

The Fight Against Global Warming: Progress Made and Priorities for a Successor to the Kyoto Protocol*

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Résumé

En 1990, le Groupe d'experts intergouvernemental sur l'évolution du climat (GIEC) concluait que la température moyenne sur Terre augmentait et qu'au rythme actuel elle continuerait d'augmenter de façon alarmante durant tout le vingt-et-unième siècle. Le GIEC revint à la charge en 2007, concluant que le réchauffement de la planète était « sans équivoque » et que les activités étaient « très probablement » à l'origine de ce réchauffement climatique.

Abstract

In 1990, the Intergovernmental Panel on Climate Change (IPCC) concluded that the average temperature of the planet was rising and would keep on rising at an alarming rate during the twenty-first century. In 2007, the IPCC concluded that the warming of the Earth's climate system is “unequivocal” and that human activities are “very likely” the cause of this warming.

The fear of seeing green house gas (GHG) concentrations in the atmo-

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La crainte de voir les concentrations de gaz à effet de serre (GES) atteindre un niveau causant une interférence dangereuse avec le système climatique de la Terre a mobilisé la communauté internationale, rassemblée au Sommet de la Terre de 1992, à s'attaquer aux changements climatiques. Premier pas de cette démarche: la signature à pareille date de la Convention cadre des Nations unies sur les changements climatiques (CCNUCC).

Le Protocole de Kyoto fut ensuite adopté en 1997: ce dernier impose aux pays développés des obligations juridiquement contraignantes de réduire leurs émissions de GES. Le Protocole de Kyoto s'appliquant à la période d'engagement 2008-2012, les pays se concentrent présentement à négocier un successeur au Protocole de Kyoto qui imposera des obligations de réduction d'émissions de GES au-delà de 2012.

L'article qui suit résume les négociations internationales entourant les changements climatiques depuis leurs débuts jusqu'au mois de mars 2012 et met en évidence les principaux défis auxquels fera face la communauté internationale dans un avenir rapproché. Les obstacles que les négociations actuelles devront surmonter à court et moyen termes concernent notamment l'extension du Protocole de Kyoto (et de son éventuel successeur) aux forêts et à l'agriculture et les besoins des pays en développement en matière de financement international et de transferts technologiques dans leur lutte contre les changements climatiques.

sphere reach a level that could cause dangerous interference with the climate system brought the international community together to tackle global warming at the 1992 Earth Summit, during which the United Nations Framework Convention on Climate Change was signed (UNFCCC).

The Kyoto Protocol was adopted in 1997 and imposes legally-binding GHG emission reduction obligations upon developed countries. The Kyoto Protocol being applicable to commitment period 2008-2012, countries are currently negotiating a successor accord that would impose GHG emission reduction obligations beyond 2012.

The current article summarizes international negotiations surrounding climate change since their inception up to March 2012 and highlights some of the main challenges facing the international community in the near future. Challenges that must be overcome include the applicability of the Kyoto Protocol (and any successor accord thereto) to agriculture and forestry and increasing international financing and technology transfer that aim to help developing countries mitigate climate change.



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In the mid-1980s, scientists began to warn that increasing emissions of greenhouse gases (GHGs) would, or at least could, cause the climate to warm. Governments responded by establishing the Intergovernmental Panel on Climate Change (IPCC) in 1988 which was tasked with assessing the magnitude, timing and possible impact of climate change caused by human activity. In 1990, the IPCC published its first assessment report, which concluded that based on a “business as usual” scenario, the average temperature of the planet would rise by an average of 0.3 degrees Celsius per decade during the twenty-first century¹. However, according to the IPCC another decade would need to pass before undisputedly detecting the enhanced greenhouse effect.

In its Fourth Assessment Report on climate change, published in 2007, the IPCC concluded that the warming of the Earth’s climate system is “unequivocal” and that human activities are “very likely” the cause of this warming².

Global GHG emission levels are still growing and are projected to continue growing over the coming decades³. Key drivers of GHG emissions include economic growth, population growth and technological progress, along with consumption and production patterns⁴.

Climate change manifests itself in various ways. Temperature increases can generate extreme heat waves, changes in infectious disease transmissions, as well as increased seasonal production of allergenic pollen. An increase in the frequency and intensity of extreme weather events (such as hurricanes, typhoons, floods, droughts and heavy precipitation) has also been observed⁵. Temperature increases can also alter agricultural and forestry management practices through earlier spring planting of crops and changes related to fires and pests affecting forests and result in earlier

¹ John H. KNOX, “The International Legal Framework for Addressing Climate Change”, (2004) 12 *Penn St. Envtl. L. Rev.* 135, at 1 [hereinafter “Knox, CC Framework”].

² WTO & UNEP, *Trade and Climate Change – a WTO-UNEP Report* (2009), at p. vii, online: <http://www.wto.org/english/res_e/booksp_e/trade_climate_change_e.pdf> (accessed Nov. 11, 2012) [hereinafter “WTO-UNEP Trade & CC 2009”].

³ *Id.*

⁴ UNCTAD, *Trade and Development Report*, UNCTAD/TDR/2009 (2009), at p. 135, online: <<http://unctad.org/en/Pages/Publications/TradeandDevelopmentReport.aspx>> (accessed Dec. 1, 2012) [hereinafter “UNCTAD TDR 2009”].

⁵ WTO-UNEP Trade & CC 2009, *supra*, note 2, at p. 13.

leaf-unfolding, bird migration and egg-laying. Seasonal and regional changes in precipitation can also be linked with the climate system warming, leading to floods in some parts of the world while causing droughts in other parts of the world⁶. The warming of the climate system has also led to rising sea levels which in turn have contributed to losses of coastal wetlands and mangrove swamps and to an increase in damage caused by coastal flooding⁷.

Measures and actions taken in respect of climate change can be organized into two broad categories: adaptation and mitigation. On one hand, adaptation measures mainly relate to addressing impacts of global warming that have become unavoidable and that are already being experienced or that have a high probability of occurring within a relatively short time-frame. Adaptation measures aim at attenuating the negative impacts of climate change or exploiting its potential beneficial effects and at increasing the ability of people or natural systems to cope with the impacts of climate change⁸.

On the other hand, mitigation measures aim to reduce the volume of accumulated GHG emissions and their associated impacts in the future, thereby reducing or avoiding the “worst-case” climate change scenarios. In order to reduce GHG emissions, mitigation measures intend, notably through technological change and substitution, to shift global production and consumption patterns towards the use of more climate-friendly primary commodities, production equipment and consumer goods; mitigation measures also intend to enhance carbon sinks, such as forests and oceans, that sequester carbon⁹. This distinction between adaptation and mitigation is not airtight: often times adaptation measures also serve mitigation purposes and vice versa. The current article will focus on actions and measures primarily intended to mitigate climate change.

The difficulty of predicting how the Earth’s non-linear climate system will react to continually increasing GHG levels has raised fears of crossing a “tipping point”: a critical threshold that, once reached, may introduce a

⁶ *Id.*, at p. 9 to 11.

⁷ *Id.*, at p. 11; UNCTAD TDR 2009, *supra*, note 4, at p. 133, 135 and 137.

⁸ UNCTAD TDR 2009, *supra*, note 4, at p. 133; WTO-UNEP Trade & CC 2009, *supra*, note 2, at p. 24 to 25.

⁹ *Id.*

new phase characterized by significant climate changes, and a point of no return upon which irreversible climate impacts are set into motion.

The fear of seeing GHG concentrations in the atmosphere reach a level that could cause dangerous interference with the climate system brought the international community together to tackle global warming at the 1992 United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro (also known as the Earth Summit), during which the United Nations Framework Convention on Climate Change¹⁰ was opened for signature. The stated objective of the UNFCCC is to stabilize “greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system” (Article 2 of the UNFCCC). This same fear led the international community to adopt a precautionary approach and to enshrine it within Article 3.3 of the UNFCCC, whereby countries pledge to take measures to anticipate, prevent or minimize the causes and adverse effects of climate change on the basis of threats of serious or irreversible damage notwithstanding lack of scientific certainty¹¹. Part II of the current article summarizes the essential steps taken by the international community through multilateral agreements on climate change.

Agriculture is particularly vulnerable to the short-term and long-term effects of climate change and must quickly adjust to it; this sense of urgency is underlined by food security and productivity concerns. Agriculture is also responsible for an important amount of GHG emissions, while at the same time showing great potential for climate change mitigation.

The forestry sector is closely linked to agriculture as deforestation, which contributes in an important way to GHG emissions, most frequently occurs when forests are converted into agricultural land. Moreover, forests constitute the world’s greatest natural carbon sinks. Part III will focus on agriculture and forestry as key areas to be addressed in any successor agreement to the Kyoto Protocol.

Part IV of this article will focus on international financing of – and technology development and transfer for – climate change adaptation and

¹⁰ *United Nations Framework Convention on Climate Change*, May 9, 1992, (entered into force March 21, 1994), 1771 U.N.T.S. 107 [hereinafter “UNFCCC”].

¹¹ *WTO-UNEP Trade & CC 2009*, *supra*, note 2, at p. 69.

mitigation actions undertaken by developing countries as priority needs in the fight against climate change.

I. Multilateral Agreements on Climate Change

A. First IPCC Report and Earth Summit

The first indication that the international community was keenly aware of its role to protect the environment can be traced back to the Stockholm Declaration of the United Nations Conference on the Human Environment in 1972, which underlines the necessity of cooperating at an international level “to effectively control, prevent, reduce and eliminate adverse environmental effects”¹².

The international community further recognized the global nature of environmental problems by convening the World Commission on Environment and Development in 1983, also known as the Bruntland Commission (given the name of its Chair Gro Harlem Bruntland). The Bruntland Commission produced a report published in 1987 entitled *Our Common Future* (also known as the Bruntland Report)¹³, which strengthened the need to find multilateral solutions to global environmental problems and also put forth a well-known definition of sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”¹⁴.

On the climate change front, and as mentioned in the Introduction to the current scoping paper, the call for action voiced by scientists led to the establishment of the Intergovernmental Panel on Climate Change (IPCC)

¹² “Principle 24 of the Declaration of the United Nations Conference on the Human Environment”, *Report of the United Nations Conference on the Human Environment*, Stockholm, June 5-16 1972 (United Nations publication, Sales No. E.73.II.A.14 and corrigendum), chap. I.

¹³ UNITED NATIONS WORLD COMMISSION ON ENVIRONMENT AND DEVELOPMENT, “Report of the World Commission on Environment and Development: Our Common Future”, Published as Annex to General Assembly document A/42/427, Development and International Co-operation: Environment, Oxford, Oxford University Press, 1987, online: <<http://www.un-documents.net/wced-ocf.htm>> (accessed Nov. 11, 2012) [hereinafter “*Bruntland Report*”].

¹⁴ *Id.*, Part I, Chapter 2, at para. 1.

in 1988 which was tasked with assessing the magnitude, timing and possible impact of climate change caused by human activity. Its first report, published in 1990, heightened the attention paid to climate change around the world and raised the stakes of idleness. On December 11, 1990, the Intergovernmental Negotiating Committee for a Framework Convention on Climate Change was created.

The Brundtland Commission and the IPCC paved the way for the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro in June 1992 (also known as the Earth Summit). Sustainable development and climate change converged during the Earth Summit.

Sustainable development objectives and concerns were voiced through the Rio Declaration on Environment and Development, while climate change led to the adoption of the United Nations Framework Convention on Climate Change (UNFCCC) on May 9, 1992. The UNFCCC was opened for signature during the Earth Summit, where it received 155 signatures. The UNFCCC entered into force on March 21, 1994 and the number of signatory countries has since then reached 192.

B. The UNFCCC

The UNFCCC contains few legally-binding obligations and does not set GHG emission reduction targets. The key feature of the UNFCCC lied in its laying the groundwork for further multilateral cooperation in order to mitigate climate change. As mentioned in the Introduction of the current scoping paper, the goal of the UNFCCC is to avoid dangerous interferences of man-made GHG emissions with the climate system. In meeting this objective, the UNFCCC calls upon countries to act despite lack of scientific certainty regarding the adverse effects of climate change (known as the precautionary principle), which aimed to prevent countries from using scientific uncertainty as an excuse to forestall the adoption of climate change mitigation policies.

The UNFCCC requires that each signatory country: (i) report on its sources and sinks of GHGs; (ii) implement national programmes destined

to mitigate climate change; (iii) report on its implementation of the UNFCCC and (iv) cooperate internationally in the study of climate change¹⁵.

The UNFCCC imposes additional obligations to two groups of countries: OECD-member countries as of 1994 and EIT¹⁶ countries. These countries are altogether identified as “Annex I countries” and the OECD-member countries as of 1994 are further designated as “Annex II countries”.

Each UNFCCC Annex I country must limit its anthropogenic GHG emissions, protect and enhance its GHG sinks and reservoirs and report detailed information regarding its GHG emission reduction efforts, its resulting projected anthropogenic GHG emissions by sources and its GHG removals by sinks¹⁷.

In addition, UNFCCC Annex II countries must: (i) pay reporting costs incurred by developing countries; (ii) assist developing countries particularly vulnerable to the adverse effects of climate change (e.g. small island states) with adaptation costs; and (iii) “take all practicable steps to promote, facilitate and finance, as appropriate, the transfer of, or access to, environmentally sound technologies and know-how” to other countries¹⁸.

The UNFCCC also created an institutional framework to stimulate an ongoing dialogue between UNFCCC signatories with a view to adopt protocols that would set binding GHG reduction obligations: the “conference of the parties” (COP), in which all UNFCCC signatory countries would be members and each have a vote.

¹⁵ J. H. KNOX, *supra*, note 1, at 2.

¹⁶ Economies in transition (most notably Russia and Eastern European countries formerly members of the Soviet bloc).

¹⁷ UNFCCC, *supra*, note 10, art. 4.2.

¹⁸ *Id.*, art. 4.3 to 4.5.

C. Important COP meetings: from Berlin (1995) to Kyoto (1997) to Durban (2011)

1. COP-1, Berlin (1995)¹⁹

The first COP (COP-1) took place in Berlin in 1995. Given that the UNFCCC did not entail mandatory GHG emission reduction targets and concluding that the UNFCCC did not go far enough in this respect, the COP adopted a decision known as “the Berlin Mandate”, a first step towards setting legally-binding GHG emission reductions. In adopting the Berlin Mandate, the COP reiterated principles embedded in the UNFCCC that have permeated climate change negotiations ever since, most notably common but differentiated responsibilities between UNFCCC Annex I countries and other countries²⁰ and the specific needs and concerns of developing and least-developed countries²¹. The Berlin Mandate also underlines the historical responsibility of Annex I countries for the bulk of GHG emissions and the necessity for developing and least-developed countries to pursue their economic growth.

These principles were voiced within the Berlin Mandate as the rationale for the decision of the COP-1 to impose GHG emission reduction targets onto UNFCCC Annex I countries and not onto developing countries.

The Berlin Mandate (COP-1, 1995) set the tone and kick-started the process that would lead to the adoption of a protocol to the UNFCCC wherein legally-binding GHG emission reduction targets for Annex I countries would be included. These negotiations culminated during the third COP (COP-3) which took place in Kyoto in 1997. COP members then adopted what became known as the Kyoto Protocol to the UNFCCC²².

¹⁹ See: IISD, “Summary of the First Conference of the Parties to the Framework Convention on Climate Change: 28 March – 7 April 1995”, (April 10, 1995) 12: 21 *Earth Negotiations Bulletin*, online: <<http://www.iisd.ca/vol12/1221000e.html>> (accessed Nov. 11, 2012).

²⁰ UNFCCC, *supra*, note 10, art. 3.1.

²¹ *Id.*, art. 4.8 to 4.10.

²² *Kyoto Protocol to the United Nations Framework Convention on Climate Change*, December 11, 1997, 37 ILM 22 (1998) [hereinafter “*Kyoto Protocol*”].

2. COP-3, Kyoto and the Kyoto Protocol (1997)²³

Article 3.1 of the Kyoto Protocol represents the single most important provision thereof, as it mandates UNFCCC Annex I countries to reduce, either individually or jointly, their aggregate anthropogenic GHG emissions “by at least 5 per cent below 1990 levels in the commitment period 2008 to 2012”²⁴. UNFCCC Annex I countries must meet this objective while individually remaining below their assigned GHG amounts for commitment period 2008-2012 as established by Annex B to the Kyoto Protocol. These amounts vary from 92% to 110% of GHG emissions produced by Annex I countries back in 1990. Article 3.5 of the Kyoto Protocol allows EIT countries to use 1988 or 1989 rather than 1990 as base year for the reduction of their GHG emissions – a useful alternative for these countries as their GHG emissions were higher during the years prior to 1990²⁵.

Article 3.1 of the Kyoto Protocol is silent with regards to the ways in which UNFCCC Annex I countries can reduce their GHG emissions. COP members were also unable to specify the extent to which UNFCCC Annex I countries could take sinks and joint action (such as emissions trading and joint implementation) into account when meeting their GHG emission reduction targets.

With respect to sinks, antagonistic positions emerged during the negotiations. Plants and oceans act as the most important natural sinks as they reabsorb great quantities of carbon dioxide (CO₂). Endowed with extensive forest areas, countries such as the United States, Canada and Russia would be better positioned to benefit from a rule allowing the GHG emission reductions generated by their forests to count toward their GHG

²³ See: IISD, “Summary of the Third Conference of the Parties to the Framework Convention on Climate Change: 1 – 11 December 1997”, (December 13, 1997) 12: 76 *Earth Negotiations Bulletin*, online: <<http://www.iisd.ca/vol12/enb1276e.html>> (accessed Nov. 11, 2012).

²⁴ *Kyoto Protocol*, *supra*, note 22, art. 3.1.

²⁵ See: UNFCCC, “Decision 9/CP.2: Communications from Parties included in Annex I to the Convention: guidelines, schedule and process for consideration”, *Report of the Conference of the Parties on its second session, held at Geneva from 8 to 19 July 1996 – Addendum – Part Two: Action taken by the Conference of the Parties at its second session*, FCCC/CP/1996/15/Add.1 (October 29, 1996), online: <<http://unfccc.int/resource/docs/cop2/15a01.pdf#page=15>> (accessed Nov. 11, 2012), at para. 5, for base years of Bulgaria, Hungary, Poland and Romania.

targets. On the contrary, many European and Asian countries lack such sinks and balked at allowing GHG reductions therefrom to be counted. Practical and technical obstacles to measuring GHG reductions from sinks, such as distinguishing natural from anthropogenic sinks and counting only GHG reductions due to the latter, only added to the political challenges raised by such a scenario.

COP members finally agreed to allow UNFCCC Annex I countries to account for GHG reductions from certain types of anthropogenic sinks – “afforestation, reforestation and deforestation since 1990”²⁶ – and did not preclude “additional human-induced activities”²⁷ from being included if such decision was reached by the Meeting of the Parties to the Kyoto Protocol. The percentage of the GHG emission reduction target that could be reached through forestry or other activities was not specified in the Kyoto Protocol; this issue later proved to be contentious.

Joint action among UNFCCC Annex I countries and between Annex I and non-Annex I countries also provoked arduous negotiations which ultimately led to the adoption of three main “flexibility mechanisms”: international emissions trading, joint implementation (JI) and the clean development mechanism (CDM).

First, through international emissions trading, the Kyoto Protocol allows trading among any UNFCCC Annex I countries of Assigned Amount Units (AAUs). Each country receives a number of AAUs equivalent to its assigned amount of GHG emissions as per Annex B to the Kyoto Protocol. Very little details are provided by the Kyoto Protocol as to how this trading is to take place.

Second, through JI, the Kyoto Protocol also authorizes an UNFCCC Annex I country to invest in GHG emission reduction or removal projects in another UNFCCC Annex I country in order to obtain GHG Emission Reduction Units (ERUs) to be counted towards meeting its GHG emission reduction target provided, among other criteria, that the project entails GHG reductions in addition to any GHG reduction that would have otherwise occurred (known as “additionality”). As of September 30, 2010, 236

²⁶ *Kyoto Protocol*, *supra*, note 22, art. 3.3.

²⁷ *Id.*, art. 3.4.

projects had been submitted and published on the UNFCCC website for public comment and 23 positive determinations were deemed final²⁸.

The third flexibility mechanism, known as the CDM, revolved around the proposition that UNFCCC Annex I countries could take advantage of Certified Emission Reductions (CERs) issued in respect of projects implemented in developing countries in order to meet their GHG emission reduction targets. The CDM amounts to a form of “global JI”. The CDM serves a dual objective: provide UNFCCC Annex I countries with another option to attain their GHG targets while allowing developing countries to attract and benefit from GHG emission reduction projects.

The Kyoto Protocol could enter into force only after having been ratified by at least 55 signatory countries representing at least 55% of global carbon dioxide (CO₂) emissions in 1990.

AAUs, CERs, ERUs and RMUs and what they stand for

Assigned Amount Units (AAUs): each country receives a number of AAUs equivalent to its assigned amount of GHG emissions as per Annex B to the Kyoto Protocol.

Certified Emission Reductions (CERs): CERs are issued in respect of projects implemented in developing countries through the CDM.

Emission Reduction Units (ERUs): ERUs are issued in respect of UNFCCC Annex I country investments in GHG emission reduction or removal projects carried out in another UNFCCC Annex I country through JI.

Removal Units (RMUs): RMUs were created for GHG emission reductions resulting from anthropogenic sinks (LULUCF).

²⁸ UNFCCC, *Annual report of the Joint Implementation Supervisory Committee to the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol*, FCCC/KP/CMP/2010/9, 6th sess. (2010), at 1, 7, 15, 29 and 30, online: <<http://unfccc.int/resource/docs/2010/cmp6/eng/09.pdf>> (accessed Nov. 11, 2012) [hereinafter “JISC, Annual Report (2010)”].

3. COP-6, The Hague (2000) and COP-6 Bis, Bonn (2001)²⁹

Prior to the Kyoto Protocol entering into force, many interpretative and implementation issues on contentious elements, such as flexibility mechanisms and anthropogenic sinks, had to be addressed through negotiations which took place during the COPs subsequent to the adoption of the Kyoto Protocol. During COP-4 in Buenos Aires, countries could not agree to anything other than a list of areas of conflict and a deadline (COP-6 in 2000) to dispel any ambiguity and disagreement.

COP-6 in The Hague in December 2000 proved to be a significant challenge to international efforts directed against climate change, as the negotiations broke down and the meeting was suspended without any agreement being reached. Amongst other things, disagreements over the extent to which anthropogenic sinks (land-use, land-use change and forestry or “LULUCF”) could count in meeting GHG targets created tensions among countries, leading many to say “it was the sinks that sunk The Hague”³⁰.

The COP-6 was resumed in Bonn in July 2001 (and is referred to as COP-6 Bis or COP-6.5). The US had announced in the meantime that it would not ratify the Kyoto Protocol, which added pressure onto countries to strike a deal in order to avoid the death of the Kyoto Protocol. The US withdrawal also significantly increased the bargaining power of countries whose ratification was necessary for the Kyoto Protocol to enter into force (i.e. developed countries, EIT countries and major developing countries with significant GHG emissions). Any agreement rather than no agreement surfaced as the dominant idea.

To general surprise, countries agreed on enough outstanding matters for COP-6 Bis to be declared a success. The “Bonn Agreement” does not establish any quantitative limit with respect to the use of flexibility mechanisms and sinks to meet GHG emission reduction targets, but it excludes GHG reductions derived from nuclear facilities from JI or the CDM.

²⁹ See: IISD, “Summary of the Resumed Sixth Session of the Conference of the Parties to the UN Framework Convention on Climate Change: 16 – 27 July 2001”, (July 30, 2001) 12: 176 *Earth Negotiations Bulletin*, online: <<http://www.iisd.ca/vol12/enb12176e.html>> (accessed Nov. 11, 2012).

³⁰ *Id.*

With respect to anthropogenic sinks (LULUCF), the Bonn Agreement added four types of activities (to afforestation and reforestation, already authorized by the Kyoto Protocol) whose GHG reductions can be computed by countries in meeting their targets: (i) forest management; (ii) cropland management; (iii) grazing land management and (iv) revegetation. All four activities must have occurred “since 1990” to be eligible. However, only afforestation and reforestation are eligible under the CDM, up to a limit of 1% of a country’s base year GHG emissions, times five during the first commitment period; moreover, GHG emission reductions from forest management are only admissible up to country-specific caps included in Appendix Z to the Bonn Agreement³¹.

The Bonn Agreement also led to the creation of three new funds: (i) the Special Climate Change Fund to help with adaptation, technology transfer, energy, transport, industry, agriculture, forestry and waste management; a Least Developed Countries Fund to help with National Adaptation Programmes of Action (NAPAs); and (iii) the Kyoto Protocol Adaptation Fund to finance concrete adaptation projects and programmes in developing country Parties that have become Parties to the Protocol³². The Adaptation Fund is funded through a 2% levy on CERs generated through CDM projects. However, no funding amounts were specified.

Sufficient progress was accomplished thanks to the Bonn Agreement to salvage the Kyoto Protocol ratification process; however, the Bonn Agreement occurred at a political level and many technical and implementation issues remained unresolved. COP-7 in Marrakech, held in November 2001, was dedicated to address and settle the operational features underpinning the Bonn Agreement.

4. COP-7, Marrakech (2001)³³

With respect to flexibility mechanisms, the Marrakech Accords made the following progress (see Box 1 for ease of reference):

³¹ UNFCCC, *Decision 5/CP.6. Implementation of the Buenos Aires Plan of Action*, FCCC/CP/2001/L.7 (July 24, 2001), online: <http://unfccc.int/cop6_2/documents/dec5cp6unedivers.pdf> (accessed Nov. 11, 2012) (also known as the “Bonn Agreement”).

³² *Id.*

³³ See: IISD, “Summary of the Seventh Conference of the Parties to the UN Framework Convention on Climate Change: 29 October – 10 November 2001”, (November 12,

- a Removal Units (RMUs) label was created for GHG emission reductions from anthropogenic sinks (LULUCF). The RMUs cannot be kept and applied to GHG emission reduction targets under the second commitment period, but can be traded for AAUs/CERs/ERUs;
- AAUs, CERs, ERUs and RMUs all count in meeting GHG emission reduction targets and can all be transferred among UNFCCC Annex I countries without restriction;
- AAUs can be kept and applied to GHG emission reduction targets under the second commitment period. The same is true for ERUs and CERs, but in their case only to a limit of 2.5% of the initial assigned amount of GHG emissions;
- International emissions trading could start as of 2008;
- The CDM could start immediately and the technology transfer mandate of the CDM was underlined; CDM rules and modalities were also clarified and CDM projects that had already begun could generate CERs retroactively to January 1, 2000 as long as they were submitted for approval before the end of 2005; and
- The JI framework was established and projects would become eligible for ERUs in 2008.

With respect to anthropogenic sinks (LULUCF), the Marrakech Accords made the following progress:

- Complying with reporting requirements would not be necessary to claim GHG reductions due to LULUCF activities during the first commitment period; and
- Reporting requirements in respect of LULUCF activities were substantially softened.

Following the Marrakech Accords, the stage was set for the ratification of the Kyoto Protocol. The Kyoto Protocol entered into force on February 16, 2005, after having been ratified by at least 55 signatory countries representing at least 55% of global carbon dioxide (CO₂) emissions in 1990. Thus, subsequent COPs progressively turned their attention towards planning the Post-Kyoto era.

2001) 12: 189 *Earth Negotiations Bulletin*, online: <<http://www.iisd.ca/vol12/enb12189e.html>> (accessed Nov. 11, 2012).

5. COP-11 and CMP-1, Montreal (2005)³⁴

During COP-11 and CMP-1 in Montreal in December 2005, which also served as the first Meeting of the Parties to the Kyoto Protocol (CMP), the decade-long Kyoto round of negotiations were concluded with the formal adoption of the Marrakech Accords and the launch of post-Kyoto round of negotiations. Planning the Post-Kyoto era also served to ensure success during the first commitment period as it could stimulate private sector involvement by offering it greater predictability. Decisions to open discussions on post-Kyoto planning under both the Kyoto Protocol and the UNFCCC also allowed to engage countries, including the US, that had not yet ratified the Kyoto Protocol, given that only countries having ratified the Kyoto Protocol were formally obligated to consider new commitments. The discussions under the UNFCCC constituted a non-binding two-year dialogue on “long-term cooperative action to address climate change” that would not directly lead to new commitments. A major breakthrough during COP-11 in Montreal came when it appeared that developing countries showed a greater willingness to partake in climate change mitigation efforts. Another interesting development arose when Papua New Guinea, heading a coalition of 15 rainforest nations, reopened the debate on deforestation with a proposal to allow credits for reducing emissions from deforestation and forest degradation (REDD).

6. COP-13 and CMP-3, Bali (2007)³⁵

The two-year dialogue initiated in Montreal culminated at the COP-13 and CMP-3 in Bali in December 2007 where frantic talks led to the adoption of a wide-ranging negotiating process known as the Bali Roadmap that was intended to result in the adoption of a successor to the Kyoto Protocol in 2009.

³⁴ See: IISD, “Summary of the Eleventh Conference of the Parties to the UN Framework Convention on Climate Change and First Conference of the Parties Serving as the Meeting of the Parties to the Kyoto Protocol: 28 November – 10 December 2005”, (December 12, 2005) 12: 291 *Earth Negotiations Bulletin*, online: <<http://www.iisd.ca/vol12/enb12291e.html>> (accessed Nov. 11, 2012).

³⁵ See: IISD, “Summary of the Thirteenth Conference of the Parties to the UN Framework Convention on Climate Change and Third Meeting of Parties to the Kyoto Protocol: 3-15 December 2007”, (December 18, 2007) 12: 354 *Earth Negotiations Bulletin*, online: <<http://www.iisd.ca/vol12/enb12354e.html>> (accessed Nov. 11, 2012).

Marked by the IPCC Fourth Assessment Report on climate change, which concluded that the warming of the Earth's climate system is "unequivocal", and that human activities are "very likely" the cause of this warming, the negotiations followed a familiar pattern: the EU demanding that the US accept hard commitments; the US refusing such hard commitments, and developing countries requesting greater technological and financial assistance while refusing to commit to serious climate change mitigation efforts.

In the end, developing countries agreed to consider taking "measurable, reportable and verifiable nationally appropriate mitigation actions supported by technology and enabled by financing and capacity-building", while developed countries would in addition consider taking mitigation "commitments or actions, including quantified emission limitation and reduction objectives"; however, no country was bound to attain any particular outcome. Echoing the initiative of Papua New Guinea two years earlier in Montreal, and given the interest raised by the issue of REDD as it constitutes the area where developing countries offered concrete proposals to reduce their GHG emissions, the COP adopted a decision encouraging rainforest countries to undertake initiatives in this respect while calling for discussions on what form financial assistance thereof would take.

The ensuing negotiating efforts were given the following priorities as summarized in the Bali Action Plan: (i) a long-term global GHG emission reduction goal; (ii) enhanced national and international mitigation efforts; (iii) enhanced national and international adaptation efforts; enhanced financing of adaptation and mitigation efforts and technology cooperation; (iv) enhanced technology development and transfer to support adaptation and mitigation efforts; (v) forests and (vi) measurement, reporting and verification (MRV).

Efforts to operationalize the Adaptation Fund reached a stepping stone in Bali with the creation of the Adaptation Fund Board to manage the funds levied on CDM projects for the purpose of the Adaptation Fund. A series of decisions made during COP-16 in Poznań (December 2008) made the Adaptation Fund fully operational.

One of the key elements of the Bali Roadmap was the launch of a negotiating process under the UNFCCC that would run in parallel with the negotiations under the Kyoto Protocol, resulting in two negotiating

tracks to be pursued under the newly launched *Ad Hoc* Working Group on Long-term Cooperative Action (AWG-LCA, under the UNFCCC) and the existing *Ad Hoc* Working Group on Further Commitments for Annex I Parties (AWG-KP, under the Kyoto Protocol). The hope was that the two tracks would converge in a comprehensive post-2012 agreement in Copenhagen in 2009.

7. COP-15 and CMP-5, Copenhagen (2009)³⁶

From 2008 onward, climate change negotiations ensued against the backdrop of a rapidly worsening global financial and economic crisis. The COP-15 and CMP-5, which took place in Copenhagen in December 2009, capped two years of intense negotiations that followed the path outlined by the Bali Action Plan. An unprecedented level of political attention was generated by the Copenhagen Conference as attested by the presence of approximately 120 Heads of State and Government who, for the very first time, met to address climate change, now perceived as a serious threat to humanity. More than 40,000 people from more than 21,000 NGOs and 5,000 media asked for accreditation; tensions erupted as the facilities could host only 15,000 people.

Despite calls weeks in advance from the political class minimizing expectations that a legally-binding agreement would be hammered out during the summit and that “Hopenhagen” might only constitute a critical step in soon reaching a turning point in the fight against global warming, the reality of reaching a solely political agreement appeared clearly for all to see only late during the Conference.

However, observers of the numerous and lengthy negotiating sessions that led to Copenhagen could notice that less progress was achieved at each meeting than was necessary to settle all requisite issues for reaching a legally-binding agreement in Copenhagen: developing countries were urging UNFCCC Annex I countries to pledge ambitious GHG emission reduction targets, while developed countries demanded that the US and major developing countries join the climate change mitigation efforts as a

³⁶ See: IISD, “Summary of the Copenhagen Climate Change Conference: 7-19 December 2009”, (December 22, 2009) 12: 459 *Earth Negotiations Bulletin*, online: <<http://www.iisd.ca/vol12/enb12459e.html>> (accessed Nov. 11, 2012); see also: PEW CENTER ON GLOBAL CLIMATE CHANGE, *Summary of COP 15 and CMP 5, 2009*, online: <<http://www.pewclimate.org/copenhagen/cop15>> (accessed Nov. 11, 2012).

prerequisite to attaining any meaningful global GHG emission reduction targets. Progress on issues such as REDD plus conservation (REDD-plus) and technology was made, but the positions of countries on issues such as mitigation and financing proved intractable. The outcome of AWG-LCA meetings formed a 200 page negotiating text with thousands of brackets accounting for areas of disagreement – the most complex document in UNFCCC history.

Countries decided that only documents produced during AWG-LCA and AWG-KP meetings should serve as bases for negotiations during the Copenhagen Conference. Many negotiators considered these documents too complicated for negotiations among Heads of States; indeed, high-level negotiations started from scratch. Alongside formal negotiations, a subgroup of approximately 28 Heads of State³⁷ met with essentially the US, China, India, Brazil and South Africa notably involved in drafting a three page document that became known as the “Copenhagen Accord” and which was finalized on December 18. US President Barack Obama immediately announced that an agreement had been reached before quickly departing back to Washington, which angered many countries and led to recriminations that transparency and the democratic process had been set aside.

The Copenhagen Accord won formal recognition in a context marked by controversy and despite the lack of consensus. Given that decisions are normally taken unanimously, neither the COP (UNFCCC) nor the CMP (Kyoto) could adopt a decision that would have accepted the Accord’s substantive content: instead, countries agreed to adopt COP and CMP decisions that “take note” of the Copenhagen Accord and to attach the Accord to the COP and CMP decisions as an unofficial document. Countries also adopted a procedure allowing countries supporting the Accord to accede to it. As a result, the Copenhagen Accord constitutes a political (as opposed to legal) agreement of a novel form.

Turning to the content of the Copenhagen Accord, it addresses all priorities enunciated in the Bali Action Plan: a long-term GHG emission

³⁷ Benoît LEGUET, “Copenhagen: A Stab in the Dark? ”, (January 2010) 43 *Tendances Carbone* 1, at 1, online: <http://www.blunext.eu/publications/TendancesCarbone/TCN.43_01.2010_En.pdf> (accessed Nov. 11, 2012).

reduction objective; mitigation; adaptation; financing; technology; forests, and MRV.

Long-Term GHG emission reduction objective. The Accord states as an aspirational goal that global temperature increase should not exceed 2 degrees Celsius. A review of the Accord is also scheduled to take place by 2015, with the possibility of limiting the temperature rise to 1.5 degrees Celsius.

Adaptation. UNFCCC Annex I countries agreed to provide international financing, technology and capacity-building to support the implementation of adaptation actions in developing countries.

Mitigation. UNFCCC Annex I (developed) countries “commit to implement”³⁸ GHG emission reduction targets for 2020, and non-Annex I (developing) countries “will implement mitigation actions.”³⁹ Least developed and small island countries “may undertake actions voluntarily and on the basis of support”⁴⁰.

Forests. The Accord declares the “immediate establishment of a mechanism [...] to enable the mobilization of financial resources from developed countries”⁴¹ to support REDD-Plus efforts; Australia, France, Japan, Norway, the United Kingdom and the US announced on December 16, 2009 that they had collectively agreed to an amount of USD 3.5 billion as initial public financing for REDD+ (Reducing and reversing deforestation and forest degradation, conservation of existing carbon stocks and enhancement of carbon stocks).

Technology. The Accord establishes a new Technology Mechanism to accelerate technology development and transfer for both adaptation and mitigation.

Fast-start and long-term finance. Developing countries were promised financial support for mitigation efforts (including forest-related), adaptation, technology development and transfer and capacity-building. For the

³⁸ UNFCCC, Decision 2/CP.15 Copenhagen Accord, FCCC/CP/2009/11/Add.1 (March 30, 2010), online: <<http://unfccc.int/resource/docs/2009/cop15/eng/11a01.pdf>> (accessed Dec. 1, 2012) [hereinafter “Copenhagen Accord”], at para. 4.

³⁹ *Id.*, at para. 5.

⁴⁰ *Id.*, at para. 5.

⁴¹ *Id.*, at para. 6.

period 2010-2012, developed countries collectively committed to provide new and additional “fast-start funding” of approximately USD 30 billion. Developed countries also commit to a goal of jointly mobilizing USD 100 billion a year by 2020 through a mix of public and private resources. It appears that donor countries had managed to collect USD 24 billion by March 2010⁴²; however, only USD 1.7 billion had effectively been committed by contributing countries by the end of 2010⁴³.

The Accord calls for a new Copenhagen Green Climate Fund as one channel for delivering financing and a High Level Panel “to study the contribution of the potential sources of revenue”⁴⁴ toward the long-term funding goal.

MRV. Existing and future MRV requirements established by the COP will apply to GHG emission reduction targets of UNFCCC Annex I countries and to their delivery of financing to developing countries. Actions by developing countries will be subject to their domestic MRV, with the results reported in biennial national communications and subject to international consultation and analysis. Developing country actions receiving international support will be subject to international MRV requirements adopted by the COP.

Climate change talks had not focused on agriculture in time to settle the technicalities necessary for reaching even a political agreement on agriculture in Copenhagen. Hence, neither agriculture nor food security are mentioned in the Copenhagen Accord, despite a draft decision on agriculture produced by the AWG-LCA entitled “cooperative sectoral approaches and sector-specific actions on agriculture”⁴⁵.

Both the AWG-LCA and AWG-KP saw their mandates extended in Copenhagen with a view to presenting the results of their work for adop-

⁴² ICTSD, ““Fast-Start” Climate Funding ODA? ”, (April 30, 2010) 10: 8 *Bridges Trade BioRes* 3, at 4, online: <<http://ictsd.org/i/news/biores/74825/>> (accessed Nov. 11, 2012) [hereinafter “*ICTSD – Fast-Start Climate Funding*”].

⁴³ See: <<http://www.faststartfinance.org/content/contributing-countries>> (accessed Nov. 11, 2012).

⁴⁴ Copenhagen Accord, *supra*, note 38, at para. 9.

⁴⁵ See: AWG-LCA, Report of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention on its eighth session, held in Copenhagen from 7 to 15 December 2009, FCCC/AWGLCA/2009/17 (February 5, 2010), at 43, online: <<http://unfccc.int/resource/docs/2009/awglca8/eng/17.pdf>> (accessed Nov. 11, 2012).

tion during the COP 16/CMP 6 that was held from November 29 to December 10, 2010 in Cancún, Mexico.

As of April 12, 2010⁴⁶, 14 UNFCCC Annex I countries plus the 27 member countries of the EU had established GHG emission reduction targets between 5% and 30% with the lowest targets often being unconditional while higher targets are conditional, for instance in the case of the EU upon other developed countries adopting comparable targets and developing countries making adequate reduction efforts. Only two UNFCCC Annex I countries (Belarus and New Zealand) have stated that their GHG emission reductions are based on the assumption that effective LULUCF rules are adopted⁴⁷.

As of April 12, 2010⁴⁸, 35 developing countries had filed submissions with the UNFCCC. As of June 1, 2012, 44 developing countries had filed submissions with the UNFCCC in response to the Copenhagen Accord. Developing countries generally recall the voluntary nature of their proposed NAMAs and their implementation is most often conditional to receiving the appropriate amount of financial, technological and capacity-building support from developed countries⁴⁹.

Of the 35 developing countries that had filed submissions with the UNFCCC as of April 12, 2010, eight did not specify any sectoral approaches while fifteen stated their intention of implementing agricultural climate change mitigation actions⁵⁰. Among these fifteen countries, four submitted quantitative agricultural GHG emission reduction targets⁵¹. The number of submissions made by developing countries that specifically targeted agriculture suggests that an important proportion of NAMAs will be devoted to agriculture, thus heightening the importance of integrating agricultural mitigation actions within the UNFCCC and Kyoto processes.

⁴⁶ See: FAO, *Agriculture, Food Security and Climate Change in Post-Copenhagen Processes – An FAO Information Note*, 2010, online: <http://foris.fao.org/static/data/nrc/InfoNote_PostCOP15_FAO.pdf> (accessed Nov. 11, 2012) [hereinafter “*FAO Information Note – Copenhagen*”].

⁴⁷ *Id.*, at p. 2.

⁴⁸ *Id.* See also: <<http://unfccc.int/home/items/5262.php>> (accessed Nov. 11, 2012) for most recent information.

⁴⁹ UNFCCC, *supra*, note 10, art. 4.7.

⁵⁰ *FAO Information Note – Copenhagen*, *supra*, note 46, at p. 5.

⁵¹ *Id.*, at p. 6.

As of March 1, 2012, it is estimated that 141 countries (including the 27-member EU) representing more than 87% of global GHG emissions have expressed their intention to be listed as agreeing to the Copenhagen Accord and are likely to or have engaged with the Copenhagen Accord⁵².

8. COP-16 and CMP-6, Cancún (2010)⁵³

Contrary to the lead-up to the Copenhagen Conference, expectations prior to the Cancún Conference were modest and few anticipated a legally-binding outcome or agreement on all outstanding issues. Fewer Heads of State attended and the media frenzy reached a far lower level than what was witnessed in Copenhagen a year before. Nevertheless, many still hoped for a “balanced package” of agreements that would deliver meaningful progress on at least a few of the key issues. Moreover, the stakes were high for the UNFCCC process and international climate change cooperation: another failed climate conference could have led countries to sideline the UNFCCC and Kyoto Protocol and to proceed through other, more informal initiatives.

COP President Patricia Espinosa committed herself to maintaining a transparent and inclusive negotiating process, which helped restore confidence in the UNFCCC and Kyoto initiatives. Lo and behold, the Cancún Agreements were finalized on the last day of the Cancún Conference and included decisions under both the COP (UNFCCC) and the CMP (Kyoto) negotiating tracks with provisions regarding adaptation, REDD+, technology, mitigation and finance.

The Cancún Agreements were adopted despite Bolivia’s opposition, with COP President Espinosa arguing that consensus gives the right to every country to be heard and have their views duly considered, which was afforded to Bolivia, but that it did not grant veto power to a country when more than 190 countries wished to go forward with the agreements that were negotiated over many years. The US supported President Espinosa’s

⁵² See: <<http://www.usclimatenetwork.org/policy/copenhagen-accord-commitments>> (accessed Nov. 11, 2012); <<http://unfccc.int/home/items/5262.php>> (accessed Nov. 11, 2012).

⁵³ See: IISD, “Summary of the Cancun Climate Change Conference: 29 November – 11 December 2010”, (December 13, 2010) 12: 498 *Earth Negotiations Bulletin*, online: <<http://www.iisd.ca/vol12/enb12498e.html>> (accessed Nov. 11, 2012) [hereinafter “IISD – Cancun Conference Summary”].

position, observing that the practice under the UNFCCC was closer to general agreement than consensus; moreover, the COP had never adopted its rules of procedure to specify the inner-workings of the decision-making process.

The Cancún Agreements were adopted under the overarching themes of “balance and compromise”, which led UNFCCC Executive Secretary Christiana Figueres to state that “everyone must be equally happy and equally unhappy with the outcome”⁵⁴. Although a sense of relief emerged from the Cancún Conference, it constituted a relatively small step in the fight against global warming. Negotiators nevertheless managed to formally integrate the main outcomes of the Copenhagen Conference within the UNFCCC process and in some cases, to go beyond the Copenhagen Accord while also providing more details to the various mechanisms.

a. The decision reached within the UNFCCC process at the Cancún Conference⁵⁵

Adoption of the Cancun Adaptation Framework. Parties adopted the Cancun Adaptation Framework⁵⁶ with the objective of enhancing action on adaptation and international cooperation on the matter, and created the Adaptation Committee⁵⁷ to promote the implementation of action on adaptation. The AWG-LCA was mandated to elaborate the composition, modalities and procedures of the Adaptation Committee based on Party submissions for adoption during COP-17 in Durban⁵⁸.

Nationally Appropriate Mitigation Actions (NAMAs). Developing country Parties agreed to take NAMAs supported and enabled by technology, financing and capacity-building that developed country Parties agree to provide, in order to deviate GHG emissions relative to “business as

⁵⁴ *Id.*, at. 29.

⁵⁵ See: UNFCCC, “Decision 1/CP.16: The Cancun Agreements: Outcome of the work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention”, *Report of the Conference of the Parties on its sixteenth session, held in Cancun from 29 November to 10 December 2010 – Addendum – Part two: Action taken by the Conference of the Parties at its sixteenth session*, FCCC/CP/2010/7/Add.1 (March 15, 2011), online: <<http://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf>> (accessed Nov. 11, 2012).

⁵⁶ *Id.*, at para. 13.

⁵⁷ *Id.*, at para. 20.

⁵⁸ *Id.*, at para. 23.

usual” emissions in 2020⁵⁹. Parties also agreed to set up a registry to record, on a voluntary basis, NAMAs seeking international support and to facilitate matching of NAMAs with finance, technology and capacity-building made available to support to these actions⁶⁰.

REDD+. Parties agreed that developing countries should focus on the following mitigation efforts in the forest sector: reducing emissions from deforestation and forest degradation, conserving forest carbon stocks, sustainable management of forests and enhancing forest carbon stocks⁶¹. Assuming the provision of adequate and predictable support, including financial resources and technical and technological support, developing country Parties were asked to develop a national strategy or action plan, forest reference (emission) levels, a national forest monitoring system and a safeguard reporting system⁶². Among the safeguards to be promoted and supported, the Parties mentioned *inter alia* the knowledge and rights of indigenous peoples and local communities and took note of the United Nations Declaration on the Rights of Indigenous Peoples⁶³.

Creation of the Green Climate Fund. Parties decided that the Green Climate Fund should act as the recipient and distributor of new multilateral funding for adaptation⁶⁴. The Fund will be governed by a board of twenty-four members, half from developing and half from developed country Parties⁶⁵. The World Bank was designated as interim trustee of the Fund subject to a review three years after the Fund has become operational⁶⁶.

Creation of a Technology Mechanism. With a view to enhancing development and transfer of environmentally sound technologies toward developing country Parties “now, up to and beyond 2012”, Parties formally created the Technology Mechanism envisioned during the Copenhagen Conference, which will consist of a Technology Executive Committee as

⁵⁹ *Id.*, at para. 48.

⁶⁰ *Id.*, at para. 53.

⁶¹ *Id.*, at para. 70.

⁶² *Id.*, at para. 71.

⁶³ *Id.*, Appendix I, at para. 2(c).

⁶⁴ *Id.*, at para. 100.

⁶⁵ *Id.*, at para. 103.

⁶⁶ *Id.*, at para. 107.

well as a Climate Technology Centre and Network⁶⁷. The Technology Executive Committee will comprise twenty expert members elected by the COP: nine members from UNFCCC Annex I Parties and eleven from non-UNFCCC Annex I Parties⁶⁸.

Fast-start and long-term finance. Developed country Parties reiterated their commitment expressed at Copenhagen to provide new and additional resources of approximately USD 30 billion for adaptation and mitigation actions, including forestry, over the period 2010-2012 and their commitment to mobilize USD 100 billion per year by 2020⁶⁹.

MRV. Parties decided to enhance UNFCCC Annex I countries' obligations to report in their national communications on mitigation targets and on the provision of financial, technological and capacity-building support to developing country Parties⁷⁰. These obligations would include annual greenhouse gas inventory reports and biennial reports on their progress in achieving GHG emission reductions⁷¹. Parties also launched a process for international assessment and review of GHG emission reductions and removals undertaken by UNFCCC Annex I countries Parties⁷². Parties also decided to enhance Non-UNFCCC Annex I Parties' reporting obligations by requiring information on their climate change mitigation actions and their effects and support received within their national communications. Non-UNFCCC Annex I Parties should submit their national communications to the COP every four years,⁷³ biennial update reports of national GHG inventories. Parties also agreed to conduct a process for international consultations and analysis of biennial reports "in a manner that is non-intrusive, non-punitive and respectful of national sovereignty"⁷⁴.

Strengthening the overall global warming objective. Parties also stressed the need for a strengthening of the global average temperature rise objec-

⁶⁷ *Id.*, at para. 117.

⁶⁸ For specific breakdown of non-UNFCCC Annex I Parties, see: *Id.*, Appendix IV, at para 1.

⁶⁹ *Id.*, at para. 95 and 98.

⁷⁰ *Ibid.*, at para. 40.

⁷¹ *Id.*

⁷² *Id.*, at para. 44 to 46.

⁷³ *Id.*, at para. 60(b).

⁷⁴ *Id.*, at para. 63.

tive, limiting it to 1.5 Degrees Celsius instead of 2, in the context of the first review which should start in 2013 and should be concluded by 2015.

b. The decision reached within the Kyoto Protocol process at the Cancún Conference⁷⁵

Parties agreed that the base year to determine GHG emission reduction will remain the same as under the first commitment period (2008-2012), that is 1990 unless EIT countries chose to use 1988 or 1989 as permitted under the Kyoto Protocol⁷⁶. Parties also agreed that international emissions trading, JI, CDM and anthropogenic LULUCF activities would remain available to UNFCCC Annex I Parties during the second commitment period⁷⁷.

Both the AWG-LCA and AWG-KP saw once more their mandates extended in Cancún with a view to presenting the results of their work for adoption during the COP 17/CMP 7 that has been held November 28 to December 9, 2011, in Durban, South Africa. The mandate of the AWG-LCA was extended for one more year; the mandate of the AWG-KP was extended in order to allow it to have its results adopted “as soon as possible” during a future COP/CMP and “in time to ensure that there is no gap between the first and the second commitment periods”⁷⁸.

9. COP-17 and CMP-7, Durban (2011)⁷⁹

The negotiating dynamics of the Durban Conference displayed a trade-off between the level of climate change mitigation ambition and the

⁷⁵ See: UNFCCC, “Decision 1/CMP.6: The Cancun Agreements: Outcome of the work of the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol at its fifteenth session”, *Report of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol on its sixth session, held in Cancun from 29 November to 10 December 2010 – Addendum – Part two: Action taken by the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol at its sixth session*, FCCC/KP/CMP/2010/12/Add.1 (March 15, 2011), online: <<http://unfccc.int/resource/docs/2010/cmp6/eng/12a01.pdf>> (accessed Nov. 11, 2012).

⁷⁶ *Id.*, at para. 6(a).

⁷⁷ *Id.*, at para. 6(b).

⁷⁸ *Id.*, at para. 1.

⁷⁹ See: IISD, “Summary of the Durban Climate Change Conference: 28 November – 11 December 2011”, (December 13, 2011) 12: 534 *Earth Negotiations Bulletin*, online:

inclusiveness of any future agreement on climate change⁸⁰. The scientific requirements to achieve an increase in global temperature of under 2 degrees Celsius have yielded to political feasibility. Although the Durban Conference outcomes are largely procedural,⁸¹ the formation of new political alliances delivered progress under both the AWG-LCA and AWG-KP negotiating tracks while deciding the replacement of the AWG-LCA by the Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP), which will be launched during the first half of 2012⁸². Given that the Durban Conference mainly set the stage for further negotiations, its ultimate success or failure will only be determined in a few years from now.

a. The decision reached within the UNFCCC process at the Durban Conference

i. The “Ad Hoc Working Group on the Durban Platform for Enhanced Action”

The COP extended the AWG-LCA for one year and it will be terminated at the end of 2012 during COP-18 in Doha, Qatar⁸³. The COP also launched a process entitled the “Ad Hoc Working Group on the Durban Platform for Enhanced Action” (ADP) with a view to developing “a protocol, another legal instrument or an agreed outcome with legal force under the Convention applicable to all Parties”⁸⁴. This new terminology resulted

<http://www.iisd.ca/vol12/enb12534e.html> (accessed Nov. 11, 2012) [hereinafter “IISD – Durban Summary”].

⁸⁰ Jessica BOYLE, “IISD Report: Assessing the Outcomes of COP 17 In Pursuit of a Binding Climate Agreement: Negotiators expand the mitigation tent but reinforce the ambition gap”, (December 2011), *International Institute for Sustainable Development*, at 1, online: http://www.iisd.org/pdf/2011/assessing_the_outcomes_cop17.pdf (accessed Nov. 11, 2012) [hereinafter “Boyle-IISD Durban”].

⁸¹ Dan BODANSKY, “Evaluating Durban”, (December 12, 2011) *Opinio Juris*, online: <http://opiniojuris.org/2011/12/12/evaluating-durban/> (accessed Nov. 11, 2012).

⁸² See: Boyle-IISD Durban, *supra*, note 80, at 4.

⁸³ UNFCCC, “Decision 1/CP.17: Establishment of an Ad Hoc Working Group on the Durban Platform for Enhanced Action”, *Report of the Conference of the Parties on its seventeenth session, held in Durban from 28 November to 11 December 2011 – Addendum – Part Two: Action taken by the Conference of the Parties at its seventeenth session*, FCCC/CP/2011/9/Add.1 (March 15, 2012), online:

<http://unfccc.int/resource/docs/2011/cop17/eng/09a01.pdf> (accessed Nov. 11, 2012).

⁸⁴ *Id.*

from a difficult compromise reached between the EU and the Alliance of Small Island States (AOSIS) on one side, who wished for strong language and the United States and BASIC countries (Brazil, South Africa, India and China) on the other side, who wished for looser language⁸⁵. The ADP must start its work during the first half of 2012, the ADP negotiations must come to a close by 2015 and the resulting “agreed outcome with legal force” is slated to enter into force in 2020.

This first Decision of COP-17 that launched the ADP does not mention the principle of common but differentiated responsibilities while underlining that this “agreed outcome with legal force” will apply to all Parties and did not openly reiterate the differentiation between UNFCCC Annex I Parties and non-UNFCCC Annex I Parties. These omissions raise unanswered questions as to just how much symmetry will be displayed between developed and developing country obligations under this new instrument and what role equity will play in shaping these obligations.

ii. *The Outcome of the AWG-LCA*

Adaptation Committee. Following the creation of the Adaptation Committee during the Cancun Conference, Parties clarified that the Adaptation Committee constitutes the advisory board of the COP on adaptation matters and operates under the authority of the COP⁸⁶, and that the Adaptation Committee will consist of 16 Members⁸⁷. The Parties requested that the Adaptation Committee hold its first meeting soon after the Durban Conference, develop a three-year plan for its work subject to approval of the COP 18, report annually to the COP, and meet at least twice a year⁸⁸.

Technology Mechanism. Still hoping that the Technology Mechanism (and its two components: the Climate Technology Centre and Network and the Technology Executive Committee) would become fully opera-

⁸⁵ See: Boyle-IISD *Durban*, *supra*, note 80, at 5.

⁸⁶ UNFCCC, “Decision 2/CP.17: Outcome of the work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention”, *Report of the Conference of the Parties on its seventeenth session, held in Durban from 28 November to 11 December 2011 – Addendum – Part Two: Action taken by the Conference of the Parties at its seventeenth session*, *supra*, note 83, at para. 92 and 95 [hereinafter “COP-17 Decision 2”].

⁸⁷ For a specific breakdown of Committee members, see: *Id.*, at para. 101.

⁸⁸ *Id.*, at paras. 96 to 97, 112 and 115.

tional as early as possible in 2012, the Parties launched the selection process for the host of the Climate Technology Centre and Network following the end of the Durban Conference⁸⁹. The Parties also requested that the Global Environment Facility support the operationalization and activities of the Climate Technology Centre and Network⁹⁰. Parties adopted terms of reference for the Climate Technology Centre and Network⁹¹ and modalities and rules of procedure for the Technology Executive Committee (TEC)⁹². The TEC will comprise 20 Members, 9 from developed country Parties and 11 from developing country Parties⁹³. Conditional upon the availability of necessary funding, the TEC must meet at least twice per year as of 2012⁹⁴.

Strengthening the overall global warming objective. Parties confirmed the Cancun Decision in this respect and confirmed that the review process should start in 2013 and end in 2015⁹⁵.

Biennial reports and national communications. Developed countries must submit their first biennial reports to the UNFCCC Secretariat by January 1, 2014 and their second and subsequent biennial reports two years after the due date of a full national communication. UNFCCC Annex I Parties must also submit a full national communication every four years, with their next national communication due no later than January 1, 2014⁹⁶. The subsequent national communication will therefore be required in 2018 and the subsequent biennial report in 2016 and 2020. Non-Annex I Parties should submit their first biennial update report by December 2014 and every two subsequent years, with the LDC Parties and small island developing States discretionary right to submit same⁹⁷.

⁸⁹ *Id.*, at para. 136.

⁹⁰ *Id.*, at para. 136.

⁹¹ *Id.*, Annex VII.

⁹² UNFCCC, "Decision 4/CP.17: Technology Executive Committee – modalities and procedures", *Report of the Conference of the Parties on its seventeenth session, held in Durban from 28 November to 11 December 2011 – Addendum – Part Two: Action taken by the Conference of the Parties at its seventeenth session, supra*, note 83, at para. 2 to 3.

⁹³ For a specific breakdown of developing country Party members, see: *Id.*, Annex II, at par. 4.

⁹⁴ *Id.*, at para. 29.

⁹⁵ *Id.*, at para. 160 to 161.

⁹⁶ *Id.*, at para. 13-14.

⁹⁷ *Id.*, at para. 41(a) et 41(f).

MRV. Parties agreed that “the first round of international assessment and review should start two months after the submission of the first round of biennial reports by developed country Parties”, and that international assessment and review for biennial reports will be conducted every two years⁹⁸. For developing country Parties, international consultation and analysis (ICA) will be conducted within six months of the submission of the first round of biennial update reports, and the frequency of ICA will be determined by the frequency of the submission of biennial update reports⁹⁹.

REDD+: Parties recognized that additional financing could come from both public and private sources¹⁰⁰ and made technical progress with respect to safeguards and forest reference emission levels¹⁰¹.

Green Climate Fund. Parties requested that the Board of the Green Climate Fund (GCF) operationalize the GCF in an expedited manner while approving the governing instrument for the GCF and designating the GCF as an operating entity of the financial mechanism of the UNFCCC¹⁰². The GCF Board will consist of 24 members, 12 from developing and 12 from developed country Parties¹⁰³.

⁹⁸ *Id.*, at para. 25 and 27.

⁹⁹ *Id.*, at para. 58(a) and 58(b).

¹⁰⁰ *Id.*, at para. 65.

¹⁰¹ UNFCCC, “Decision 12/CP.17: Guidance on systems for providing information on how safeguards are addressed and respected and modalities relating to forest reference emission levels and forest reference levels as referred to in decision 1/CP.16”, *Report of the Conference of the Parties on its seventeenth session, held in Durban from 28 November to 11 December 2011 – Addendum – Part Two: Action taken by the Conference of the Parties at its seventeenth session*, FCCC/CP/2011/9/Add.2 (March 15, 2012), online: <http://unfccc.int/files/adaptation/nairobi_work_programme/application/pdf/cop17.pdf> (accessed Nov. 11, 2012).

¹⁰² UNFCCC, “Decision 3/CP.17: Launching the Green Climate Fund”, *Report of the Conference of the Parties on its seventeenth session, held in Durban from 28 November to 11 December 2011 – Addendum – Part Two: Action taken by the Conference of the Parties at its seventeenth session*, *supra*, note 83, at para. 3 to 6.

¹⁰³ For a specific breakdown of developing country Party representatives, see: *id.*, at para. 10 and related Annex – *Governing instrument for the Green Climate Fund*, at para. 9, online: <http://unfccc.int/files/meetings/durban_nov_2011/decisions/application/pdf/cop17_gcf.pdf> (accessed Nov. 11, 2012).

Parties must also make arrangements before COP-18 to ensure the GCF “is accountable to and functions under the guidance of”¹⁰⁴ the COP. Parties conferred “juridical personality and legal capacity”¹⁰⁵ to the GCF and requested that the GCF Board balance its resources between adaptation and mitigation.

Parties stressed that expeditious operationalization of the GCF depended on secure funding, which developed country Parties will provide directly and indirectly through public, private and alternative sources¹⁰⁶. Developed countries and chiefly the United States, mindful of their fiscal constraints, insisted on private sector financing, while developing countries demanded that public financing provide the majority of funding to the GCF¹⁰⁷. These opposing views led to the previously described middle ground wording. The United States also attempted to underline the possibility that developing country Parties fund the GCF,¹⁰⁸ which was partially achieved by adding the words “financial inputs from a variety of other sources”¹⁰⁹ and by thanking the Republic of Korea (along with Germany and Denmark) for funding the GCF’s start-up costs¹¹⁰.

b. The decision reached within the Kyoto Protocol process at the Durban Conference: The Outcome of the AWG-KP

With a view to reducing GHG emissions by UNFCCC Annex I Parties by at least 25–40 per cent below 1990 levels by 2020, Parties decided that the second commitment period under the Kyoto Protocol will begin on January 1, 2013 and end either on December 31, 2017 or December 31, 2020. The end date of the second commitment period is scheduled to be decided by the AWG-KP during the 17th session of the AWG-KP scheduled

¹⁰⁴ *Id.*, at para. 3.

¹⁰⁵ *Id.*, at para. 8 and 11.

¹⁰⁶ *Id.*, at para. 7 and 9 and related *Annex – Governing instrument for the Green Climate Fund*, *supra*, note 103, at para. 29 and 30.

¹⁰⁷ See: *Boyle-IISD Durban*, *supra*, note 80, at 7.

¹⁰⁸ See: C2ES (CENTER FOR CLIMATE AND ENERGY SOLUTIONS), *Outcomes of the U.N. Climate Change Conference in Durban, South Africa*, December 2011, at p. 3, online: <http://www.c2es.org/docUploads/COP17_Summary.pdf> (accessed Nov. 11, 2012).

¹⁰⁹ UNFCCC, “Decision 3/CP.17: Launching the Green Climate Fund”, *supra*, note 102; *Annex – Governing instrument for the Green Climate Fund*, *supra*, note 103, at para. 30.

¹¹⁰ UNFCCC, “Decision 3/CP.17: Launching the Green Climate Fund”, *supra*, note 102, at para. 26.

to take place in Bonn in May 2012¹¹¹. Parties took note of UNFCCC Annex I Parties' quantified economy-wide emission reduction targets and their intention to convert these targets to quantified emission limitation or reduction objectives (QELROs) that would apply for the second commitment period. QELROs are slated to be submitted during the 17th session of the AWG-KP with a view to adopting the resulting GHG emission reduction targets as amendments to Annex B to the Kyoto Protocol during CMP-8¹¹². QELROs are not derived from an overarching GHG emission reduction objective¹¹³.

Major developing countries will not be bound to reduce their GHG emissions during a second commitment period, while over the past two years, Canada, Japan and Russia have indicated that they do not intend to be bound by a second commitment period¹¹⁴.

II. Priority Sectors of a Successor to The Kyoto Protocol

A. Agriculture

1. Overview

Agriculture generates approximately 14% of all GHG emissions, with approximately 74% of these GHG emissions originating from developing countries¹¹⁵. Agriculture is responsible for approximately 47% of methane

¹¹¹ UNFCCC, "Decision 1/CMP.7: Outcome of the work of the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol at its sixteenth session", *Report of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol on its seventh session, held in Durban from 28 November to 11 December 2011 – Addendum – Part Two: Action taken by the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol at its seventh session*, FCCC/KP/CMP/2011/10/Add.1 (March 15, 2012), at para. 1, online: <<http://unfccc.int/resource/docs/2011/cmp7/eng/10a01.pdf>> (accessed Nov. 11, 2012) [hereinafter "*Decision 1/CMP.7*"].

¹¹² *Id.*, at para. 4 to 6.

¹¹³ See: *IISD – Durban Summary*, *supra*, note 79, at p. 29.

¹¹⁴ See: *Decision 1/CMP.7*, *supra* note 111, see: *Annex 1 – Proposed amendments to Annex B to the Kyoto Protocol*, footnotes p, q, r, at p. 7.

¹¹⁵ *FAO, Enabling Agriculture to Contribute to Climate Change Mitigation – Submission to the UNFCCC* (2009), online: <<http://unfccc.int/resource/docs/2008/smsn/igo/036.pdf>>, (accessed Nov. 11, 2012) at 1 [hereinafter "*FAO – Enabling Agriculture*"].

(CH₄) emissions (especially due to cattle and wetlands, most notably rice paddies) and 58% of nitrous oxide (N₂O) emissions (mostly from fertilizer use)¹¹⁶. If deforestation – which most often occurs to convert forests into agricultural land – is added to the mix, approximately one third of global anthropogenic GHG emissions, more specifically 25% of carbon dioxide (CO₂), 50% of methane (CH₄) and 75% of nitrous oxide (N₂O) can be traced back to agriculture and deforestation.

Not only is agriculture emitting significant amounts of GHGs, it is also one of the sectors most vulnerable to the effects of climate change: a rise in temperature, changes in precipitation patterns, a rise in sea levels and a higher incidence of extreme weather events (droughts, storms, floods) will likely negatively impact agricultural yields, especially in the poorest countries located in tropical Africa and Latin America¹¹⁷.

The vulnerability of agriculture and the world's increased reliance on its constantly increasing productivity stress the urgency of implementing adaptation measures and, where possible, to favor actions and policies that simultaneously address adaptation, mitigation and food security concerns. A recent study suggested that without adaptation efforts, decreased yields in South Asia could threaten the food security of more than one billion people and the number of malnourished children under five years of age in Africa and in Southeast Asia could increase respectively by an additional 10 million and 11 million to reach a total of 52 million in Sub-Saharan Africa and 73 million in Southeast Asia by 2050¹¹⁸.

Even more troubling, GHG emissions from agriculture are expected to show high growth rates in the future, due mainly to population and

¹¹⁶ Pete SMITH & al., “Chapter 8: Agriculture”, in Bert METZ, Ogunlade DAVIDSON, Peter BOSCH, Rutu DAVE et Leo MEYER (eds.), *Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge and New York, Cambridge University Press, 2007, at p. 503, online: <<http://www.ipcc.ch/pdf/assessment-report/ar4/wg3/ar4-wg3-chapter8.pdf>> (accessed Nov. 11, 2012) [hereinafter “IPCC – Agriculture”].

¹¹⁷ FAO, *Organic Agriculture and Food Availability. Proceedings of the International Conference on Organic Agriculture and Food Security* (2007), at p. 7, online: <<ftp://ftp.fao.org/docrep/fao/meeting/012/ah948e.pdf>> (accessed Nov. 11, 2012) [hereinafter “FAO – Food Availability”].

¹¹⁸ INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE, *Climate Change Impact on Agriculture and Costs of Adaptation* (October 2009), at p. 12, online: <<http://www.ifpri.org/sites/default/files/publications/pr21.pdf>> (accessed Nov. 11, 2012).

income increases, diet changes and technological change. The projected increase in world population during the next 40 years, which should reach 9.1 billion in 2050, requires that agriculture significantly steps up its production and productivity, adding significant pressure on the agricultural sector, which is also called upon to reduce GHG emissions given its promising mitigation potential.

Agriculture raises hopes of climate change mitigation as it offers cost neutral or net-profit-positive actions with low capital requirements¹¹⁹. It is estimated that soil carbon sequestration could provide 89% of the mitigating potential associated with agriculture, while 9% could be provided by methane (CH₄) mitigation and the final 2% by mitigation of soil nitrous oxide (N₂O) emissions¹²⁰. It is also estimated that approximately 70% of the mitigation potential lies in non-OECD/EIT countries, 20% in OECD countries and 10% in EIT countries¹²¹. Hence, international investments with a view to help mitigate climate change will have to flow in the direction of developing countries in order for them to reach their full mitigating potential.

2. Challenges for Agricultural Climate Change Mitigation

The sheer size of globally cultivated land, the numerous and varying agro-ecosystems and farming methods and the global number of farmers underpin just how great a challenge it is to fight climate change through the agricultural sector.

Uncertainty in GHG emission estimates from the agricultural sector, limited available information to establish terrestrial carbon baselines at the national level as well as the high cost of measuring, reporting and verifying (MRV'ing) agricultural GHG emission reductions have plagued international efforts to create mechanisms that would reward agricultural GHG emission reduction activities¹²². Saturation of soil carbon sequestra-

¹¹⁹ *FAO – Enabling Agriculture, supra*, note 115, at p. 1.

¹²⁰ *IPCC – Agriculture, supra*, note 116, at p. 515.

¹²¹ *Id.*, at p. 499.

¹²² *AWG-LCA, Report on the Workshop on Opportunities and Challenges for Mitigation in the Agricultural Sector, FCCC/AWGLCA/2009/CRP.2* (April 7, 2009), para. 12 and 24, online: <<http://unfccc.int/resource/docs/2009/awglca5/eng/crp02.pdf>> (accessed Nov. 11, 2012) [hereinafter “*AWG-LCA, Mitigation in the Agricultural Sector*”].

tion capacity, the risk of losing stored carbon and the duration of the sequestration in time have also caused their fair share of problems.

Soil carbon sequestration must be estimated accurately in a practical and cost-effective way to provide sufficient credibility for effective funding mechanisms to see the light of day. Accuracy can be met with current measurement capabilities, but a widespread use raises the necessity of developing efficient sampling designs and rigorous protocols¹²³. Direct “on-the-ground” soil carbon measurement would be too expensive and is unnecessary. A combination of field measurements and model-based approaches would be sufficient, but would require more comprehensive and extensive data, as well as a global system of information sharing. Reliability and performance would improve with time in a way that practice-based approaches could eventually be sufficient to monitor and verify soil carbon sequestration¹²⁴.

3. Moving Forward With Agricultural Climate Change Mitigation

Despite the complexity associated with these information gathering and validation needs, enough is known to start including agricultural initiatives in the fight against climate change.

International funding of globally coordinated pilot projects would help: gather soil, climate, land use and management information through direct measurement; establish rigorous field and laboratory protocols and a common data archive; determine the most effective soil carbon MRV’ing and crediting mechanisms, and develop and test remote sensing-based and ground survey-based methods for monitoring and verifying management practice implementation¹²⁵.

Developing countries will need financial support to develop national terrestrial carbon baselines and their MRV capacities. The initial phase should focus on building confidence, capabilities and national strategies

¹²³ FAO, *Anchoring Agriculture Within a Copenhagen Agreement – Policy Brief for UNFCCC Parties*, 2009, at p. 2-3, online: <<http://www.fao.org/climatechange/17790-09dab77d5fe2896a8a93ef00fc65bf7cb.pdf>> (accessed Nov. 11, 2012) [hereinafter “FAO – Anchoring Agriculture within Copenhagen Agreement”].

¹²⁴ FAO – *Enabling Agriculture*, *supra*, note 115, at p. 4.

¹²⁵ See: AWG-LCA, *Mitigation in the Agricultural Sector*, *supra*, note 122, at para. 26; FAO – *Enabling Agriculture*, *supra*, note 115, at p. 4.

that would imply providing capacity building, technical assistance and financial incentives through public funds and institutions¹²⁶. Actions to be encouraged on a priority basis should simultaneously serve adaptation, mitigation and agricultural productivity purposes.

In order to fully tap into the “GHG sink” potential of agriculture, appropriate wording on agricultural climate change adaptation and mitigation efforts and on the requisite financing and technology development and transfer should be enshrined in any successor to the Kyoto Protocol¹²⁷.

Agriculture has generated interest during the Durban Climate Change Conference, with Parties expecting to adopt a decision on the matter during COP-18; however, the content of such decision remains difficult to predict¹²⁸.

B. Forestry

Forests store vast amounts of carbon and constitute the world’s chief carbon sinks. Forests cover just over four billion hectares (ha.) or 31% of total world land area.

Deforestation through land-use change (generally for agricultural purposes) generates approximately 18.2% of total GHG emissions and thus constitutes one of the most important sources of GHG emissions. Fires, pests, diseases and extreme weather events also cause increasing forest losses in many countries.

Approximately 13 million ha. of forests were converted to other uses or lost through natural causes annually between 2000 and 2010, in comparison to approximately an annual conversion of 16 million ha. between 1990 and 2000¹²⁹. Annual forest losses in Brazil (2.9 million ha.) and Indonesia (1.9 million ha.), the highest suffered by any country during the 1990s, were reduced during the last decade (respectively to 2.6 million and

¹²⁶ *FAO – Anchoring Agriculture within Copenhagen Agreement, supra*, note 123, at p. 2.

¹²⁷ *FAO Information Note – Copenhagen, supra*, note 46, at p. 4.

¹²⁸ See: *COP-17 Decision 2, supra*, note 86, at para. 75 to 77.

¹²⁹ *FAO, Global Forest Resources Assessment – Main Report, 2010*, at p. xiii, online: <<http://www.fao.org/forestry/fra/en/>> (accessed Nov. 11, 2012) [hereinafter “*FAO, Forest Assessment 2010*”].

0.5 million ha.)¹³⁰. Wide-scale tree planting programs, along with natural forest expansion, have provided approximately five million ha. of new forests during each year between 2000 and 2010¹³¹. The annual global net forest loss thus fell from 8.3 million ha. between 1990 and 2000 to 5.2 million ha. between 2000 and 2010¹³². Tree planting programs in China, India and Viet Nam helped Asia register an average net annual gain of 2.2 million ha. of forests between 2000 and 2010. South America suffered the highest net annual forest loss during the same period with four million ha., followed by Africa (3.4 million ha. annual forest loss). Forest cover remained stable in North and Central America and expanded in Europe¹³³.

Approximately 13.5% of the world's forests benefit from the status of protected area. Potential to increase this percentage is relatively low, except in large forested regions with low population density (Amazon Basin, Congo Basin, boreal forests in Canada and Russia)¹³⁴.

Alternative ways of reducing GHG emissions via forests must increasingly be promoted. REDD+ (Reducing and reversing deforestation and forest degradation, conservation of existing carbon stocks and enhancement of carbon stocks) is viewed as one of the most promising and affordable GHG emission reduction measures¹³⁵ (. Other important areas where efforts must be stepped up include sustainable forest management, afforestation and reforestation, agro-forestry and providing wood fuels as a substitute for fossil fuels and wood products in lieu of more energy-intensive materials. Any efforts to preserve the sink attributes of forests must ensure that the market value of a standing tree surpass that of a cut down tree.

¹³⁰ *Id.*, at p. 21.

¹³¹ *Id.*, at p. 27.

¹³² *Id.*, at p. xiii.

¹³³ *Id.*, at p. xvi.

¹³⁴ *Id.*, at p. 50.

¹³⁵ See REDD+, *infra*, p. 571

III. Priority Needs of Future Climate Change Mitigation Efforts: Financing and Technology

A. Increased International Financing of Climate Change Mitigation Efforts Undertaken by Developing Countries

Since the adoption of the Bali Action Plan, developing countries have recognized that they must be actively involved in the fight against climate change, most notably given their continually increasing GHG emissions, that they will likely endure the most acute effects of climate change and that a substantial proportion of the climate change adaptation and mitigation potential lies in developing countries. On the basis of the principle of common but differentiated responsibilities embedded in the Preamble and in Articles 3.1 and 4.1 of the UNFCCC, developed countries are called upon to increase financial support for adaptation and mitigation efforts undertaken by developing countries.

The IPCC estimated additional financial needs of five sectors for adaptation measures in 2030¹³⁶. Estimates suggest financing needs anywhere between 50 and 170 USD billions, with the majority of the financing going to developing countries.

In order to reduce global GHG emissions by 25% below 2000 levels by 2030, financial resources needed for the implementation of requisite climate change mitigation measures have been estimated to USD 200-210 billion globally by the IPCC¹³⁷, in addition to the amount expected to be available under a business as usual scenario, with over half of the additional global investment and financial flows needed in developing countries.

IPCC projects that approximately 68% of the global GHG emission reductions will take place in developing countries, where mitigation opportunities are projected to be less costly due to the rapid economic growth of major developing countries, the relatively inefficient energy use

¹³⁶ See: UNFCCC, *Investment and financial flows to address climate change: an update*, FCCC/TP/2008/7 (2008), at p. 19 online: <<http://unfccc.int/resource/docs/2008/tp/07.pdf>>, (accessed Nov. 11, 2012) [hereinafter “UNFCCC – Climate Change and Financial Flows”].

¹³⁷ *Id.*, at p. 18.

and the prevalence of low-cost mitigation opportunities in the forestry sector.

International financing of climate change adaptation and mitigation measures directed toward developing countries is currently channeled through a variety of funding arrangements. The overview that follows focuses on existing international financing mechanisms aimed at climate change mitigation activities in developing countries; it only provides a sample of existing arrangements and does not pretend to be exhaustive.

1. UNFCCC Financing Already in Place

a. The Clean Development Mechanism

The Clean Development Mechanism (CDM) represents a blend of public-private support to climate change mitigation. Public financing, through development banks and government agencies, played an instrumental role in building capacity and to a lesser extent investing directly in CDM projects during the early stages. However, the CDM is increasingly channeling large amounts of private capital into climate change mitigation projects in developing countries. These private investment funds either invest in proposed projects, commit to purchase CERs, purchase primary CERs, or do secondary trading in CERs¹³⁸.

According to estimates, investments in CDM projects and the number of such projects have gone through an exponential increase between 2003 and 2007. As of February 9, 2011, there were 5,600 CDM projects of which 2,801 were registered (compared to 1,231 in November of 2008)¹³⁹ and 56 were requesting registration¹⁴⁰. The value of transactions that took place on the CDM market was estimated at close to USD 33 billion in 2008¹⁴¹. Given that nearly 80% of such an estimate consists of secondary trading of

¹³⁸ See: Jan CORFEE-MORLOT, Bruno GUAY (OECD) and Kate LARSEN (IEA), *Financing Climate Change Mitigation: Towards a Framework for Measurement, Reporting and Verification*, COM/ENV/EPOC/IEA/SLT(2009)6, 2009, at p. 26, online: <<http://www.oecd.org/env/climatechange/44019962.pdf>> (accessed Nov. 11, 2012) [hereinafter “OECD-IEA, *Financing Mitigation and MRV*”].

¹³⁹ UNFCCC – *Climate Change and Financial Flows*, *supra*, note 136, at p. 64.

¹⁴⁰ For up-to-date statistics: <<http://cdm.unfccc.int/Statistics/index.html>> (last consulted on February 9, 2011).

¹⁴¹ See: OECD-IEA, *Financing Mitigation and MRV*, *supra*, note 138, at p. 25.

CERs, only the primary sales of CERs, amounting to USD 6.5 billion, can be considered as an international financial flow from developed to developing countries. CDM projects initiated by UNFCCC Annex I countries were valued at USD 7.4 billion in 2007 compared to USD 5.8 billion in 2006¹⁴².

The lag of nearly one year between when CDM projects “enter the pipeline” and are finally registered has generated a significant difference between the amount expected to be invested in registered CDM projects (approx. USD 11.5 billion in 2007) and the investments in CDM projects entering the pipeline in the same year (approx. USD 45 billion USD in 2007). These numbers fail to reveal yet another lag that occurs between CDM project registration and its implementation, hence an investment may not necessarily take place in the same year as the registration of the CDM project to which it relates. The CDM Executive Board, responsible for approving CDM projects, would likely need increased resources to speed up the approval process, along with a streamlining of the approval process and criteria.

So far CDM projects have been concentrated in a few countries and in a few sectors: as of July 2009, almost 66% of all CDM projects in the pipeline were expected to take place in China and India and nearly 70% of all CERs issued by 2012 were expected to stem from these two same countries, with 55% of these CERs coming from China¹⁴³. Brazil and Mexico also attract many CDM projects but pale in comparison with China and India. Only 1% of CDM projects are to take place in least-developed countries (LDCs), possibly due to a limited number of potential projects but most likely due to insufficient administrative capacity in order to fully engage with the CDM.

The international community has come together through the Nairobi Framework in November of 2006 to increase participation of a greater number of developing countries in the CDM. The Nairobi Framework serves to build capacity in developing countries, with a focus on sub-Saharan Africa, for these countries to fully participate in the CDM.

¹⁴² UNCTAD TDR 2009, *supra*, note 4, at p. 160.

¹⁴³ *Id.*

The wind energy development sector has taken the CDM by storm: in August 2009, there were 740 wind projects in the CDM pipeline, amounting to 16% of all CDM projects, second only to hydropower projects (27%). Wind power CDM projects were expected to yield 11% of total CERs (see Box 1) issued per year¹⁴⁴. Once again, China and India dominated among wind CDM projects. Although China and India sported similar numbers of CDM projects in the pipeline (371 and 301 respectively), Chinese CDM projects accounted for 21 GW of installed capacity, more than three and a half times the expected amount in India (5.7 GW). Mexico and South Korea followed in wind energy CDM projects in the pipeline, with 12 projects each.

Agriculture is practically excluded from CDM projects: for instance, soil carbon sequestration, which accounts for nearly 90% of agriculture's mitigating potential, is excluded from CDM unless it qualifies as an afforestation/reforestation (A/R) project¹⁴⁵. However, projects entailing methane (CH₄) avoidance (626 projects in the CDM pipeline – 11% of projects as of February 9, 2011)¹⁴⁶, biogas projects and projects planning on using agricultural residues for biomass energy (723 projects in the CDM pipeline – 12% of projects as of February 9, 2011)¹⁴⁷ can qualify under the CDM¹⁴⁸.

Forestry has generated very little interest within the CDM realm: by July 2009, only six A/R CDM projects were registered¹⁴⁹ and as of February 9, 2011, only 60 A/R projects (1% of CDM projects) were in the CDM pipeline¹⁵⁰. As of March 2010, there were only eight A/R registered CDM projects out of over 2,000¹⁵¹. MRV problems combined with uncertainty

¹⁴⁴ IEA, *Technology Roadmap – Wind Energy*, 2009, at p. 40, online: <http://www.iea.org/publications/freepublications/publication/Wind_Roadmap-1.pdf> (accessed Dec. 1, 2012) [hereinafter “*IEA Roadmap – Wind Energy*”].

¹⁴⁵ FAO – *Enabling Agriculture*, *supra*, note 115, at p. 2.

¹⁴⁶ See: <<http://cdmpipeline.org/cdm-projects-type.htm>> (accessed on February 9, 2011).

¹⁴⁷ *Id.*

¹⁴⁸ FAO, *Carbon Finance Possibilities for Agriculture, Forestry and Other Land Use Projects in a Smallholder Context*, 2010, at p. 7, online: <<http://www.fao.org/docrep/012/i1632e/i1632e00.htm>> (accessed Nov. 11, 2012) [hereinafter “*FAO, Carbon Finance for AFOLU Projects*”].

¹⁴⁹ *Id.*

¹⁵⁰ See: <<http://cdmpipeline.org/cdm-projects-type.htm>> (accessed on February 9, 2011).

¹⁵¹ MINISTÈRE CHARGÉ DE L'ÉCOLOGIE ET DU DÉVELOPPEMENT DURABLE (France), *Press Kit – International Conference on the Major Forest Basins*, 2010, online: <<http://www>>

as to carbon sequestration through forests partly explain the negligible role of A/R projects under the CDM¹⁵².

Under the CDM, certain small-scale agricultural and forestry projects (that generate less than a specified amount of carbon sequestration) can benefit from simplified procedures and modalities, an exemption from the adaptation tax (2% levy on CERs generated through CDM projects) and reduced registration and administration fees¹⁵³. However, the CDM sets a cap on the size of these projects which are too low and prevent these projects from being financially viable at the current low level of carbon prices¹⁵⁴.

The GHG emission reduction potential of agriculture and forestry is far from being fully exploited by the CDM. The process and criteria in place to approve CDM projects should be amended to enable admissibility of GHG emission reduction projects based on agriculture, forestry and other land uses (AFOLU), while at the same time further facilitating the admissibility of small-scale projects. Another challenge facing the CDM consists of channeling a greater proportion of CDM projects in rural areas and in Africa.

During the Durban Climate Change Conference (CMP-7), Parties requested that the Executive Board of the CDM promote the equitable distribution of project activities and increase its support and assistance for countries underrepresented in CDM projects¹⁵⁵.

developpement-durable.gouv.fr/Conference-internationale-sur-les,14577.html> (accessed Nov. 11, 2012) [hereinafter “*Press Kit – Major Forest Basins*”].

¹⁵² See: FAO, *State of the World's Forests*, 2009, at p. 76, online: <<http://www.fao.org/forestry/sofo/en/>> (accessed Nov. 11, 2012).

¹⁵³ FAO, *Carbon Finance for AFOLU Projects*, *supra*, note 148, at p. 8.

¹⁵⁴ UNCTAD *TDR 2009*, *supra*, note 4, at p. 99 and 163.

¹⁵⁵ UNFCCC, “Decision 8/CMP.7: Further guidance relating to the clean development mechanism”, *Report of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol on its seventh session, held in Durban from 28 November to 11 December 2011 – Addendum – Part Two: Action taken by the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol at its seventh session*, FCCC/KP/CMP/2011/10/Add.2 (March 15, 2012), at para. 30 and 31, online: <<http://unfccc.int/resource/docs/2011/cmp7/eng/10a02.pdf>> (accessed Nov. 11, 2012).

b. Joint Implementation

Through JI, the Kyoto Protocol also authorizes an UNFCCC Annex I country to invest in GHG emission reduction or removal projects in another UNFCCC Annex I country in order to obtain ERUs to be counted towards meeting its GHG emission reduction target.

Twenty-two (22) JI projects had entered the pipeline in November of 2008. The JI projects that entered the pipeline during 2007 were expected to generate investments of USD 3.3 billion¹⁵⁶. The number of JI projects has since then encouragingly increased: as of September 30, 2010, 236 projects had been submitted and published on the UNFCCC website for public comment and 23 positive determinations were deemed final¹⁵⁷. During the Durban Climate Change Conference (CMP-7), Parties noted with appreciation that 291 projects had made their way before the JI Supervisory Committee (JISC) and that 39 determinations had been reached by the JISC in respect of such projects¹⁵⁸.

c. The Global Environment Facility¹⁵⁹

Established in 1991, the Global Environment Facility (GEF) Trust Fund operates as the financial mechanism of the UNFCCC. GEF funding comes from voluntary donor country contributions. The GEF has distributed approximately USD 2.4 billion between 1991 and 2008 to climate change projects. Funding for GEF climate change projects has averaged USD 163 million a year from 2003 to 2006, 33% more than the previous four year period. The GEF funds five project types, namely renewable energy, energy efficiency, sustainable transportation, adaptation, low GHG energy technologies and enabling activities¹⁶⁰. The GEF Trust fund has

¹⁵⁶ UNFCCC – *Climate Change and Financial Flows*, *supra*, note 136, at 64.

¹⁵⁷ JISC, *Annual Report (2010)*, *supra*, note 28.

¹⁵⁸ UNFCCC, “Decision 8/CMP.7: Further guidance relating to the clean development mechanism”, *supra*, note 155, at par. 3.

¹⁵⁹ See: <<http://www.thegef.org/gef/whatisgef>> (accessed Nov. 11, 2012) and <<http://www.undp.org/gef/>> (accessed Nov. 11, 2012). See also: OECD-IEA, *Financing Mitigation and MRV*, *supra*, note 138.

¹⁶⁰ Sujata GUPTA et al., “Chapter 13: Policies, Instruments and Co-Operative Arrangements”, in B. METZ, O. DAVIDSON, P. BOSCH, R. DAVE et L. MEYER (eds.), *supra*, note 116, online: <http://www.ipcc.ch/publications_and_data/ar4/wg3/en/ch13.html>, (accessed Nov 11, 2012), at p. 786.

received a total of USD 10.885 billion during four replenishments slated to take place every four years from 39 donor countries¹⁶¹.

The key characteristic of GEF lies not in the importance of the amounts it invests, but in its role as a private investment leveraging tool, attracting private investments in less carbon intensive and difficult markets that would otherwise have been bypassed: the GEF has annually leveraged about seven times its own capital contributions through co-financing over the past ten years¹⁶².

The GEF also administers the Least Developed Countries Fund (LDCF) and the Special Climate Change Fund (SCCF), two funds geared toward financing adaptation measures. The GEF has received voluntary contributions of approximately USD 120 million for the SCCF and of approximately USD 180 million for the LDCF¹⁶³. The GEF provides secretariat services on an interim basis to the Adaptation Fund¹⁶⁴, which is managed by its own Adaptation Fund Board.

d. REDD+

As its name suggests, REDD+ aims at reducing GHG emissions due to deforestation and forest degradation, maintaining forest carbon stocks, promoting sustainable forest management and increasing forest carbon stocks. REDD+ is built around three principles: the need for good forest governance, respect for the right of indigenous people and members of local communities and protection and conservation of biological diversity and ecosystem services¹⁶⁵.

During the International Conference on the Major Forest Basins that took place in Paris on March 11, 2010 and which reunited countries with major forest basins and major donor countries¹⁶⁶, Australia, France, Japan, Norway, the United Kingdom and the US confirmed their collective pledge of USD 3.5 billion as initial public finance for REDD+ over the 2010-2012

¹⁶¹ See: <<http://www.thegef.org/gef/node/2042>> (accessed Dec. 1, 2012).

¹⁶² *OECD-IEA, Financing Mitigation and MRV, supra*, note 138, at p. 17.

¹⁶³ See: <<http://www.thegef.org/gef/node/2042>> (accessed Dec. 1, 2012).

¹⁶⁴ See: <http://unfccc.int/cooperation_and_support/financial_mechanism/adaptation_fund/items/3659.php> (accessed Dec. 1, 2012).

¹⁶⁵ *Press Kit – Major Forest Basins, supra*, note 151.

¹⁶⁶ *Id.*

period made during the Copenhagen Conference. Germany, Slovenia, Spain and the European Commission joined the group of donors. Donor countries underlined the important role that “fast-start funding” (the USD 30 billion pledge made in the Copenhagen Accord) will be asked to play regarding REDD+, stating that more than 20% of fast-start funding should be devoted to REDD+.

Donor countries had apparently managed to collect close to USD 3.5 billion by March 2010¹⁶⁷ with donor countries contributing the following amounts: Norway (USD 1 billion), the US (USD 1 billion), Japan (USD 500 million), the United Kingdom (USD 480 million), France (USD 375 million) and Australia (USD 120 billion)¹⁶⁸.

Participating countries then met at the Oslo Climate and Forest Conference held on May 27, 2010 and formalized their involvement by creating an interim REDD+ Partnership open to all countries wishing to join¹⁶⁹. Further pledges were made in Paris and Oslo: as of May 27, 2010, total pledges stood at USD 4 billion and the REDD+ Partnership included 58 countries¹⁷⁰.

REDD+ Partners met in Nagoya, Japan on October 26, 2010. Partner countries had grown to 62 by then and new pledges were announced by Belgium, Canada and Italy totalling approximately USD 150 million¹⁷¹.

Developing countries that participate in REDD+ have agreed to adopt a national strategy on deforestation and its causes, to establish a reliable and transparent monitoring systems, to prepare and implement REDD+ actions and demonstration activities and to ensure that relevant stakeholders, including indigenous peoples, local communities and civil society, be fully involved in designing and implementing REDD+.

Several programmes will also be used to relay REDD+ funding, including: the United Nations Collaborative Program on Reducing Emis-

¹⁶⁷ ICTSD – *Fast-Start Climate Funding*, *supra*, note 42, at p. 3.

¹⁶⁸ See: *Press Kit – Major Forest Basins*, *supra*, note 151.

¹⁶⁹ REDD+ PARTNERSHIP, *REDD+ Partnership Adopted*, 2010, online: <<http://reddpluspartnership.org/en/>> (accessed Nov. 11, 2012).

¹⁷⁰ *Id.*

¹⁷¹ See: REDD+ PARTNERSHIP, *Co-chairs’ Summary – Aichi-Nagoya Ministerial Meeting of the REDD+ Partnership*, 2010, online: <<http://reddpluspartnership.org/en/>> (accessed Nov. 11, 2012).

sions from Deforestation and Forest Degradation in developing countries (UN-REDD Program), the Government of Norway's International Climate and Forest Initiative and the World Bank's Forest Carbon Partnership Facility (FCPF). Moreover, the UN-REDD Program and the FCPF will be providing secretariat services to the REDD+ Partnership.

The following estimates of the financing required by REDD+ efforts to significantly curb deforestation and forest degradation rates have been put forward: USD 12 billion per year to eliminate deforestation in non-industrialized countries by 2030 (UNFCCC); USD 17 to 28 billion per year to halve the rate of deforestation (International Institute for Applied Systems Analysis); USD 20 to 33 billion to halve the deforestation rate by 2020 (European Commission)¹⁷². The creation of REDD+ constitutes a milestone in combating deforestation, but its elimination will need much more financing. Moreover, the implementation of REDD+ is faced with definition (e.g. what is a forest) and MRV problems.

Moreover, concerns have arisen that some of the donor countries may divert Official Development Assistance (ODA) funds to meet their REDD+ pledges and that REDD+ funding may not be additional to development aid¹⁷³. Developing countries are claiming that additional aid must be devoted to climate change in order to avoid creating or amplifying social and economic problems that ODA already intended to address.

Towards REDD++

Given that very few funding initiatives target agriculture, and that agriculture is the single most important cause of deforestation, there have been suggestions that REDD+ be broadened to cover all AFOLU activities – and be designated as REDD++ – in order to develop a comprehensive approach towards terrestrial carbon sequestration that would take advantage of synergies between various land uses and avoid potential leakage¹⁷⁴.

It has also been suggested that a REDD-like mechanism be set up for agriculture that could serve to provide a globally coordinated effort in improving MRV in agriculture, a global agricultural land management

¹⁷² *Press Kit – Major Forest Basins, supra*, note 151.

¹⁷³ *ICTSD – Fast-Start Climate Funding, supra*, note 42, at p. 3.

¹⁷⁴ *AWG-LCA, Mitigation in the Agricultural Sector, supra*, note 122, at para. 22.

accounting and trading system and a smallholder climate change readiness fund¹⁷⁵.

2. International Financing Going Forward

Current international funding of climate change mitigation actions in developing countries falls short of what will be needed in years to come. Many suggestions have been put forth by different countries to increase the availability of international funding for this purpose¹⁷⁶.

Notwithstanding the particular path chosen to increase international financing of climate change mitigation actions undertaken by developing countries, the following key principles should guide supplemental efforts in this regard¹⁷⁷.

First, it should be noted that climate change will impact the economic development of developing countries and that it thus constitutes both an economic and an environmental challenge. Therefore, international financing should address economic development and climate change in a complimentary and coordinated fashion as opposed to in silos.

Second, developing countries should pilot climate change mitigation activities to ensure that these activities correspond to their needs, views and priorities. Country ownership of climate change mitigation projects should be enhanced.

Third, developing countries should equip themselves with national climate change strategies and fully integrate such strategies into relevant policies targeting key climate change related sectors (agriculture, rural development, energy, water resources, etc.) in order to successfully lead the charge in addressing climate change domestically. As a result, international financing should be streamlined and the number of funding mechanisms should be reduced to take advantage of economies of scale and greater coordination thanks to sharing administrative capacities.

¹⁷⁵ *FAO – Enabling Agriculture, supra*, note 115, at p. 10.

¹⁷⁶ See: *UNFCCC – Climate Change and Financial Flows, supra*, note 136, at p. 94.

¹⁷⁷ See: *OECD, Factsheet – Key Principles to Inform Climate Change Financing*, 2009, at p. 1 and 2, online: <<http://www.oecd.org/env/climatechange/43423222.pdf>> (accessed Nov. 11, 2012).

Fourth, international financing should follow a programmatic approach as opposed to a project level approach. A programmatic approach can be defined as a strategic arrangement of interlinked projects that contribute to the attainment of an overarching objective (e.g. climate change mitigation). A programmatic approach can be designed at thematic, regional, and national levels. Planning at a programmatic level improves the predictability of financing as funding decisions are taken prior to reaching the project level. A programmatic approach also enhances country ownership as developing countries play a greater role in overseeing specific projects; it can also offer the possibility, in certain instances, for developing countries to include such financing in their budgets, thus subjecting it to scrutiny by parliaments and similar domestic accountability institutions and civil society. The programmatic approach has been approved during the Durban Climate Change Conference in respect of LDCs who wish to adopt it¹⁷⁸.

Fifth, all current and future international financing directed towards developing countries from public and private sectors should favor more sustainable and climate-friendly projects activities when such an alternative exists; mechanisms that assess and better rate climate-friendly projects should be put in place.

Finally, given their significant and still largely untapped mitigation potentials, agriculture and forestry must be explicitly identified as priority sectors when financing mitigation actions in developing countries.

B. Increased International Technology Development and Transfer

New technologies will play a critical role in mitigating GHG emissions and adapting to climate change. Both the UNFCCC and the Kyoto Protocol require Parties to promote and cooperate in the development and dif-

¹⁷⁸ UNFCCC, “Decision 9/CP.17: Least Developed Countries Fund: support for the implementation of elements of the least developed countries work programme other than national adaptation programmes of action”, *Report of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol on its seventh session, held in Durban from 28 November to 11 December 2011 – Addendum – Part Two: Action taken by the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol at its seventh session, supra*, note 83, at par. 1(b).

fusion, including transfer, of technologies that control, reduce or prevent GHG emissions¹⁷⁹. Technology transfer can be understood as the way in which climate-friendly technologies are developed and shared across borders. In adapting to and mitigating the effects of climate change, developing countries will need to gain access to new technologies such as wind energy, flood control technologies and drought resistant crop strains.

The AWG-LCA discussions launched during COP-13 in Bali were mandated to focus, among other issues, on enhancing actions, mechanisms and financial incentives for the development within developing countries – and the transfer toward these same countries – of climate change adaptation and mitigation technology. These same discussions were also mandated to focus on increasing international technology collaboration, including win-win solutions (i.e. whereby both developed and developing countries involved gain from collaborating). The Bali Action Plan insisted on both the development and the transfer of technology. Nevertheless, international discussions surrounding climate change technology tends to focus more on the transfer than on the development thereof.

Progress was achieved at COP-15 in Copenhagen with the creation of a Technology Mechanism; Parties built on this breakthrough by further structuring the Technology Mechanism at COP-16 in Cancun (see descriptions of COP-15 and COP-16 above).

1. International Technology Collaboration

International technology collaboration can help accelerate and facilitate a change toward more climate-friendly technologies by a greater sharing of information, knowledge, lessons learned, costs and efforts. International technology collaboration allows developing countries to enhance domestic scientific capabilities by gaining access to additional facilities and resources. International technology collaboration proves most popular in respect of long-term transformative R&D efforts and in the early stages of technology development that entail high research costs. The more a technology gets closer to commercialisation, the less room there is for collaboration; however, collaboration can still prove helpful in

¹⁷⁹ See, e.g.: *UNFCCC*, *supra*, note 10, art. 4.1(c); *Kyoto Protocol*, *supra*, note 22, art. 10.

respect of market deployment efforts, information and education campaigns and standards development¹⁸⁰.

The International Energy Agency (IEA) has developed the greatest expertise in international collaboration regarding energy technology R&D. The IEA administers more than 40 Implementing Agreements¹⁸¹, established through its Framework for International Technology Cooperation, which cover nearly all key sectors of climate-change relevant energy technology.

One example of international technology collaboration in the wind energy sector is embodied by the IEA Wind Energy Systems Implementing Agreement (IEA Wind). IEA Wind involves national technology experts from over 20 countries, who together have developed a coherent research program in a number of important areas up to 2013¹⁸². Another example, this time in the solar sector, is the IEA Solar PACES Implementing Agreement, supported in particular by Germany, the European Commission and the US Department of Energy¹⁸³.

2. International Technology Transfer Going Forward

To positively and deeply impact the abilities of developing countries to access, use and further improve climate-friendly technologies, technology transfer must involve situations whereby developing countries can use such technologies within their own institutions and businesses as a result of an intellectual property (IP) licensing agreement or a collaborative technology development contract. Developing countries currently face a

¹⁸⁰ See: Ujjwal KACKER, "Technology Transfer and Financing: Issues for Long Term Climate Policy in Developing Countries", (2009) 3 *CCLR* 292, at 297-298 [hereinafter "*Kacker – Technology and Financing*"]; see also: Debra Justus (OECD) and Cédric Philibert (IEA), *Synthesis Report – International Energy Technology Collaboration and Climate Change Mitigation*, COM/ENV/EPOC/IEA/SLT(2005)11, online: <<http://www.oecd.org/env/climatechange/35798801.pdf>> (accessed Dec. 1, 2012), at 5.

¹⁸¹ See: IEA, *Implementing Agreements – Background and Framework as of 2003*, 2003, online: <http://www.iea-4e.org/files/otherfiles/0000/0042/Framework_text.pdf> (accessed Dec. 1, 2012).

¹⁸² *IEA Roadmap – Wind Energy*, *supra*, note 144, at p. 39.

¹⁸³ IEA, *Renewable Energy Essentials: Concentrating Solar Thermal Power*, 2009, online: <http://www.iea.org/publications/freepublications/publication/CSP_Essentials.pdf> (accessed Dec. 1, 2012), at 4.

shortage of bargaining power when negotiating climate change technology licenses due notably to a lack of purchasing capital and ownership over climate change technology IP that can be traded for accessing other technologies. Given that certain types of climate-friendly technologies (e.g. solar) have reached a mature level and are not all concentrated within the hands of only a few protagonists, an opportunity currently exists of empowering developing countries by becoming owners and traders of climate change technology, thus not only furthering climate change mitigation efforts, but also helping the economic development of developing countries.

Most technologies must be adjusted to their new working environment in order to reap the full benefit thereof. This technology adjustment process requires that developing countries may domestically rely on people capable of using and adjusting the technologies being transferred. Therefore, a key concern of technology transfer efforts should focus on ensuring that developing countries can count on people versed in climate change technologies from within their own universities and research institutions¹⁸⁴.

In terms of capacity building, it is suggested that future measures to assist developing countries should focus on the following objectives: training domestic professionals versed in IP-related skills such as patent drafting, contract negotiation and technological marketing; discounting and/or subsidizing patent application fees incurred by developing country research institutions and small and medium enterprises (SMEs), and helping developing countries adopt and implement domestic innovation policies and strategies that stress protection of IP rights for domestic R&D. In terms of financial support, an international fund should be established that would serve to finance climate change R&D efforts taking place in developing countries¹⁸⁵. On the technology development side, funding should also encourage domestic research using traditional knowledge,

¹⁸⁴ Cynthia CANNADY (ICTSD), "Access to Climate Change Technology by Developing Countries: a Practical Strategy", *Intellectual Property and Sustainable Development Series • Issue Paper 25* (2009), online: <<http://ictsd.org/i/publications/129640/>> (accessed Nov. 11, 2012) [hereinafter *Cannady – Practical Strategy*], at p. 21-22; Kacker – *Technology and Financing*, *supra*, note 180, at p. 294.

¹⁸⁵ *Cannady – Practical Strategy*, *supra*, note 184, at p. 21 and 22.

which can often lead to technologies and methods better suited to the prevailing local conditions and challenges.

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Given the public finance concerns developed countries are currently grappling with, and in light of the sheer amount of resources needed to fight climate change, non-governmental organizations, civil society and more particularly the private sector will be relied on heavily going forward. This trend has been voiced with increasing clarity by developed countries ever since the Copenhagen Climate Change Conference in December 2009.

States around the world, which have identified foreign direct investment (FDI) as an indispensable ally in their quest for greater economic development, now turn to FDI with the hope that it will play a key role not only in greening the economy and promoting sustainable development, but also in reducing greenhouse gas emissions.

It is estimated that at least USD 97 billion of “climate specific finance” is annually made available to “low-carbon” and “climate-resilient” development¹⁸⁶. The private sector provides approximately USD 54.6 billion to climate change mitigation projects, i.e. more than half of all current climate finance¹⁸⁷. Developed and developing countries alike also hope that such climate finance flows will bring about technology transfer in their wake.

The slow pace of climate change negotiations, combined with its ultimate focus on regulating primarily public-source funding for climate change adaptation and mitigation, suggest that the legal framework that will impact climate finance the most in the short and medium terms might not originate in the climate change forum. Identifying and understanding the legal rules applicable to FDI may yield unsuspected benefits for climate change mitigation.

¹⁸⁶ Barbara BUCHNER, Angela FALCONER, Morgan HERVÉ-MIGNUCCI, Chiara TRABACCHI and Marcel BRINKMAN, *The Landscape of Climate Finance – a CPI Report*, Oct. 2011, online: <<http://climatepolicyinitiative.org/publication/the-landscape-of-climate-finance>>, (accessed on Dec. 1, 2012), at p. 4.

¹⁸⁷ *Id.*, at p. 8.