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GHG-Framed Mitigation Actions by Developing Countries

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Forty-one developing countries have submitted mitigation actions under the UNFCCC in line with the 2010 Cancun agreements. This paper examines the subset of developing country actions that are framed in GHG terms, with the goal of identifying the GHG impacts that could result from these actions and the accounting questions that would need to be clarified in order to better understand the magnitude of those impacts.

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Introduction

International negotiations on climate change have recognized the importance of enhanced national action on mitigation, and of finance, technology, and capacity-building support to developing countries.[1] Since 2009, a growing number of developed and developing countries have pledged mitigation targets and actions, and developed countries have committed to provide financing to developing countries, including US$30 billion in "fast-start" finance during 2010 – 2012.[2]

WRI has tracked these targets, actions, and pledges since 2009 in an effort to shed light on their implications for greenhouse gas (GHG) emissions and for finance, respectively, and to call attention to data gaps.[3]

This paper summarizes a subset of the mitigation actions announced by developing country parties and submitted to the UNFCCC,[4] focusing on those actions that are framed in GHG terms. While 41 developing countries have put forward actions that take a variety of forms, this summary includes only those 16 countries that have framed their actions in terms of their expected GHG impact, i.e. "GHG-framed mitigation actions." The types of GHG-framed mitigation actions examined in this paper are illustrated in Box 1.

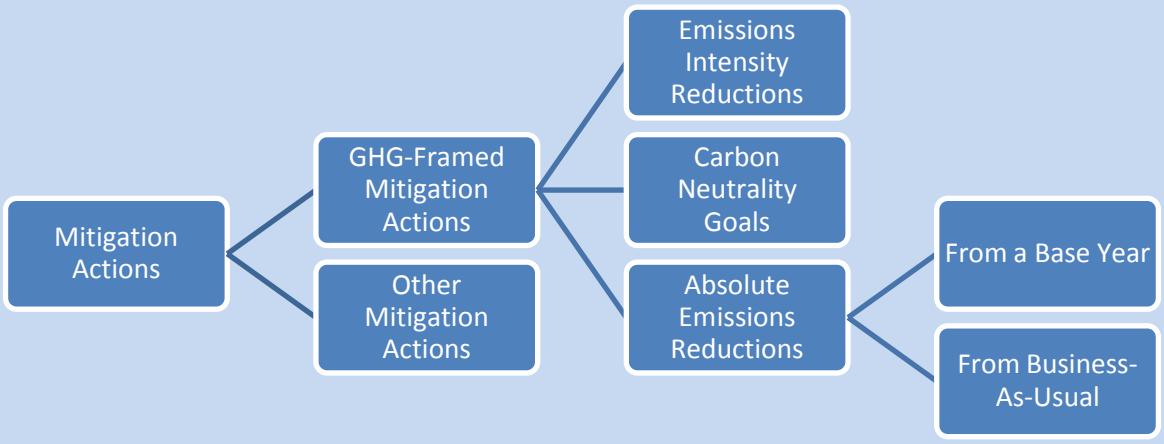
Ultimately, it will be important to understand the GHG impact of all targets and actions that have been pledged internationally. In light of the diversity of forms that developing country actions take, however, we focus first on those that are framed in GHG terms. This approach allows us to identify the accounting and performance-tracking issues common to this form. Additionally, the developing countries that have framed their actions in GHG terms contributed approximately 60 percent of all developing country GHG emissions in the year 2000. [5]

The purpose of this paper is to identify (a) the GHG impacts that could result from the mitigation actions assessed and (b) the accounting questions that would need to be clarified in order to better understand the magnitude of those impacts. It does not attempt to compare the actions to one another or to assess their ambition, adequacy or appropriateness.[6]

This paper builds on a previous summary, released in 2010, that presented actions articulated in the Copenhagen Accord and in other country announcements.[7]

Box 1: Types of Mitigation Actions

Developing countries have put forward a wide range of mitigation actions. This paper focuses on those that are framed specifically in terms of their quantitative effect on GHG emissions. This subset of actions includes actions that would reduce the GHG intensity of the country's economy per unit of GDP (GHG intensity reductions), actions that would make the country carbon neutral (carbon neutrality goals), and actions that would result in an absolute reduction of GHG emissions, either from a historic base year or from a hypothetical business-as-usual scenario. The relationship of these actions to one another is illustrated below, and the tables at the end of this document group countries' actions according to these categories.



Methodology

For each of the actions analyzed, this paper attempts to identify the following information:

- Form of the action (emissions intensity reduction, carbon neutrality goal, or absolute emissions reduction)
- Sectors and gases covered by the action
- Target year national GHG emissions
- Baseline national GHG emissions (whether business-as-usual (BAU) or a base year) and percent difference between target year emissions and baseline emissions
- Current or most recently reported GHG emissions and percent difference between target year emissions and current or recent emissions

The summary draws on the UNFCCC INF.1 document, national communications to the UNFCCC, national climate action plans and other national documentation, and statements by government officials from the countries in question.

Findings

Several countries have considerably enhanced the information available about their GHG-framed mitigation actions since the first version of this summary was prepared in 2009.[8] To more fully understand the GHG impacts of each action and to facilitate countries' ability to track performance, however, additional information is still needed. The data gaps identified in this paper include questions regarding BAU and baseline calculation methodology; clarity in sectors and gases covered by the actions; and provision of finance, technology, and capacity building to countries whose actions are contingent upon international support. Many countries are actively trying to address these issues, and may benefit from enhanced technical support of their efforts.

Box 2: Terms and Definitions

This paper uses the following terms to describe GHG-framed mitigation actions:

- ***Baseline:*** The level of absolute emissions or emissions intensity against which a country's goal is set and tracked. May be expressed as a base year or as BAU.
- ***Base year:*** A historic year against which a country's absolute emissions or emissions intensity goal is set and tracked.*
- ***Business-as-usual (BAU):*** A scenario used to estimate what a country's GHG emissions or emissions intensity would have been in a future year in the absence of enhanced action on GHG mitigation.
- ***Target year:*** The year by which a country's absolute emissions or emissions intensity goal is to be met (often 2020, in the context of this analysis).*

* Adapted from the WRI/WBCSD Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard, available at www.ghgprotocol.org.

Business-As-Usual Scenario. Nine countries have announced plans to reduce GHG emissions relative to a BAU scenario. Of these, seven have specified what they expect emissions would be under the BAU scenario in the target year. This is a significant step forward in determining what these countries' emissions will be in the target year if their actions are achieved. While the methodologies and assumptions used to determine the BAU figure were not reviewed as part of this study, such information would also shed light on the context of each country's efforts.

Sectors and gases. In order to understand the GHG impact of a mitigation action, it is necessary to understand whether the action covers the entire economy, or only a subset of economic sectors. A 20 percent reduction in emissions from a country's energy sector, for example, is not the same as a 20 percent reduction in emissions from a country's entire economy. Likewise, it is necessary to understand which of the six GHGs[9] the action covers; a 20 percent reduction in CO_2 is not the same as a 20 percent reduction in the CO_2 equivalent of all GHGs emitted. Of the 16 countries whose actions were examined for this study, only six have specified the sectors to which their action applies, and only two have specified the gases. This information is needed to understand the GHG impacts of mitigation actions and for countries to be able to monitor implementation and performance against them. For purposes of the tables in this paper, however, the calculations assume that the action applies to all sectors and gases unless otherwise specified.

Other considerations. It is not clear in all cases whether the reductions that result from developing country actions will be used for domestic compliance, sold into an international offset market, or both. This is due in part to the fact that a number of developed countries have not addressed the role that purchased emissions reductions will play in their quantified economy-wide emissions reduction targets.[10] While an assessment of the role of purchased emissions reductions is beyond the scope of this paper, without clear explanation of how countries will account for mitigation actions undertaken as part of an international offset scheme, there is a risk that mitigation effects will be double-claimed.

Another major question emerging from the compilation of country actions relates to the conditions under which these actions would be achieved. Particularly important for developing country actions is the provision of financing and other international support upon which at least seven countries' actions are contingent. Additional information on the support needed to achieve these actions, and on the extent to which such support has been or will be provided, will shed additional light on the likelihood that they will be achieved.

1. Bali Action Plan, available at: http://unfccc.int/resource/docs/2007/cop13/eng/06a01.pdf.
2. Cancun Agreements, available at: http://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf.
3. WRI's analysis of Annex 1 emissions pledges can be found at http://www.wri.org/publication/comparability-of-annexi-emission-reduction-pledges, and WRI's analysis of initial "fast-start" pledges can be found at http://www.wri.org/publication/summary-of-developed-country-fast-start-climate-finance-pledges.
4. These actions are recorded in the UNFCCC document *Compilation of information on nationally appropriate mitigation actions to be implemented by Parties not included in Annex 1 to the Convention, Note by the secretariat*, dated March 18, 2011 and referred to in this paper as INF.1.
5. Climate Analysis Indicators Tool (CAIT) Version 8.0. (Washington, DC: World Resources Institute, 2011).
6. See UNEP (2010), *The Emissions Gap Report*, available at http://www.unep.org/publications/ebooks/emissionsgapreport/ for an assessment of the collective ambition and adequacy of all pledges articulated in the Copenhagen Accord.
7. See Fransen (2010), *Summary of GHG Reduction Pledges Put Forward by Developing Countries*, available at http://www.wri.org/stories/2009/12/summary-ghg-reduction-pledges-put-forward-developing-countries. Note that earlier versions of this document included actions by Guyana and Thailand, which were announced prior to the 2009 Copenhagen Accord but were not reported to the UNFCCC. Now that the 2011 INF.1 document has been released, we have elected to evaluate only the actions noted therein.
8. For example, several countries have clarified their estimated future emissions under a BAU scenario.
9. The six GHGs regulated by the Kyoto Protocol are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).
10. See http://www.wri.org/publication/comparability-of-annexi-emission-reduction-pledges.

Table 1 | Emissions Intensity Reductions

	Intensity Change Relative to Base Year					Emissions Change Relative to Base Year				
	Change	Baseline		Target		Change	Baseline		Target	
	%	Year	Amount (kgCO2e/ Unit GDP)	Year	Amount	%	Year	Amount ($MTCO_2e$)	Year	Amount ($MTCO_2e$)
China	-40 to -45%	2005	N/A[1,2]	2020	N/A	N/A	N/A	N/A	2020	N/A
India	-20 to -25%	2005	.05621 $kgCO_2e$/ Rs	2020	.0422 - .0450 $kgCO_2e$/ Rs	+145 to +195%	2005	1433	2020	3,512 to 4,221[3]

Table 2 | Carbon Neutrality Goals

	Net Change				
	Change	Target Level		Recent Level[4]	
	%	Year	Amount ($MTCO_2e$)	Year	Amount ($MTCO_2e$)
Costa Rica	-100%	2021	0	2005	8.6
Maldives	-100%	2020	0	1994	0.1

Table 3 | Absolute Emissions Reductions from a Base Year

	Change Relative to Baseline					Change Relative to Recent Level		
	Change	Baseline		Target		Change	Recent Level	
	%	Year	Amount ($MTCO_2e$)	Year	Amount ($MTCO_2e$)	%	Year	Amount ($MTCO_2e$)
Antigua and Barbuda	-25%	1990	0.3	2020	0.225	-25%	1990	0.3
Marshall Islands	-40%	2009	N/A	2020	N/A	N/A	N/A	N/A
Republic of Moldova	-25%	1990	41.2	2020	30.9	+294%	2005	10.5

Covered Sectors	Covered Gases	Additional Observations
While China has not specified the sectoral scope of its intensity reduction, it has communicated examples of policies for achieving this goal, such as energy pricing policies.	CO_2	Action is a decision from the Standing Committee of China's State Council and is domestically binding, but is characterized as voluntary in the March 2011 Compilation of information on nationally appropriate mitigation actions by the secretariat of the UNFCCC (INF.1 doc). In March 2011, China announced dual goals of reduction of energy intensity by 16% and carbon intensity by 17% during the 12th Five Year Plan period (2011-2015).
Limited to the following sectors: power, transport, buildings, and forestry. Agriculture is excluded.	Not specified	Action is voluntary and not legally binding. A compilation of 5 modeling studies published by the Indian government indicated that CO_2 intensity would fall 24% to 59% between 2005 and 2030 absent new GHG mitigation policies.

Covered Sectors	Covered Gases	Additional Observations
On a preliminary basis, Costa Rica has communicated that its mitigation efforts will be focused on the transport, energy, forestry, and waste sectors.	Not specified	The entire scope of Costa Rica's action is voluntary and contingent upon support from the international community.
Not specified	Not specified	Action is voluntary and unconditional.

Covered Sectors	Covered Gases	Additional Observations
Not specified	Not specified	
Not specified, but the Marshall Islands has communicated that the goal will be achieved through measures in the energy sector such as increasing end-user efficiency and the supply of local renewables.	CO_2	Action is subject to the provision of international support. Baseline data will be included in the national communication to be submitted in 2011.
Limited to the following sectors: energy, transport, agriculture, forestry, and waste.	Not specified	Action will be met through implementation of "global economic mechanisms focused on climate change mitigation."

Table 4 | Absolute Emissions Reductions from Business-as-Usual

	Change Relative to Baseline				Change Relative to Recent Level		
	Change	BAU Emissions[5]	Target		Change	Recent Level	
	%	Amount ($MTCO_2e$)	Year	Amount ($MTCO_2e$)	%	Year	Amount ($MTCO_2e$)
Brazil	-36.1 to -38.9%	2703	2020	1651 to 1728	-21 to -25%	2005	2191.9
Chile	-20%	N/A	2020	N/A	N/A	1994	45.7
Indonesia	-26%	2950	2020	2183	+22%	2005	1791.4
Israel	-20%	109	2020	88	+16%	2007	76.8
Mexico	Up to -30%	882	2020	617.4	-14%	2006	715
Papua New Guinea	At least -50%	99 to 141	2030	49.5 to 70.5	-50 to -14%	2010	82 to 99
	-100%	99 to 141	2050	0	-100%	2010	82 to 99
Republic of Korea	-30%	813	2020	569	-4%	2005	594
Singapore	-16%	N/A	2020	N/A	N/A	2000	38.8
South Africa	-34%	≈800	2020	≈530	+20%	2003	440
	-42%	≈800	2025	≈460	+5%	2003	440

Covered Sectors	Covered Gases	Additional Observations
Brazil's quantitative goal is the sum of actions focusing primarily on the land use, agriculture and ranching, and energy sectors.	Not specified	Action became law when Brazilian Law 12.187 was signed in December 2009, but is characterized in the INF.1 doc as "voluntary" and as the "expected" GHG impact if 11 specific actions are implemented.
Limited to the following sectors: energy and LULUCF.	Not specified	Chile's BAU as projected from the year 2007. The methodology for calculating Chile's BAU is currently unspecified. In order to accomplish its objective, Chile "will need an appropriate level of international support."
Limited to the following sectors: energy, LULUCF, and marine and fisheries.	Not specified	The -26% action is unilateral. Indonesia has also put forward a -41% action contingent on international support. Only the -26% action is included in Appendix II of the Copenhagen Accord, and only the 26% action is included in the March 2011 INF.1 document, although the -41% action with international support is reiterated in a presentation during the April 2011 Bangkok meetings.
Not specified, but Israel has communicated that the goal would be achieved primarily through increasing renewable energy supply and reducing electricity demand.	Not specified	
Limited to the following sectors: energy, waste, and agriculture, forestry, and other land use.	Not specified	The 617.4 $MTCO_2e$ figure is from the calculation of a 30% reduction from Mexico's BAU estimate of 882 $MTCO_2e$; Mexico has publicly referenced a target of 618 $MTCO_2e$. In addition to its 2020 goal, Mexico has indicated it would retain its long-term "aspirational" goal to reduce emissions by 50% from 2000 levels by 2050. Action is contingent on "adequate" financial and technological support from developed countries.
Not specified	Not specified	Action is "preliminary and conditional."
Not specified, but the Republic of Korea has communicated possible strategies including measures in the electricity sector.	Not specified	Prior to COP-15, President Lee Myung-Bak framed the target as a voluntary, unilateral measure.
Not specified, but Singapore has mentioned possible strategies including improved energy efficiency and sustainable transport.	Not specified	Action is "contingent on a global agreement in which all countries implement their commitments in good faith."
Not specified, but South Africa has communicated that one possible set of actions for achieving this goal would target the energy, transport, LULUCF, waste, industry, and housing sectors.	Not specified	South Africa's Long-Term Mitigation Scenarios note BAU emissions of 1500 to 1600 $MtCO_2e$ in 2050, and a chart in the same document appears to indicate BAU emissions of approximately 800 $MtCO_2e$ for 2020 to 2025, although no specific number is given. Implementation depends on finance, technology, and capacity-building support from developed countries.

Notes for Tables 1 – 4

1. "N/A" indicates that the information was not available at the time of publication.
2. The Chinese government has not yet released base year intensity or emissions numbers. Independent calculations of China's emissions and intensity levels can be found in the publication *China's Carbon Intensity Goal: A Guide for the Perplexed* (available at www.chinafaqs.org/library/chinafaqs-chinas-carbon-intensity-goal-guide-perplexed).
3. These numbers are calculated based on a 20-25% reduction in emissions intensity from 2005 levels, using GDP calculations from *Low Carbon Strategies for Inclusive Growth: An Interim Report* based on 8% and 9% GDP growth rates. While India notes its official intensity target as 20-25% below 2005 intensity levels, *Low Carbon Strategies for Inclusive Growth: An Interim Report* estimates India's 2020 emissions levels at anywhere from 3017 $MTCO_2e$ to 4016, $MTCO_2e$, which equates to a 24% to 34% reduction in intensity from 2005 levels.
4. This summary presents recent emissions levels, including LULUCF/LUCF, based on national communications submitted by each country to the UNFCCC, or, when available, on more recent estimates published by the government of the country in question. The inclusion of LULUCF/LUCF is assumed unless otherwise noted in the column on sectoral coverage. National communications data detailed by Party can be found at http://unfccc.int/di/DetailedByParty.do.
5. This summary presents the estimated BAU level identified by the country in question, without evaluating the robustness of the estimate. It does not consider BAU estimates presented by other sources. If the country has not specified its BAU estimate, this summary lists it as "N/A."

References for Tables 1 – 4

Antigua and Barbuda: Information regarding Antigua and Barbuda's action is from INF.1; information on 1990 emissions levels is from Antigua and Barbuda's National Communication to the UNFCCC, available at www.unfccc.int.

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