated. Alternatives such as discreet sectoral agreements (with REDD+ being the most likely) could be considered. A proposal building on the GATT experience of gradual imposition of international regulations for trade has also been developed for climate change.[33] Transitioning from today's legal framework under the UNFCCC and Kyoto Protocol to alternative modalities will be difficult and contentious, as would be redefining the role of the UNFCCC and its Secretariat.

After Copenhagen, countries are struggling to find a path to harmonize the need for collective action on addressing climate change with the limitations of international negotiation and international institutions. There is no question that the U.N. negotiating process will continue, providing a venue for the full international community to participate in addressing the many facets of climate policy—emissions reductions, technology, adaptation, carbon markets, and the principles and goals that will guide global action. At the same time, ongoing divisions in the U.N. negotiations have underscored not only the scale of the challenge but also the possibility that new tools, more narrowly targeted groups of countries and fresh institutional approaches may be necessary to encourage more aggressive and coordinated action.

Though the past year has been a sobering reminder that the issues will not be easily solved, it is important to remember that just one year ago there was, in fact, substantial global support for action to combat global climate change. The need for action has not changed, and if anything the technological means to address it continues to improve. Therefore, the international community has an opportunity both to make moderate progress through Cancun and beyond and to reframe the elements of climate policy in what might be a more robust set of agreements that serve to set appropriately ambitious goals, solidify norms on climate action, and establish concrete and credible mechanisms to move from goals to outcomes.

Endnotes

1. The text of the Copenhagen Accord is available at: http://unfccc.int/resource/docs/2009/cop15/eng/11a01.pdf
2. US-CAN Network, Tracking on the Copenhagen Accord, available at: http://www.usclimatenetwork.org/policy/copenhagen-accord-commitments
3. See Todd Stern's speech, "A New Paradigm: Climate Change Negotiations in the Post-Copenhagen Era," delivered at the University of Michigan Law School, Ann Arbor, MI. October 8, 2010.
4. See European Commissioner for Climate Action Connie Hedegaard's lecture, "Europe's view on International Climate Policy," delivered at Harvard Kennedy School, Cambridge MA. September 20, 2010.
5. The negotiations are taking place along two tracks: Long-term Cooperative Action (LCA) and extension of the Kyoto Protocol, due to expire in 2012. The United States is not a Party to the Kyoto Protocol.
6. Europe has offered to increase emissions reduction pledge from its current goal of 20-30 percent by 2020 on the conditional that other developed countries' commitments to undertake emissions reductions are comparable to their respective responsibilities and capabilities. Japan is considering reducing emissions by 25 percent by 2020, with a longer-term goal of 80 percent emission reduction from 1990 levels by 2050. http://www.usclimatenetwork.org/policy/copenhagen-accord-commitments, accessed on November 11, 2010.
7. See "Reducing Greenhouse Gas Emissions in the United States Using Existing Federal Authorities and State Action," World Resource Institute, July 2010.
8. See The G-20 Seoul Summit Leaders' Declaration, November 11 – 12, 2010, available at: http://www.seoulsummit.kr/outcomes/index.jsp
9. Brookings Senior Fellow and Policy Director in the Metropolitan Policy program, Mark Muro, outlines this near-term agenda in "Climate and Energy Policy: Reset!" Brookings Up Front Blog, October 21, 2010. See also Steven Hayward, Mark Muro, Ted Nordhaus and Michael Shellenberger, "Post-Partisan Power – How a limited and direct approach to energy innovation can deliver clean cheap energy, economic productivity, and national prosperity," October 2010.
10. See the Leader's Statement: The Pittsburgh Summit, September, 2009 and the G-20 Seoul Summit Leader's Declaration, November, 2010.
11. See Warwick McKibbin, Adele Morris and Peter Wilcoxen, "Comparing Climate Commitments: A Model-Based Analysis of the Copenhagen Accord," The Brookings Institution, May 27, 2010.
12. See Kemal Dervis and Sarah Puritz Milsom, "Development Aid and Financing Global Public Goods: The example of Climate Protection," in *Catalyzing Development: A New Vision for Aid* Brookings-KOICA-JICA, November 2010.
13. http://www.faststartfinance.org
14. See the Report of the Secretary-General's High-level Advisory Group on Climate Change Financing, November 5, 2010. Available at: http://www.un.org/wcm/content/site/climatechange/pages/financeadvisorygroup
15. Carbon dioxide equivalent ($C0_2e$) is Defined by the U.S. Energy Information Administration as the amount of carbon dioxide by weight emitted into the atmosphere that would produce the same estimated radiative forcing as a given weight of another greenhouse gas, such as methane or nitrous oxide. CO_2e is computed by multiplying the weight of the gas being measured by its estimated global warming potential.
16. See Parker, C., Mitchell, A., Trivedi, M., Mardas, N., Sosis, K. The Little REDD+ Book (2009).
17. See United Nations Food and Agriculture Organization, available at: www.fao.org
18. See Manish Bapna, Forests, Climate Change and the Challenge of REDD, World Resource Institute, March 9, 2010.

19. See UN-REDD Programme at www.un-redd.org
20. WRI From Copenhagen to Cancun: Forests and REDD, by Florence Davient, May 17, 2010.
21. http://www.un-redd.org
22. http://www.cleanenergyministerial.org
23. http://www.globalccsinstitute.com
24. http://www.cgiar.org/impact/global/climate.html
25. The Climate Action Network is tracking commitments, available at: http://www.usclimatenetwork.org/policy/copenhagen-accord-commitments, accessed November 10, 2010.
26. See The Economics of Adaptation to Climate Change – A Synthesis Report, the World Bank Group, August 2010.
27. Adaptation From Copenhagen to Cancun, Germanwatch and WWF.
28. AWG-LCA negotiating text, August 2010.
29. *Ibid.*
30. Germanwatch and WWF, 2010.
31. On November 9, 2010 the PPCR Trust Fund Committee approved the first three of nine pilot programs, in Bangladesh, Niger and Tajikistan; with investment programs summing to $270 million leveraging another $705 million. See http://www.climate-investmentfunds.org/cif/
32. See Allison Anderson, "Combating Climate Change through Quality Education," The Brookings Institution, Washington, DC, September 2010.
33. See Antholis and Talbott, in *Fast Forward: Ethics and Politics in the Age of Global Warming*, Brookings Institution Press, Washington, DC, 2010. The authors suggest a General Agreement to Reduce Emissions "GARE" approach which would have GATT-like function for setting rules, channels for arbitration and creating incentives that can be applied to the climate change challenge. The GARE would not be a treaty, but rather an agreement that expands as nations join with their own sufficiently ambitious reduction and compliance targets.

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