



**Global Action
on Climate Change
in Agriculture:
Linkages to Food Security,
Markets and Trade Policies
in Developing Countries**



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By

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Acronyms

AAU	Assigned Amounts Units
ADB	Asian Development Bank
AfDB	African Development Bank
AFOLU	Agriculture, Forestry and Other Land Uses
AfT	Aid for Trade
A/R	Afforestation/reforestation
AWG-KP	Ad-hoc working group on the Kyoto Protocol
AWG-LCA	Ad-hoc working group on long term action
BTA	Border tax adjustment
CA	Conservation agriculture
CDM	Clean Development Mechanism
CER	Certified Emissions Reductions
CIF	Climate Investment Fund
CMP	Meeting of the Parties of Kyoto Protocol
COP	Committee Of Parties
CPC	Central Product Classification
CTF	Clean Technology Fund
CTO	Committee on Trade and Environment
DAC-CRS	Development Assistance Committee's Creditor Reporting System
DSB	Dispute Settlement Body of the WTO
EBA	Everything-but-Arms
EBRD	European Bank of Reconstruction and Development
EE	Energy efficiency
EGs	Environmental goods and services
EIF	Enhanced Integrated Framework
EIT	Economies in Transition
ERU	Emission Reduction Units
FCPF	Forest Carbon Partnership Facility
GATT	General Agreement on Trade and Tariffs
GEF	Global Environment Facility
GHG	Greenhouse gases
GSP	Generalized System of Preferences
HS	Harmonized System
IDB	Inter-American Development Bank
IEA	International Energy Agency
IIRSA	Initiative for Integration of Regional Infrastructure in South America
IPCC	Inter-governmental Panel on Climate Change
IPRs	Intellectual Property Rights
ITA	Information Technology Agreement
JI	Joint Investment
LCA	Lifecycle analysis
LDCF	Least Developed Countries Fund
LULUCF	Land Use and Land Use Change and Forestry

MCA	Multi-criteria analysis
MDB	Multilateral development bank
MEA	Multilateral Environmental Agreement
MFN	Most favoured nation
MRV	Monitoring, Reporting and Verification
NAMA	Nationally appropriate mitigation actions
NAPA	National Adaptation Programme of Actions
NGO	Non-governmental organization
NTB	Non-tariff barrier
ODA	Official Development Assistance
OECD	Organization of Economic Cooperation and Development
PPM	Process and production method
PTA	Preferential Trade Agreement
R&D	Research and development
REDD	Reducing Emissions from Deforestation and Forest Degradation
SBI	Subsidiary body on implementation
SBSTA	Subsidiary body on scientific and technical advice
SCCF	Special Climate Change Fund
SCMA	Subsidies and Countervailing Measures Agreement
SECCI	Sustainable Energy and Climate Change Initiative
SPSA	Agreement on the Application of Sanitary and Phytosanitary Measures
SSCL	Services Sectoral Classification List
SVEs	Small, Vulnerable Economies
TBTA	Agreement on Technical Barriers to Trade
TRIMS	Trade-Related Investment Measures
TRIPS	Trade-Related Aspects of Intellectual Property Rights
UNFCCC	United Nations Framework Convention on Climate Change
WTO	World Trade Organization

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Executive Summary

The objective of this report is to catalyse thinking about the ways in which agriculture – which has a vital role in global food security, development and natural resources use – can and must be fully integrated into national strategies and a consensus-based multilateral framework to address the challenges of climate change. The report brings forth questions that will occupy the world community over the next decade or more regarding the role of agriculture in climate change adaptation and mitigation. The report offers some answers and concrete proposals – while recognizing that much more needs to be learned, more questions formulated, and more experience gained, to build an effective strategy to support global agricultural adaptation while harnessing its significant potential contribution to climate change mitigation and taking into consideration development objectives and food security concerns.

Climate change and agriculture

Agriculture is among the most vulnerable sectors to the effects of climate change because changes in temperatures and rainfall, more frequent weather extremes, and the growing presence of carbon dioxide (CO₂) in the atmosphere have mostly negative effects on productivity. Yet, the projected increase in world population during the next 40 years, which should reach 9.1 billion in 2050, calls for agriculture to significantly step up its productivity and production levels. Agricultural activities also account for a substantial share of total greenhouse gas (GHG) emissions and these are expected to increase in the future due to a variety of drivers, including population and income increases, diet changes and technological change. Together, these factors demonstrate the urgency of implementing measures that favour actions and policies that simultaneously address climate change mitigation and adaptation in agriculture

while supporting development objectives and ensuring food security.

Agricultural mitigation and adaptation

In industrial economies, a fundamental rethink of the way agriculture is practiced needs to be initiated. Mitigation practices include conservation agriculture, organic agriculture and greater reliance on renewable energy for domestic use in rural households in developing countries. Finding ways to reduce reliance on chemicals and synthetic fertilizers and creating incentives to promote the use of renewable energy throughout the modern agricultural systems is of the utmost urgency and requires concerted policy action.

Adaptation to climate change is a multi-dimensional, ecological and socio-economic process. Much agricultural adaptation occurs autonomously at the local level as farmers adjust their planting systems to climatic change. Planned adaptation occurs at the sectoral and national levels and includes policies such as addressing changes in food insecurity, identifying vulnerabilities, re-assessing agricultural research priorities, and strengthening agriculture extension and communication systems. Planned action on climate change adaptation should build on, coordinate with, and remove impediments to autonomous local adaptation, while pursuing sector-level and long-term adjustment.

A role for agriculture in the multilateral UNFCCC framework

Agriculture's potential contribution to climate change mitigation has yet to be fully harnessed in the coordinated, multilateral climate mitigation action being undertaken within the UNFCCC framework. A role for agriculture was addressed in a draft decision

produced by the *Ad-hoc* working group on long term action (AWG-LCA) for the 2009 UNFCCC Copenhagen meeting, which outlined a commitment for members to promote and cooperate in research and development and technology transfer to mitigate GHG emission while promoting agricultural efficiency and productivity and taking into account development priorities and food security. Climate change talks in Copenhagen did not focus on agriculture in time to settle the technicalities necessary for reaching even a political agreement on agriculture's inclusion in the accord. Hence, neither agriculture nor food security are mentioned in the Copenhagen Accord, despite their critical importance for developing countries. However, the proposed agriculture text in Copenhagen was dropped in Cancun (only calling for a work programme of the Subsidiary Body on Scientific and Technical Advice - SBSTA). Now it remains as "agriculture as a driver of deforestation" in REDD+.

GATT/WTO rules: "Climate first, trade second"

The most challenging question for world trade that is posed by actions taken to adapt to and mitigate climate change is whether the rules-based global trade system under the GATT/WTO can achieve a balance between ensuring an open and fair multilateral trading system while providing sufficient scope for multilateral and national action to mitigate climate change.

Climate change is now recognized as primary – "Climate first, trade second." Within the framework of a multilateral consensus on climate change targets and mandates, multilateral trade rules should not hinder policies that encourage a switch to more sustainable patterns of consumption and production, and trade rules should themselves encourage the sustainable use of resources.

A review of the multilateral trade framework and an analysis of trade rules from an environmental perspective find that the WTO

Appellate Body has adopted interpretations of GATT provisions that now give environmental measures a better chance to pass muster. Unilateral trade measures can be justified as long as they are applied flexibly and in connection with good-faith negotiating efforts to reach a multilateral agreement on the policy issues that eventually prompted the unilateral trade measures. Unilateral trade measures in accordance with trade restrictions embedded within a multilateral environmental agreement (MEA), even if applied to countries that are not parties to the MEA, could likely be justified as long as membership to the MEA is open to all countries to which the trade restrictions apply.

Overall, however, the long and arduous process in the adjustment of GATT/WTO trade rules to environmental concerns has demonstrated the continued primacy of trade over environmental concerns. Many trade rules need to be reconfigured in light of the mounting concerns over sustainability of natural resources and the increasingly pressing challenges posed by climate change. Proposed areas in which global trade rules could be "greened" include a reduction in fossil fuel subsidies; increased renewable energy subsidies; liberalized trade in biofuels and in environmental goods and services; mandatory and voluntary standards, certificates and labels; and technology transfer.

The funding chasm

A critical obstacle to developing countries' adaption and mitigation activities in agriculture is their ability to marshal the resources needed to build the capacity to identify, plan, prioritize and implement effective climate change programmes. The UNFCCC incorporates the principle of differentiated obligations, which include the provision of financial support from developed to developing countries. The multilateral community has also stepped up to provide a number of funding mechanisms. Nevertheless, the financing 'chasm' is still far from being bridged and represents one of the

key obstacles in the coordinated, multilateral fight against global climate change.

Since climate change impacts the economic development of developing countries, it constitutes both an economic and an environmental challenge. Therefore, international financing should address economic development and climate change in a complementary way. Allowing developing countries to ensure that funded activities correspond to their needs, views and priorities; that multiple funding sources are streamlined and coordinated; and that the financing is used to support an over-arching, programmatic strategic approach are among the principles that would help to ensure the most effective use of funding provided to developing countries.

Meeting the challenges

Meeting the challenges of ensuring food security and supporting agricultural development, at the same time as coping with the need for farming systems to adapt to and mitigate climate change, will require broad-based commitment by the global community, more substantial financial transfers to developing countries than has so far been achieved, and concerted national and multilateral policy action involving the convergence of adaptation, climate change mitigation and trade.

Chapter 1

Introduction

In its Fourth Assessment Report on climate change, published in 2007, the Intergovernmental Panel on Climate Change (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.¹ Global greenhouse gas (GHG) emission levels are projected to continue growing over the coming decades.² Key drivers of GHG emissions include economic growth, population growth and technological progress, along with changes in consumption and production patterns.³

Agriculture is one of the sectors that is most vulnerable to the effects of climate change. Agricultural production and productivity are impacted in multiple ways: (i) higher temperatures affect plant health, increase the occurrences of pests, and lower water availability; (ii) modified rainfall patterns reduce water availability and shift rainy seasons, with consequences both for irrigated and rainfed agriculture and for farming systems; (iii) enhanced frequency of weather extremes worsens supply variability; (iv) enhanced carbon dioxide (CO₂) concentration in the atmosphere may improve yields and crop productivity in some cases; and (v) the rise in sea level and frequent flooding disturb global

agricultural production patterns, generating losses for some farmers and countries.

While the magnitude of the impact on global agricultural production is uncertain at this time, countries in the temperate zones of North America, Northern Europe and Asia are expected to benefit from increased agricultural productivity. In contrast, regions around the Mediterranean and especially in tropical zones are expected to be net losers from declining productivity. For most developing countries in semi-arid, arid and tropical zones, yields are expected to drop significantly, reducing current production levels and making it more challenging to reach the even higher productivity goals needed to meet their growing food demands in the next decades.⁴

As production possibilities shift across agro-ecological zones, global agricultural trade flows will also shift dramatically. Because the disruption of agricultural production is expected to be most severe in developing countries, both their import food requirements and their import financing needs will increase substantially. Thus, the expected effects of climate change on global agricultural production will have serious and negative impacts on food security for many countries.

The disruption in global agriculture will occur as the world population during the next 40 years increases to a projected 9.1 billion in 2050, thus requiring that agriculture significantly step up

1 UNEP - WTO - Trade & Climate (2009, 194 pp.), at vii.

2 UNEP - WTO - Trade & Climate (2009, 194 pp.), at vii.

3 UNCTAD - Trade & Development Report, 2009 - Climate Change Mitigation & Development (218 pp.), at 135.

4 FAO - Organic Agriculture and Stability of Food Supply (5 May 2007, 32 pp.), at 7.

production and productivity in the coming decades. Without sufficient adjustment by existing agricultural systems, the number of people living in hunger will rise rapidly over the next 50 years. For example, 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 in Africa could increase by 10 million more to a total of 52 million by 2050.⁵ Climate change thus is expected to result in impacts on all four dimensions of food security: availability, stability, utilization and access (Schmidhube et al. 2007).

The Stern Review and IPPC reports also draw attention to the particular necessity to adapt agriculture to be more climate-resilient in developing countries because of the heavy reliance of their economies on this climate-sensitive sector (Wiegman, 2010).

Measures and actions taken in respect of climate change can be organized into two broad categories: mitigation and adaptation, although this distinction is not airtight. Often adaptation measures also serve mitigation purposes and vice versa. An important distinction between mitigation and adaptation is that mitigation activities, wherever they occur, generate a global benefit of reduced GHG emissions. Adaptation activities respond to specific climate change impacts and they benefit those locally who pay for it (Wiegman 2010).

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 that sequester carbon, such as forests and oceans.⁶

Adaptation measures mainly relate to addressing the 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 timeframe. 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 change.⁷

The cost of adaptation to climate change is difficult to estimate because it depends upon projected climate changes, assessments of vulnerability, and data about adaptation activity at the farm and national levels that are often limited. Therefore, cost estimates of adaptation vary widely, ranging between USD 9 billion and USD 86 billion (Müller, 2008).

Developing countries will have difficulty in marshalling the sizeable resources that will be needed to finance their adaptation to a changing climate. The global community is being called upon to help provide the urgently needed funds that developing countries require to build their capacity to plan and prioritize adaptation actions, and to implement effective adaptation policy while at the same time meeting their policy objectives for development, poverty reduction and food security.

5 IFPRI - Climate Change - Impact on Agriculture and Costs of Adaptation (2009, 30 pp.).

6 UNCTAD - Trade & Development Report, 2009 - Climate Change Mitigation & Development (218 pp.), at 133, and UNEP - WTO - Trade & Climate (2009, 194 pp.), at 24-25.

7 UNCTAD - Trade & Development Report, 2009 - Climate Change Mitigation & Development (218 pp.), at 133, and UNEP - WTO - Trade & Climate (2009, 194 pp.), at 24-25.

Agricultural mitigation and adaptation activity at the farm and national levels, and the costs and financing of adaptation, are the subject of Chapter Two of this report.

Because climate change is a global problem, its mitigation requires concerted and coordinated multilateral action to reduce the growth in GHG emissions that are the cause of global warming. Since 1990, the United Nations Framework Convention on Climate Change (UNFCCC) has served as the forum in which multilateral action on climate mitigation measures and commitments are negotiated and implemented. In 1997, the UNFCCC framework led to the signing of the 1997 Kyoto Protocol, which mandates UNFCCC Annex I countries⁸ to reduce, either individually or jointly, their aggregate anthropogenic GHG emission levels between 2008 and 2012. Negotiations continue on a post-Kyoto accord but, despite the growing urgency of aggressive action, the complexity and enormity of the task has stalled progress on defining new GHG reduction mandates.

In Chapter Three, we analyse and assess the current and potential role of agriculture in the multilateral UNFCCC framework, and the costs and funding of developing countries' implementation of UNFCCC climate change mitigation action.

In part as a response to the difficulties being encountered by the international community in finding multilateral solutions to address global warming, many countries are pursuing and enacting unilateral "climate smart" policies to mitigate against global warming and to ensure greater ability to adapt to the

immediate impacts of climate change. To do so, many current laws, policies and actions are changing in order to prompt a shift to a low-carbon economy and towards more sustainable patterns of production and consumption. As a result, domestic measures that address climate change but that impact trade have been multiplying.

National actions intended to address environmental concerns raised fears of protectionism long before global warming garnered any political attention. Now that the fight against climate change heads the international political agenda, there is growing debate as to whether international trade rules unduly impede climate-friendly measures and, more important, whether they allow the climate-friendly potential of trade to be fully exploited.

Today, trade is being called upon to serve climate change objectives and not the reverse. In Chapter Four, a review of the multilateral trade framework and an analysis of trade rules from an environmental perspective describe an evolving interpretation of the General Agreement on Trade and Tariffs/World Trade Organization (GATT/WTO) rules that now provide greater opportunity for members to pursue unilateral, trade-related measures that have environmental objectives. The chapter also identifies nine areas in which WTO members could change GATT/WTO rules to achieve a better balance between safeguarding the principals of an open trading system and the increasing demands for environmental protection and sustainable use of natural resources, while simultaneously supporting development, poverty reduction and food security goals.

8 Annex I countries: Australia, Austria, Belarus, Belgium, Bulgaria, Canada, Croatia, Czech Republic, Denmark, Estonia, European Union, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russian Federation, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom of Great Britain and Northern Ireland, United States of America.

Chapter 2

Agriculture and Climate Change Mitigation and Adaptation

Agriculture is one of the sectors whose production is most vulnerable to the effects of climate change. While the magnitude of effects remains uncertain, changes in temperature and water availability, weather extremes and flooding, and changing CO₂ levels in the atmosphere all have direct and significant impacts on agricultural productivity and result in shifting crop production patterns across agro-ecological zones (see UNCTAD, page 3).

Agriculture also has the potential to make a significant contribution to mitigating climate change. A full assessment of the GHG emissions due to agriculture is still in the making. What is clear is that modern industrialized agriculture from developed economies is a major source of GHG emissions; but the extent and magnitude have not yet been established. In developing countries, major agricultural production systems also contribute to the cumulative GHG emission from agriculture. However, as agriculture represents the main income-earning activity in many of these same countries, mitigation actions must also be designed to help ensure food security and alleviate poverty reduction.

Agriculture and GHG Mitigation

In industrial economies, a fundamental “rethink” of the way agriculture is practiced needs to be initiated. Finding ways to reduce reliance on chemicals and synthetic fertilizers and creating incentives to promote the use of renewable energy throughout the modern agricultural systems is of the utmost urgency and requires concerted policy action.

The concern over climate change and the need to shift to more sustainable systems has raised the profile of and interest in many long-standing practices, including conservation agriculture and organic agriculture, and greater reliance on renewable energy for domestic use in rural households in developing countries.

Conservation Agriculture

Conservation Agriculture (CA) aims to conserve, improve and make more efficient use of natural resources through integrated management of available soil, water and biological resources combined with external inputs.⁹ It contributes to environmental conservation as well as to enhanced and sustained agricultural production. It can also be referred to as resource-efficient/resource-effective agriculture. A variety of CA practices deemed GHG reducing should be encouraged. Among these:

- agronomic practices (promoting the use of perennial crops, which can be cultivated for longer periods, instead of annual crops, which require periodic turning of soil; extending crop rotations);
- more careful land nutrient (most notably fertilizers) management;
- improved fallows;
- improved grazing land management;

9 <ftp://ftp.fao.org/agl/agll/ch10/ch104.pdf>

- minimized tilling frequency;
- increased practice of agro-forestry (i.e. crop production on land that also grows trees);
- restoration of degraded lands and organic soils through, for instance, re-vegetation;
- rewetting of cultivated organic soils;
- change in the composition of animal feed or change in stocking practices toward more intensive grazing methods in order to reduce enteric methane emissions from cows and other ruminants;
- improved manure management; and
- adoption of rice cultivation practices (such as mid-season drainage and shallow flooding) that reduce the amount of time that soils are submerged under water and by the same token the amount of gas produced.¹⁰

If properly implemented, these practices can achieve GHG mitigation and improve agricultural productivity and sustainability.¹¹ For instance, in East Africa, agricultural productivity, currently at a low level, could be increased through improved nutrient management, increasing organic and synthetic fertilizer use (given current very low levels) and through restoration of degraded land. These measures would not only increase agricultural productivity, but also reduce deforestation and

sequester increased amounts of CO₂.¹² Another example is in Asia, where improved efficiency in fertilizer use could reduce production costs and increase productivity while reducing emissions of nitrous oxide (NO₂).¹³

Organic Agriculture

Organic farming is being promoted as a climate-friendly and sustainable farm system. Organic agriculture combines modern science and traditional knowledge and strives to convert low-input and subsistence farms into more productive systems and to increase farmers' ability to avail themselves of local resources.

A key feature of organic agriculture is its reliance on techniques for recycling farm-own nutrients and organic carbon. These include direct recycling of manure; efficient composting techniques for crop residues, non-palatable biomass and livestock manure; and mulching with crop residue and green manure to prevent erosion of fertile topsoil.

Organic agriculture is thought to contribute to GHG mitigation based on a number of factors. Organic agriculture has a much reduced consumption of fossil fuels for energy, less vulnerability of soils to erosion, and an increase in carbon sequestration due to the recycling of farm-own nutrients and to other techniques aimed at building up soil fertility.

Research on these factors has come a long way to explain how organic agriculture helps reduce emissions of methane (CH₄) and nitrous oxide (N₂O). Data show that CO₂ emissions from organic agriculture are generally much lower than from conventional agriculture. This goes hand in hand with lower energy consumption, the omission of synthetic fertilizers and

¹⁰ Msangi-Rosegrant - Agriculture and Environment – Linkages, Tradeoffs and Opportunities (Summer 2007, 20 pp.), at 12-14; IPCC - Climate Change Mitigation - Agriculture (2007, 44 pp.), at 505-511; FAO - Enabling Agriculture to Contribute to Climate Change Mitigation (Feb. 6, 2009, 13 pp.), at 2.

¹¹ FAO - Enabling Agriculture to Contribute to Climate Change Mitigation (6 February, 2009, 13 pp.), at 3.

¹² FAO - Anchoring Agriculture Within a Copenhagen Agreement - Policy Brief for UNFCCC Parties (2009, 4 pp.), at 2.

¹³ FAO - Anchoring Agriculture Within a Copenhagen Agreement - Policy Brief for UNFCCC Parties (2009, 4 pp.), at 2.

pesticides, and a reduced use of high-energy feedstuff.

Although few data exist regarding N_2O emissions from organic agriculture, it is likely that key organic agriculture characteristics and practices result in reductions of such emissions compared to conventional agriculture. Significantly less mobile nitrogen concentrations can be found in organic soils, which are more aerated. Many organic cropping systems also use permanent plant covers, which further reduce nitrous oxide N_2O emissions. These two factors account for considerable reductions in N_2O emissions.

It is possible, however, that organic agriculture does not contribute significantly to a reduction in CH_4 emissions from organic rice and ruminant production, although it appears to help reduce methane emissions during the unproductive phase of young cattle and the productive phase of dairy cows.

Despite these advantages, organic agriculture still occupies a very small – but growing – slice of total agriculture. The reasons for its slow adoption are economic and reflect changes in yields, production costs and product prices. Under low-input systems, a switch to organic agriculture generates little or no yield reductions. Moreover, yields under organic agriculture can recover or even be higher than before, once the conversion period (2-3 years) is over. Yield reductions are more important when the system had previously run on a high-input level; although yields recover after the conversion period, they might not return to the yield level preceding the switch to organic agriculture.

Production costs vary greatly among farm types (e.g. degree of farm mechanization, labour intensity of crops). While organic agriculture may entail higher production costs than conventional agriculture (e.g. organic apple production in the US), it can also provide greater net returns due to lower

production costs (e.g. cotton production in India). Typically, organic agriculture, both in developed and developing countries, requires more labour, which increases production costs but saves on expensive synthetic fertilizer and pesticide costs.

Not only is organic agriculture relatively labour-intensive, it is also knowledge-intensive because it requires an understanding of local varieties and breeds and of local production conditions. Access to and conservation of traditional knowledge and practices thus constitute important dimensions of organic agriculture, especially in a globalized world where intellectual property claims and disputes abound.

Premium prices paid mostly by developed country consumers for organic products represent one of the main incentives for farmers of developed and developing countries alike. However, gaining access to these premium prices requires that agricultural products be certified and/or labelled organic, which entails additional costs and efforts.

Renewable Energy Use

A major area of potential benefits for GHG mitigation is the transformation of small-scale energy use by rural households. Given the scale of traditional reliance on biomass for rural cooking and other energy needs, the spread of appropriate technologies based on renewable and clean energy to small-scale rural households has perhaps the largest potential in terms of reducing GHG emissions and lessening resource degradation in developing countries.

Challenges for Agricultural GHG Mitigation Actions

One of the key impediments to mitigation activities is the uncertainty about GHG emission estimates from the agricultural sector. Limited 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 mitigation activities.¹⁴

Limitations and gaps in our knowledge of saturation of soil carbon sequestration capacity, the risk of losing stored carbon and the duration of the sequestration in time also have caused 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 need to develop efficient sampling designs and rigorous protocols.¹⁵ 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 then improve with time so that practice-based approaches could eventually be sufficient to monitor and verify soil carbon sequestration.¹⁶

Despite the complexity associated with information-gathering and validation needs, enough is known now to start including agricultural initiatives in the fight against climate change. International funding of globally coordinated pilot projects could 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 implementation.¹⁷

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, which would imply providing capacity-building technical assistance and financial incentives through public funds and institutions.¹⁸ In order to fully tap into the "GHG sink" potential of agriculture, appropriate wording on agricultural climate change mitigation efforts and on the requisite financing and technology development and transfer should be enshrined in any successor to the Kyoto Protocol¹⁹ (see Chapter 3).

Agriculture and Climate Change Adaptation

Adaptation to climate change is the adjustment of natural and human systems in response to expected or actual climatic factors in order to moderate the harm or benefit from change of its effects (IPCC, 2001). The concept includes changes in processes, practices and structures in ecological, economic and social systems (Wiegman, 2010). These broad definitions demonstrate that adaptation incorporates both environmental and social-economic policy domains.

14 AWG-LCA Report - opportunities and challenges for mitigation in the agricultural sector (7 April 2009, 4 pp.), at paras. 12 and 24.

15 FAO - Anchoring Agriculture Within a Copenhagen Agreement - Policy Brief for UNFCCC Parties (2009, 4 pp.), at 2-3.

16 FAO - Enabling Agriculture to Contribute to Climate Change Mitigation (6 February 2009, 13 pp.), at 4.

17 See AWG-LCA Report - opportunities and challenges for mitigation in the agricultural sector (7 April 2009, 4 pp.), at para. 26, and FAO - Enabling Agriculture to Contribute to Climate Change Mitigation (6 February 2009, 13 pp.), at 4.

18 FAO - Anchoring Agriculture Within a Copenhagen Agreement - Policy Brief for UNFCCC Parties (2009, 4 pp.), at 2.

19 FAO - Information Note - Agriculture, Food Security and Climate Change in Post-Copenhagen Processes (12 April 2010, 6 pp.), at 4.

More specific delineations of adaptation and its dimensions remain to be formulated. Even in the UNFCCC, a commonly accepted definition of adaptation is not specified, nor have any of the recent submissions by Parties proposed one (Persson et al. 2009). Aside from their human and systems adjustment definition (as per above), the IPCC (2007) distinguishes between adaptive capacity and vulnerability. Adaptive capacity is defined as the ability of a system to adjust to climate change (including climate variability and extremes) to moderate potential damages to take advantage of opportunities or cope with the consequences. Vulnerability implies the degree to which a system is susceptible to and unable to cope with adverse effects of climate change including climate variability and extremes.

The UNFCCC (2009) distinguishes between the following categories of adaptation actions:

- actions that climate-proof socio-economic activities by integrating future climate risk;
- actions that expand the adaptive capacity of socio-economic activities to deal with future and not only current climate risks; and
- actions targeting activities adapting to climate change that would not otherwise be initiated under business-as-usual scenarios.

The international community acknowledges that adaptation to climate change is a pressing issue, especially for developing countries, and that more resources are needed to adequately reduce exposure to disturbed climate patterns. There is considerably less consensus on how the scale of adaptation that is needed can be achieved. Although changing and adapting to climate variability have always occurred in human societies, the phenomenal and increasing pace of climate change demands proactive and urgent responses, without losing sight of the rich source of information gained

from coping with environmental shocks in the past. There is unlikely to be any one-size-fits-all solution to adapting to climate change, but there are many lessons that already have been learned and this knowledge can be shared to help better inform decision making.

Agriculture should be in the frontline for adaptation priorities, given its natural vulnerability to climate and its crucial importance for food security and livelihood protection in developing countries. However, the local nature of adaptation actions and benefits raises issues about the local capacity for coping and implementation. These concerns are heightened because those most vulnerable to the effects of climate change, or the potential beneficiaries from adaptation, often lack the capacity and finance needed. Considerable efforts will be required to prepare developing countries in particular to deal with climate-related impacts on agriculture (FAO, 2007).

Autonomous and Planned Adaptation

In its 2007 report, FAO distinguished between autonomous (micro - farm level) and planned (macro - policy level) adaptation. Examples of autonomous adaptation to climate change include changes in sowing dates, production of different crop varieties or species, changes in the use of irrigation and water supply, changes in the use of other inputs or in farm management (e.g. fertilizer, tillage methods, grain drying) (Reilly and Schimmelpfenning, 1999, p.768).

The range of adaptation strategies that autonomous actors have depends upon social, economic and political status (ISET, 2008). Vulnerable households may have to choose between an adaptation activity, such as constructing rain-harvesting or other irrigation methods in drought-prone areas, or paying for other important services like schooling or health care (Klein, 2002). Therefore the amount of autonomous adaptation desirable and feasible largely depends on the level of

individual income and amount of available resources (Margulis et al., 2008).

Planned adaptations are sector-wide changes in processes or systems to build climate resilience or to encourage shifts in resources to a more efficient use under climate change effects (FAO, 2007). Examples of planned adaptations include addressing changes in food insecurity, identification of vulnerabilities, re-assessment of agricultural research priorities, strengthening of agriculture extension and communication systems, adjustments in commodity and trade policy, and increased training and education. Planned adaptation policies take into account that, in addition to the important role of autonomous adaptation, there are limits to the capability of individuals to make long-term strategic adjustments in the absence of government policies that incentivize farmers and communities to adopt adaptation activities.

Coordination of autonomous and planned adaptation activities is essential. In some cases, maladaptive adaptation has occurred because of a dis-harmony between planned and autonomous local-level actions. ISET (2008) cites the example of farming communities in India settling in flood plains which were designed to protect villages from adverse weather conditions. The result was repeated flooding of their fields, which caused more risks rather than reducing them. A further example is the improved use of chemical pesticides and herbicides to build crop resilience under increasingly difficult conditions. This may in fact have health risks to producers and consumers as well as increase the emissions of GHGs and air pollutants (Scheraga et al., 1998).

There is also strong merit in incorporating autonomous adaptation processes to operate as a prime point of entry for policy development. ISET outlines the strategy of targeting autonomous adaptation as follows: At the micro level (individual, household), autonomous adaptation interventions cover

the course of action individuals, households, communities and businesses take in response to the opportunities, constraints and risks they face within livelihood systems (ISET, 2008). By seeking to identify the factors that constrain actors in responding to risks and opportunities associated with natural hazards and changing climatic conditions, a variety of points of entry can be found where appropriately targeted support of other interventions can enhance existing or catalyse new adaptation responses. This approach is most effective when it can build on existing abilities of households, communities and businesses to adapt to climate variability and reduce their vulnerability to disaster risks.

A key finding from an ISET study on South Asian households was that the degree to which households take measures to adapt to the threat of flood and drought occurrence depended largely on their access to information regarding climatic statistics and other goods and services, the ability to migrate and diversify income, and the existing patterns of vulnerability that exist in the community (gender, age, income and social position factors) (ISET, 2008). Therefore, communication and early warning systems regarding wider market, economic and environmental information are a key entry point for planned adaptation activities.

Thus far, the breadth of adaptation research and policy development, and the involvement of international organizations, has been limited to the planned adaptation level. However, as proposed by ISET (2008), autonomous adaptation is more likely to play the key role in responding to climate change than planned adaptation efforts for the simple reason that actors at the grass-roots level are much more closely aligned with the mix of constraints, opportunities and risks that arise in the local context than are governments.

Support for planned adaptation strategies therefore should include capacity building to better enable local communities to manage

their existing resources and diversify income (Nelson et al., 2009). Planned adaptation should also focus on developing an enabling environment by improving institutions, creating incentive structures, strengthening legal frameworks, and improving education and health (Klein, 2002), which should foster better economic and social conditions and give individual actors more options for adaptation activities.

Adaptation Costs

A challenge for developing countries in forming policy and implementing adaptation activities at whatever level is in setting aside adequate resources to facilitate adaptation and in developing a clear vision of how to use existing funding. Ascertaining the costs involved in adaptation has been hard to operationalize, and estimates have varied greatly for several reasons.

First, estimating costs relies largely on climate projections, assessment of exposure, models of climate sensitivity and the forecasted potential impacts at a given level. Depending on which forecast is used, the potential impacts vary and therefore the corresponding adaptations vary as well. Furthermore there are different levels of adaptation - full adaptation may include all possible opportunities to mitigate risk/ benefit from climatic changes, whereas partial adaptation may focus on activities that avert the highest level or most probable risks (Margulis et al., 2008).

Adaptation activities at the autonomous level are perhaps more widespread than planned adaptation measures, but their costs are harder to estimate because they are rolled out by private actors. There are also some grey areas as to what activities constitute adaptation measures, and there is a lack of a concise definition for adaptation (some are direct, others are more broad and cover both soft and hard activities). In addition, financial institutions do not agree on what is classified as

adaptation finance, which makes it increasingly hard to find estimates on the current level of adaptation finance that is being leveraged in the private sector (Atteridge et al., 2009).

Although there are obstacles to calculating the cost of adaptation given the uncertainty, this is not a valid justification for inaction and therefore should not hinder decision making regarding adaptation activities. Under Article 3.3 of the UNFCCC, it is stated that “where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such measures.” Persson et al. (2009) argue that this should hold as much for economics as for climate science and that the urgent and immediate adaptation needs of least developed countries must be strongly underlined.

Adaptation Financing: Opportunities and Obstacles

Developing countries face significant challenges in marshalling the resources necessary to fund their adaptation activities. Multilateral negotiations on adaptation funds have stagnated given the difficulties in ascertaining the exact costs of adaptation and an ongoing lack of political commitment to adequately address financing needs for activities in developing countries.

At present USD 244 million has been distributed for adaptation activities, with the regional breakdown shown in Table 1. Although most estimates vary, the indication is that billions of dollars annually are required. The World Bank places the figure between USD 9 and 41 billion, the UNDP at USD 86 billion, Oxfam at more than USD 50 billion and the UNFCCC at between USD 28 and 67 billion (Müller, 2008). Closing the “adaptation

Table 1. Amounts disbursed for adaptation activities by region

Region	Amount dispersed (USD millions)
Africa	118.6
Asia	50.3
Europe	1.1
Oceania	16.0
Middle East	20.2
North America	8.2
Central America	7.6
Total	244.0

Source: www.climatefundsupdate.org

funding chasm” requires substantial additional funding amounts. Current funding horizons do not come anywhere near this, and many believe existing sources of finance cannot be scaled up to meet these needs (Atteridge et al., 2009).

Adaptation funding has come largely from bilateral/voluntary Official Development Assistance (ODA) (Müller, 2008). Bilateral ODA consists of concessional finance monitored by the OECD Development Assistance Committee’s Creditor Reporting System (DAC-CRS). The DAC has 23 members (22 countries and the EU) and is the key forum in which bilateral donors coordinate development aid and support sustainable development. It may be difficult to induce further contributions through ODA to facilitate adequate adaptation funding.

Multilateral funding mechanisms include the Adaptation Fund, which was established to finance concrete adaptation projects and programmes in developing countries that

are Parties to the Kyoto Protocol and are particularly vulnerable to the adverse effects of climate change. The Adaptation Fund is financed from a share of proceeds from the Clean Development Mechanism (CDM), which allocates 2 percent of certified emission reductions (CERs) issued for CDM project activities (UNFCCC, 2010).

The Global Environment Fund (GEF) also has been a large contributor of funds but has focused on adaptation assessment, planning and capacity building, particularly in the National Adaptation Programmes of Actions (NAPA) process described in the section that follows. More focus on the implementation side of adaptation projects is urged by key stakeholders. The implementation of activities should provide a rich source of data regarding actual costs and benefits realized by the projects, which would help to facilitate the quantitative analysis that is lacking in project proposals at the planned level.

While some are more optimistic about raising private finance to fund adaptation in developing countries (or pessimistic about the availability of public funds to achieve this), one thing is clear: more funding is needed to make adaptation happen. Until then, other financial options can help facilitate adaptation at the individual level, such as crop insurance, financial hedging or bank loans (Mahul & Vermersch, 2000), although these mechanisms have yet to be explored in the context of developing countries that are already faced with challenging climatic conditions.

Prioritizing Agricultural Adaptation: The NAPA Mechanism for Least Developed Countries

Given the funding constraints to adaptation activities, a rigorous evaluation must be applied to adaptation projects to ensure that limited resources are used effectively. Within the UNFCCC framework, the development of NAPAs supports the efforts of the least developed countries to plan and prioritize their adaptation activities.

NAPAs are used to identify priority activities that respond to countries' **urgent** and **immediate** needs to adapt to climate change – activities for which further delay would increase vulnerability and/or costs at a later stage. While the NAPA projects cover small areas that represent urgent adaptation needs in the least developed countries, they also provide a strong basis for developing medium- to long-term adaptation plans (UNFCCC, 2010).

NAPAs are based on the use of existing information on autonomous adaptation that is already occurring at the micro level. The emphasis on local activities and inputs recognizes that local communities are an important source of information and that the

impacts of climate change are felt mainly at the local level.²⁰

Forming the NAPAs requires a process of rigorous assessment of risk and options. In the final stage, potential projects are ranked according to priority. Priorities for adaptation are determined by nationally defined criteria as set out in the UNFCCC NAPA guidelines. Four general criteria are used in selecting national priorities:

1. level or degree of adverse effects of climate change;
2. poverty reduction to enhance adaptive capacity;
3. synergy with other multilateral environmental agreements; and
4. cost-effectiveness.

In developing the NAPAs, most countries employ the use of multi-criteria analysis (MCA). The MCA approach is appropriate because of the lack of quantifiable data that are required when applying standard cost-benefit analyses to evaluate projects.

Cost-benefit analysis weighs costs against benefits and determines whether benefits outweigh costs over a given period of time, thereby supporting a decision on whether implementation is in the interest of the national economy. When quantifying costs and benefits, it is necessary to set a baseline (situation without the measure carried out) and a project case (situation with the measure). Expressing costs and benefits in monetary terms when approaching adaptation activities is not always possible.

20 UNFCCC downloaded on 17 August 2011 from http://unfccc.int/cooperation_support/least_developed_countries_portal/ldc_work_programme_and_napa/items/4722.php

Although much adaptation has already occurred at the autonomous level, there is limited availability of data regarding this experience. Agricultural adaptations also have strong links to development outcomes that should be taken into account. In addition, agriculture adaptation options are not always easily and clearly identifiable from ongoing management decisions, and the costs and benefits of adaptation are commonly shared by more than one party (Smit et al., 2001).

Consequently, countries have extended the UNFCCC list of priorities to take into account other priorities and to incorporate a variety of criteria, not limited to cost or economic factors (Smit et al., 2001). That is not to say that costs do not matter in the formulation of NAPAs; in fact they represent the single largest barrier to their implementation.

Existing adaptation needs assessments under the NAPAs have been submitted by 45 countries as of August 2011. The NAPAs detail current climatic concerns/changes, their impacts, and current and future adaptation measures. Adaptation of the crop sector was the most common form of adaptation project proposed, as it responds to concerns over adverse weather patterns that result in significant reduction in crop yields and hence pose a direct and immediate threat to livelihoods.

Funding for NAPAs so far has been used for preparation, not implementation, of projects. While the activities set out in the NAPAs (over 400-plus projects in total) have fulfilled the criteria of immediate and urgent adaptation needs, only one has been implemented to date, in Bhutan (Persson et al., 2009). The financial commitments to NAPAs needs to be followed through – not only to validate the programme set out but also to collect rigorous economic and financial data on the implementation cost and benefits of adaptations and to allow for international comparisons. Funding projects is a pivotal issue in climate change adaptation, and it is considerably more difficult to achieve

considering the localized benefit of adaptation activities compared to mitigation activities.

In conclusion, adaptation policy – including in agriculture – is very much a work in progress. Proposing a clear set of adaptation options and recommendations for prioritizing activities in the agriculture sector to adapt to the pressing realities of climate change is no simple task. More work at the local level in pragmatic activities and better collection of data on such grass-roots adaptation costs will be invaluable to ensuring that eventual national adaptation policies will work on existing strengths at the community level as well as avoid maladaptation. The extensive evaluation and research that went into developing the NAPAs is a testament to how much needs to be done across sectors, but particularly in agriculture, to help developing countries adapt. Actions to be encouraged on a priority basis should simultaneously serve mitigation, adaptation and agricultural productivity purposes.

Financing is the issue which blocks progress in the implementation of adaptation projects, not a lack of evaluation of needs, tools for evaluation, or uncertainty regarding the effects of climate change. The international community is called upon to drive momentum in the area of raising adequate funds as well as look at ways in which to best use alternative financial tools to provide resources for adaptation.

Forestry and Climate Change

Forestry is closely linked to climate change and agriculture because shifts in cultivated areas are associated with deforestation. Forests cover just over 4 billion hectares (ha) or 31 percent of total world land area. They store vast amounts of carbon and constitute the world's chief carbon sinks. Deforestation through land-use change (generally for agricultural purposes) generates approximately 18.2 percent 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.

Each year approximately 13 million ha of forests were converted to other uses or lost through natural causes between 2000 and 2010, in comparison to an approximate annual conversion of 16 million ha between 1990 and 2000. 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 0.5 million ha). At the same time, wide-scale tree planting programmes in China, India, the US and Viet Nam, along with natural forest expansion, have provided more than 7 million ha of new forests during each year of the last decade. 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 2010.

Tree planting programmes 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 4 million ha, followed by Africa (3.4 million ha annual forest loss). Forest cover remained stable in North and Central America and expanded in Europe.²¹

Approximately 13.5 percent of the world's forests benefit from the status of protected area. The 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).²²

Alternative ways of mitigating GHG emissions via forests must increasingly be promoted. The United Nation's REDD+ (Reducing Emissions from Deforestation and Forest Degradation in Developing Countries) programme addresses the reversal of deforestation and forest degradation, conservation of existing carbon stocks and enhancement of carbon stocks. These activities are viewed as the most promising and affordable GHG mitigation measures.

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 to replace more energy-intensive materials. Any efforts to preserve the sink attributes of forests must ensure that the market value of a standing tree surpasses that of a felled tree.

21 FAO - Key Findings - Global Forest Resources Assessment 2010 (12 pp.).

22 FAO - State of the World's Forests 2009 (March 2009, 168 pp.), at 72.

Chapter 3

Agriculture and Multilateral Climate Mitigation in the UNFCCC

While agriculture is particularly vulnerable to the short-term and long-term effects of climate change and must quickly adapt to it, agriculture also offers great potential for climate change mitigation in light of the size of its emissions. Current estimates put agriculture's total contribution to GHG emissions at 14 percent (excluding forestry).²³ In non-carbon dioxide gases, agriculture's contribution to emission is even higher: 47 percent of CH₄ emissions (especially due to cattle and wetlands, most notably rice paddies) and 58 percent of N₂O emissions (mostly from fertilizer use).²⁴ Agriculture thus should be a priority sector in multilateral efforts to mitigate climate change, although its diversity and complexity will present enormous challenges.

If deforestation is added to the mix, approximately one third of global anthropogenic GHG emissions, more specifically 25 percent of CO₂, 50 percent of CH₄ and 75 percent of N₂O, can be traced back to agriculture and deforestation. Forestry is closely intertwined with agriculture because increases in agricultural area are often linked to deforestation. This has negative impacts on GHG emissions because forests constitute the world's greatest natural sinks.

UNFCCC – The Framework for Multilateral Action on Climate Change Mitigation

The United Nations Framework Convention on Climate Change (UNFCCC)

Multilateral negotiations on a coordinated, global agenda to mitigate global warming and climate change have taken place within the 1994 UNFCCC, an international treaty signed by nearly every country of the world.

The UNFCCC has its origins in the 1992 Earth Summit in Rio, some 20 years following the first United Nations Conference on the Human Environment in 1972 in Stockholm. The Stockholm conference underlined the need for countries to cooperate at an international level to effectively control, prevent, reduce and eliminate adverse, global environmental effects.²⁵ The major milestones in the four decades of global action following the Stockholm conference are summarized in Box 1.

The objective 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 a lack of scientific certainty, regarding the adverse effects of climate change. The UNFCCC aims to prevent countries from using scientific uncertainty as

23 FAO - Enabling Agriculture to Contribute to Climate Change Mitigation (6 February 2009, 13 pp.), at 1.

24 IPCC - Climate Change Mitigation - Agriculture (2007, 44 pp.), at 503.

25 Stockholm Declaration of the United Nations Conference on the Human Environment (1972), Principle 24; see UNEP - WTO - Trade & Climate (2009, 194 pp.), at 68.

an excuse to forestall the adoption of climate change mitigation policies.

The UNFCCC contains few legally binding obligations and does not set GHG emission reduction targets. Its role has been to lay the groundwork for further multilateral cooperation by creating an institutional framework to support ongoing dialogue between UNFCCC signatories, with a view to adopt protocols that would set binding GHG reduction obligations. To do so, the framework provides for periodic multilateral conferences, called “conferences of the parties” (COPs). COPs are a venue in which all UNFCCC signatory countries are members and each has one vote.

The UNFCCC also 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 change.²⁶

The UNFCCC imposes additional obligations on two groups of countries: OECD-member countries as of 1994 and Economies in Transition (EIT)²⁷ 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 GHGs. One 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).

In addition, UNFCCC Annex II countries must: (i) pay reporting costs incurred by developing countries; (ii) assist developing countries that are 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 countries.²⁸

The principles embedded in the UNFCCC have permeated climate change negotiations ever since, most notably the concepts of common but differentiated responsibilities between UNFCCC Annex I countries and other countries²⁹ and the specific needs and concerns of developing and least-developed countries.³⁰ The 1995 Berlin Mandate, negotiated at COP-1, also underlined the historical responsibility of Annex I countries for the bulk of GHG emissions and the necessity for developing countries and least-developed countries to pursue their economic growth.

²⁶ Knox - International Legal Framework for Addressing Climate Change (Winter 2004, 9 p.), at 2.

²⁷ Economies in transition (most notably Russia and Eastern European countries formerly members of the Soviet bloc).

²⁸ Articles 4.3 to 4.5 of the UNFCCC.

²⁹ Article 3.1 of the UNFCCC.

³⁰ Articles 4.8 to 4.10 of the UNFCCC.

Box 1: Milestones in the UNFCCC Framework

- 1972 Stockholm Declaration of the United Nations Conference on the Human Development calls for international cooperation to address adverse environmental problems
- 1983 World Commission on Environment and Development convenes (Bruntland Commission)
- 1987 Bruntland Commission issues a Report “Our Common Future” which calls for stronger multilateral solutions to global environmental problems
- 1988 Establishment of the Intergovernmental Panel on Climate Change (IPCC) tasked to assess timing, magnitude and impact of climate change caused by human activity
- 1990 IPPC issues its First Report
- 1990/2 Creation of the United Nations Framework Convention on Climate Change (UNFCCC)
- 1992 Adoption of the United Nations Framework Convention on Climate Change (UNFCCC)
- 1992/2 United Nations Conference on Environment and Development in Rio de Janeiro, Brazil (Earth Summit) – 155 countries sign on the UNFCCC
- 1994 UNFCCC enters into force with 192 signatory countries; UNFCCC lays the groundwork for multilateral cooperation to mitigate climate change
- 1995 First Conference of the Parties (COP-1) is held under the auspices of the UNFCCC in Berlin (Berlin Mandate); goal: move toward mandatory GHG reduction targets for Annex 1 (OECD) countries
- 1997 COP-3 held in Kyoto, Japan and results in an agreement on binding targets for GHG emission cuts for Annex 1 countries (Kyoto Protocol)
- 2000 COP-6 held in the Hague; results in a deadlock over how anthropogenic sinks (land-use, land use change and forestry - LULUCF) could count toward GHG emission reduction targets
- 2001 COP-6.5 meeting in Bonn – expanded the coverage of anthropogenic sinks to cover four additional types of activities: (i) forest management; (ii) cropland management; (iii) grazing land management; and (iv) revegetation
- 2001 COP-7 meeting in Marrakesh finalizes the Kyoto protocol setting the stage for its ratification

- 2005 COP-11 meeting in Montreal, first Meeting of the Parties to the Kyoto Protocol (CMP-1); growing interest in developing countries considering mitigation efforts; proposal to allow credits for reducing emissions from deforestation and forest degradation (REDD) is tabled by 15 rainforest nations
- 2007 COP-13 and CMP-3 meetings in Bali; adoption of the Bali Roadmap toward a successor to the Kyoto in 2009; 4th IPCC Assessment issued, asserting that climate change is “unequivocal” and that human activities are “very likely” the cause of warming
- 2009 Copenhagen Conference (COP-15 and CMP-5); countries fail to agree to a new post-Kyoto protocol; an unofficial Copenhagen Accord is issued
- 2010 Cancun Conference; makes further progress on adaptation, mitigation processes; but no new breakthrough on firm country commitments in mitigation; more focus on adaptation

As of 12 September 2011,³¹ 16 UNFCCC Annex I developed economies (including the European Union and its member countries) have established GHG emission reduction targets between 5 and 30 percent, with the lowest targets often being unconditional while higher targets are conditional.

The Kyoto Protocol

The 1997 COP-3 meeting held in Kyoto, Japan concluded with a landmark multilateral agreement – the Kyoto Protocol to the UNFCCC. The Kyoto Protocol imposed mandates on UNFCCC Annex I countries to reduce, either individually or jointly, their aggregate anthropogenic GHG emissions by at least 5 percent below 1990 levels in the commitment period 2008 to 2012.³²

The Kyoto Protocol to the UNFCCC entered into force on 16 February 2005, after having been ratified by 55 signatory countries representing 55 percent of global CO₂ emissions in 1990.

During the protocol’s negotiation, COP members struggled 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. Countries with large forest areas (US, Canada, Russia) favoured the inclusion of forest sinks toward GHG targets, but other Annex I countries were opposed. The solution was to allow only certain types of anthropogenic (man-made) sinks – afforestation, and reforestation since 1990.³³

One remaining obstacle in the Kyoto negotiations was the percentage of the GHG emission reduction target that could be reached through forestry or other activities. This was not specified in the Kyoto Protocol and this issue later proved to be contentious.

³¹ See FAO - Information Note - Agriculture, Food Security and Climate Change in Post-Copenhagen Processes (12 April 2010, 6 pp.), which seems to be updated every two months. See also <http://unfccc.int/home/items/5262.php> (last consulted on 17 September 2011) for most recent information and for targets of other UNFCCC Annex I countries.

³² Article 3.1 of the Kyoto Protocol.

³³ Article 3.3 of the Kyoto Protocol.

The Protocol established joint action among UNFCCC Annex I countries and between Annex I and non-Annex I countries through three main “flexibility mechanisms”: international emissions trading, joint implementation (JI) and the CDM.

International emissions trading between UNFCCC Annex I countries of Assigned Amount Units (AAUs) was allowed but how this trading is to take place was not specified.

JI allows Annex I countries to invest in projects in other Annex I countries and receive credits towards their GHG emission reduction targets. As of 1 October 2011, 478 projects were in the pipeline³⁴.

The CDM allow firms in Annex I countries to invest in projects in developing countries and receive CERs that count toward their GHG emission reduction targets.

During the 2001 COP-6.5 meeting in Bonn, the details of the Kyoto Protocol were finalized and 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; (ii) a Least Developed Countries Fund to help with 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 Protocol.³⁵

Post-Kyoto: In Search of a New Agreement on GHG Emissions

During COP-11 Montreal in December 2005, which also served as the first Meeting of the Parties to the Kyoto Protocol (CMP-1),

planning for a Post-Kyoto accord started in earnest. A major breakthrough during COP-11 came when developing countries showed a greater willingness to consider developing-country mitigation efforts. Another significant development was the leadership of Papua New Guinea, heading a coalition of 15 rainforest nations, in re-opening the debate on deforestation with a proposal to allow credits for REDD.

The two-year dialogue initiated in Montreal culminated at the COP-13 and CMP-3 in Bali in December 2007 with 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.

The Bali meeting was also marked by the release of 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.

At the Bali meeting, developing countries agreed to consider taking nationally appropriate MRV mitigation actions supported by technology and enabled by financing and capacity-building. 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 on REDD at the Montreal COP, the Bali conference adopted a decision encouraging rainforest countries to undertake initiatives in this respect while calling for discussions on what form financial assistance would take.

Among the priorities for future negotiations reported in the Bali Action Plan were: enhanced national and international mitigation efforts; enhanced national and international

34 Source: <http://www.cdmpipeline.org/ji-projects.htm#1> (last viewed 13 October 2011).

35 See COP-6 Bis The Bonn Agreement (24 July 2001, 14 pp.).

adaptation efforts; and enhanced financing of adaptation and mitigation efforts and technology cooperation.

Also at the Bali meeting, the Adaptation Fund (under the Kyoto) was operationalized by the creation of the Adaptation Fund Board to manage the funds generated by levies on CDM projects.

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.

The COP-15 and CMP-5, which took place in Copenhagen in 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 non-governmental organizations (NGOs) and 5,000 media asked for accreditation; while the conference facilities could host only 15,000 people. As of September 2011, it is estimated that 141 countries, including the 27-member EU, are likely to engage, or have engaged, with the accord.³⁶ (See Tables 2 and 3 on GHG Emission Reduction Targets.)

³⁶ See <http://www.usclimatenetwork.org/policy/copenhagen-accord-commitments> and <http://unfccc.int/home/items/5262.php>

As of 12 September 2011,³⁷ 16 UNFCCC Annex I developed economies (including the European Union and its member countries) have established GHG emission reduction targets between 5 and 30 percent, with the lowest targets often being unconditional while higher targets are conditional.

³⁷ See FAO - Information Note - Agriculture, Food Security and Climate Change in Post-Copenhagen Processes (12 April 2010, 6 pp.), which seems to be updated every two months. See also <http://unfccc.int/home/items/5262.php> (last consulted on 17 September 2011) for most recent information and for targets of other UNFCCC Annex I countries.

Table 2. GHG emission reduction targets of selected UNFCCC Annex I countries in 2020

Selected UNFCCC Annex I (Developed) Country	GHG Emission Reduction Target in 2020
Australia	5% (unconditional) up to 15% (conditional on international agreement to reduce GHGs in atmosphere with target beyond 450 ppm CO ₂ -eq) or 25% (conditional on international agreement to reduce GHGs in atmosphere with target below 450 ppm CO ₂ -eq) compared to 2000 levels.
Canada	17% compared to 2005 levels, to be aligned with the final GHG emission reduction target of the US in enacted legislation.
European Union	20% (unconditional) up to 30% (conditional on comparable targets from other developed countries and on adequate efforts from developing countries) compared to 1990 levels.
New Zealand	10% up to 20% compared to 1990 levels (actual target conditional on there being a global agreement whereby temperatures cannot rise more than 2 degrees Celsius, developed countries make comparable efforts, major developing countries contribute adequately, and there are LULUCF rules and an international carbon market regime).
Russian Federation	15% up to 25% compared to 1990 levels (actual target conditional on how Russia's forests are accounted for as anthropogenic sinks and on major GHG emitters committing to legally binding GHG reduction targets).
United States of America	In the range of 17% compared to 2005 levels, in conformity with anticipated US energy and climate legislation. (The proposed legislation entails a 30% reduction in 2025 and a 42% reduction in 2030, in line with the goal to reduce GHG emissions 83% by 2050.)

Only two UNFCCC Annex I countries have stated that their GHG emission reductions are based on the assumption that effective LULUCF rules are adopted.³⁸

As of 17 September 2011,³⁹ 44 developing countries had filed submissions with the UNFCCC. Developing countries generally recall the voluntary nature of their proposed NAMAs and that their implementation is conditional to receiving the appropriate amount of financial, technological and capacity-building support from developed countries.⁴⁰ (See Table 3. GHG emission reduction targets of major developing countries in 2020

38 See FAO - Information Note - Agriculture, Food Security and Climate Change in Post-Copenhagen Processes (12 April 2010, 6 pp.), at 2.

39 See FAO - Information Note - Agriculture, Food Security and Climate Change in Post-Copenhagen Processes (12 April 2010, 6 pp.), which seems to be updated every two months. See also <http://unfccc.int/home/items/5262.php> (last consulted on 17 September 2011) for most recent information.

40 Article 4.7 of the UNFCCC.

Table 3. GHG emission reduction targets of major developing countries in 2020

Major Developing Country	Voluntary GHG Emission Reduction Target in 2020 and NAMAs
Brazil	Between 36.1% and 38.9% below projected GHG emissions. NAMAs: reduction in deforestation; restoration of grazing land; crop-livestock system; no-till farming; biological nitrogen fixation; energy efficiency; increase of biofuel use; increase in energy supplied by hydroelectric power plants and alternative energy sources.
China	Between 40% and 45% of CO ₂ emissions per unit of GDP compared to 2005 levels. NAMAs: increase share of non-fossil fuels in primary energy consumption to around 15% by 2020 and increase forest coverage by 40 million ha. Increase forest stock volume by 1.3 billion cubic meters by 2020 from 2005 levels.
India	Between 20% and 25% of the emission intensity of its GDP (excluding agriculture) compared to 2005 levels.
South Africa	34% below “business as usual” GHG emissions in 2020 and 42% below in 2025.

Disappointingly, no binding agreement came out of the Copenhagen meeting on forging a new post-Kyoto protocol. Divergent positions of the parties were too large and too numerous to bridge although progress was made toward a REDD ++ (an expansion of REDD + to include carbon conservation and technology). Instead, a group of 24 Heads of States, including Brazil, China, India, South Africa and the US, reached an agreement of principals known as the “Copenhagen Accord.”

The Copenhagen Accord addresses the priority areas already articulated in the Bali Action Plan⁴¹:

- *Long-term GHG emission reduction objective*: the Accord states as an aspirational goal that global temperature increase should not exceed 2 degrees Celsius by 2050. A review of the Accord is also scheduled to take place by 2015, with

41 The following summary is based on Pew - Summary - Copenhagen Climate Summit (December 2009, 5 pp.).

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 countries “commit to implement” GHG emission reduction targets for 2020, and non-Annex I countries “will implement mitigation actions.” Least developed and small island countries “may undertake actions voluntarily and on the basis of support”;
- *Forests:* the Accord declares the immediate establishment of a mechanism to enable the mobilization of financial resources from developed countries to support REDD+ efforts; Australia, France, Japan, Norway, the United Kingdom and the US announced on 16 December 2009 that they had collectively agreed to an amount of USD 3.5 billion as initial public finance for REDD+;⁴²
- *Technology:* the Accord establishes a new Technology Mechanism to accelerate technology development and transfer for both adaptation and mitigation; and
- *Finance:* developing countries were promised financial support for mitigation efforts (including forest-related), adaptation, technology development and transfer, and capacity building. For 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 managed to collect USD 24 billion by March 2010.⁴³

The Accord calls for a new Copenhagen Green Climate Fund as one channel for delivering finance, and a High Level Panel “to study the contribution of the potential sources of revenue” 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 their delivery of finance for 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.

Prospects for a Role for Agriculture in the UNFCCC

An explicit role for agriculture in the UNFCCC was addressed in a draft decision produced by the AWG-LCA for the Copenhagen meetings, entitled “Cooperative sectoral approaches and sector-specific actions on agriculture.”⁴⁴ The draft document outlined a commitment by member parties to promote and cooperate in research and development and technology transfer to promote practices and processes that control, reduce or prevent anthropogenic emissions of GHG, particularly those that promote agricultural efficiency and productivity in a sustainable manner. This action should take into account members’ differentiated

⁴² See <http://www.actoncopenhagen.decc.gov.uk/en/ambition/achievements/december/forest-fast-start-announcement> (last consulted on 11 May 2010).

⁴³ ICTSD - Bridges Trade BioRes (Vol. 10, No. 8, 30 April 2010), at 4. Available at <http://ictsd.org/downloads/biores/biores10-8.pdf> (last consulted on 11 May 2010).

⁴⁴ See AWG-LCA Meeting, 1-15 December 2009 - Report With Draft Decisions, at 43.

responsibilities, their development priorities, and the linkages between adaptation and mitigation and the links between agriculture and food security, while at the same time avoid distortions or disguised barriers to international trade.

Article 2 of the UNFCCC Treaty states the following with respect to agriculture: “stabilization of GHG concentrations [...] should be achieved within a time frame sufficient [...] to ensure that food production is not threatened”. However, the proposed agriculture text in Copenhagen (within AWG-LCA) was dropped in Cancun (only calling for work programme of the Subsidiary body on scientific and technical advice – SBSTA). Now it remains as “agriculture as a driver of deforestation” in REDD+.

Climate change talks in Copenhagen did not focus on that sector in time to settle the technicalities necessary for reaching even a political agreement on agriculture’s inclusion in the accord. Hence, neither agriculture nor food security are mentioned in the Copenhagen Accord, despite their critical importance for developing countries.

The Copenhagen Accord provides for developing countries to submit Nationally Appropriate Mitigation Actions (NAMAs) to be recorded as an appendix to the Copenhagen Accord. The number of submissions made by developing countries that specifically targeted agriculture suggests its central role for many of them in their fight against the effects of climate change.

As of March 2011, 48 developing countries had filed submissions with the UNFCCC and 15 stated their intention of implementing agricultural climate change mitigation.⁴⁵

45 See table on Non-UNFCCC Annex I country targets and sector-specific NAMAs from FAO - Information Note - Agriculture, Food Security and Climate Change in Post-Copenhagen Processes (12 April 2010, 6 pp.), at 5.

Of these, four have submitted quantitative agricultural GHG emission reduction targets.⁴⁶

Prospects for a more explicit or targeted treatment of agriculture in future global climate change negotiations within the UNFCCC framework are slim at this time. Even if agriculture is addressed more fully in future UNFCCC negotiations, it is likely to take a long time before an accord can be reached, given the complexity and diversity of production systems and agro-ecological linkages. As an example, forestry and the problems of sinks was responsible for almost a decade of negotiations before the Kyoto Protocol was finalized.

Moreover, to the extent that the main goal of the UNFCCC is to bring countries to agree on binding commitments to cut GHGs, imposing such targets on agriculture may prove not only extremely difficult to implement, given the measurements challenges, but also may be prohibitively costly in some cases, particularly in the least developed countries.

Yet there are those who also argue that agriculture offers cost-effective ways to serve as carbon sinks and that agriculture has a great potential to contribute substantially toward mitigating climate change because it offers cost-neutral or net-profit-positive actions with low capital requirements.⁴⁷ This is an area that needs to be explored further before such claims can be objectively ascertained.

At the UNFCCC conference in Cancun, the prominent focus on adaptation has direct relevance to agriculture for the developing world. At Cancun, the Cancun Adaptation Framework and the Adaptation Committee were established to support better international planning and implementation and cooperation

46 See table on the summary of agricultural NAMAs from FAO - Information Note - Agriculture, Food Security and Climate Change in Post-Copenhagen Processes (12 April 2010, 6 pp.), at 6.

47 FAO - Enabling Agriculture to Contribute to Climate Change Mitigation (6 February 2009, 13 pp.), at 1.

on adaptation. Also put in motion were formulations for ways to best address loss and damage from climate change impacts in developing countries, and developing mechanisms and options for managing and reducing climate change risk to developing nations (e.g. climate risk insurance facility).

In the area of mitigation, the Cancun conference created a formal international registry for developing countries submissions of their plans for controlling green house emissions (NAMAs). The registry will be maintained by the UNFCCC Secretariat and enable better matching of support and action needed by the submitted NAMAs. Those actions not requiring international support (by industrialized countries) will be recorded in a separate section of the registry. Supported actions will be measured, reported and verified internationally; domestically supported actions will be done at the national level. Additionally, developing countries are encouraged under the agreement to draw up low-carbon development strategies or plans.

Another important decision taken at Cancun was the recognition that economic and social consequences of mitigation response measures need to be fully addressed. In some cases, the implementation of actions that reduce emissions could result in negative economic or social consequences for other countries. As a result, governments decided to convene a forum in 2011 to further discuss this and to establish a work programme to address such consequences. Economics and cost-effectiveness are increasingly factored into mitigation actions. Governments are encouraged to focus on new market-based mechanisms to both enhance and promote the cost-effectiveness of mitigation actions. The establishment of such a mechanism will be considered at the next Climate Change Conference in Durban, South Africa.

Mitigation Financing: Opportunities and Constraints

Under the assumptions of a 25 percent reduction in global GHG emissions below 2000 levels by 2030, the financial resources needed to implement the requisite climate change mitigation measures are estimated by the IPCC, in its Fourth Assessment Report on climate change (2007), to be USD 200-210 billion globally⁴⁸, in addition to the amount expected to be available under a “business as usual” scenario.

Over half of the additional global investment and financial flows is needed in developing countries, where the IPCC projects that approximately 68 percent of the global GHG emission reductions will take place. Mitigation actions are projected to be less costly in developing countries due to rapid economic growth in the major developing countries, their relatively inefficient energy use, and the prevalence of low-cost mitigation opportunities in the forestry sector.

The IPCC also estimated additional financial needs of five sectors in 2030⁴⁹ to be in the tens of USD billions, with the majority of the financing needing to go to developing countries.

International financing of climate change mitigation measures directed to 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.

48 See Table 4 - Additional investment and financial flows needed for mitigation in 2030, by sector from UNFCCC - Investment and financial flows to address climate change - an update (26 November 2008, 111 pp.), at 18.

49 See Table 5 - Additional investment and financial flows needed for adaptation in 2030, by sector from UNFCCC - Investment and financial flows to address climate change - an update (26 November 2008, 111 pp.), at 19.

UNFCCC Financing

The Clean Development Mechanism. The CDM established under the Kyoto Protocol allows a country to earn CER credits by implementing an emission reduction project in a developing country. A CER, worth one ton of CO₂, is sellable and may be applied to any country's emission reduction commitments under the Kyoto Protocol. In addition, a 2 percent levy on CERs generated through CDM projects is allocated to fund the Kyoto Protocol's Adaptation Fund.

The CDM has resulted in blend of public-private support to developing-country climate change mitigation efforts. In its early stages, 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. Increasingly, the CDM is channeling large amounts of private capital into climate change mitigation projects in developing countries. These private investment funds invest in proposed projects, commit to purchase CERs, purchase primary CERs, or do secondary trading in CERs.⁵⁰

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 1 October, there were 5,600 CDM projects in the pipeline, of which 3,518 were registered (compared to 1,231 in November 2008)⁵¹ and 43 were requesting registration.⁵² CDM projects initiated by UNFCCC Annex I countries were valued at

USD 7.4 billion in 2007 compared to USD 5.8 billion in 2006.⁵³

The value of transactions that took place on the CDM market was estimated at close to USD 33 billion in 2008.⁵⁴ However, nearly 80 percent consisted of secondary trading of 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.

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).

So far CDM projects have been concentrated in a few countries and sectors: as of September 2011, 89.6 percent were taking place in Asia and the Pacific and almost 66 percent of all CDM projects in the pipeline were expected to take place in China and India; nearly 70 percent of all CERs issued by 2012 were expected to stem from these two same countries, with 55 percent coming from China.⁵⁵ Brazil and Mexico also attract many CDM projects but pale in comparison with China and India. Only 1 percent of CDM projects are to take place in least developed countries, 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 came together through the Nairobi Framework in November

50 See OECD - IEA - Financing Climate Change Mitigation and MRV (October 2009, 50 pp.), at 26.

51 UNFCCC - Investment and financial flows to address climate change - an update (26 November 2008, 111 pp.), at 64.

52 For up-to-date stats: <http://cdm.unfccc.int/Statistics/index.html> (last consulted on 13 May 2010).

53 UNCTAD - Trade & Development Report, 2009 - Climate Change Mitigation & Development (218 pp.), at 160.

54 See OECD - IEA - Financing Climate Change Mitigation and MRV (October 2009, 50 pp.), at 25.

55 UNCTAD - Trade & Development Report, 2009 - Climate Change Mitigation & Development (218 pp.), at 160.

2006 to increase the participation of a greater number of developing countries in the CDM. The Nairobi Framework serves to build capacity in developing countries to more fully participate in the CDM, with a focus on sub-Saharan Africa.

Agriculture is practically excluded from CDM projects. For instance, soil carbon sequestration, which accounts for nearly 90 percent of agriculture's mitigating potential, is excluded from the CDM unless it qualifies as an afforestation/reforestation (A/R) project.⁵⁶ However, projects entailing CH₄ avoidance (576 projects in the CDM pipeline – 11 percent of projects as of 1 May 2010),⁵⁷ biogas projects and projects planning on using agricultural residues for biomass energy (195 projects in the CDM pipeline – 4 percent of projects as of 1 May 2010)⁵⁸ can qualify under the CDM.⁵⁹

Forestry has generated very little interest within the CDM realm. By March 2011, 21 A/R CDM projects were registered⁶⁰ and three were in the pipeline.⁶¹ As of March 2010, there were only eight A/R registered CDM projects out of over 2,000.⁶² MRV problems combined with uncertainty as to carbon sequestration through

forests partly explain the negligible role of A/R projects under the CDM.⁶³

Under the CDM, 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 and reduced registration and administration fees.⁶⁴ However, the CDM sets a cap on the size of these projects, which is too low and prevents these projects from being financially viable at the current low level of carbon prices.⁶⁵

The GHG mitigation 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 mitigation 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.

The Global Environment Facility.⁶⁶

Established in 1991, the GEF Trust Fund operates as the financial mechanism of the UNFCCC. GEF funding comes from voluntary donor country contributions. Since 1991, the GEF has distributed approximately USD 6.8 billion in grants leveraged by more than USD 24 billion in co-financing in support of nearly 1,900 projects in more than 160 countries (GEF, 2011c). The GEF funds five project types: renewable energy, energy efficiency, sustainable

56 FAO - Enabling Agriculture to Contribute to Climate Change Mitigation (6 February 2009, 13 pp.), at 2.

57 See <http://cdmpipeline.org/cdm-projects-type.htm>

58 See <http://cdmpipeline.org/cdm-projects-type.htm>

59 FAO - Carbon Finance Possibilities for Agriculture, Forestry and Other Land Use Projects in a Small-holder Context (February 2010, 24 pp.), at 7.

60 FAO - Carbon Finance Possibilities for Agriculture, Forestry and Other Land Use Projects in a Small-holder Context (February 2010, 24 pp.), at 7.

61 See <http://cdmpipeline.org/cdm-projects-type.htm>

62 Press Kit - International Conference on the Major Forest (11 March 2010, 32 pp.), available at <http://www.developpement-durable.gouv.fr/Conference-internationale-sur-les,14577.html> (last consulted on 11 May 2010).

63 See FAO - State of the World's Forests 2009 (March 2009, 168 pp.), at 76.

64 FAO - Carbon Finance Possibilities for Agriculture, Forestry and Other Land Use Projects in a Small-holder Context (February 2010, 24 pp.), at 8.

65 UNCTAD - Trade & Environment Review (November 2009, 230 pp.), at 99 and 163.

66 See <http://www.thegef.org/gef/whatisgef> and <http://www.undp.org/gef/>. See also OECD - IEA - Financing Climate Change Mitigation and MRV (October 2009, 50 pp.), at 17.

transportation, adaptation, low GHG energy technologies and enabling activities.⁶⁷

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 to 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 years.⁶⁸ The GEF also administers the Least Developed Countries Fund (LDCF) and the Special Climate Change Fund (SCCF), two funds geared toward financing adaptation measures.

REDD+ and REDD++. The REDD+ programme aims to reduce emissions from deforestation and forest degradation in developing countries, plus supporting the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries.⁶⁹ 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 services.⁷⁰

Developing countries wishing to participate in REDD+ must adopt a national strategy on deforestation and its causes, a national reference level for forests and a reliable and transparent monitoring system for follow-up and reporting on activities. The UNFCCC

SBSTA has adopted a decision⁷¹ which lays out the coordination of capacity-building activities, follow-up and reporting requirements and guidelines on how to set up the national forest reference levels.

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 17-28 billion per year to halve the rate of deforestation (International Institute for Applied Systems Analysis); USD 20-33 billion to halve the deforestation rate by 2020 (European Commission).⁷²

A key source of REDD+ funding was put in place during the International Conference on the Major Forest Basins that was held in Paris on 11 March 2010 and which reunited countries with major forest basins and major

67 IPCC - Climate Change Mitigation - Policies, Instruments and Co-operative Arrangements (2007, 64 pp.).

68 OECD - IEA - Financing Climate Change Mitigation and MRV (October 2009, 50 pp.), at 17.

69 Bali Action Plan, para 1(b)iii.

70 Press Kit - International Conference on the Major Forest (11 March 2010, 32 pp.), available at <http://www.developpement-durable.gouv.fr/Conference-internationale-sur-les,14577.html> (last consulted on 11 May 2010).

71 Mentioned in Press Kit - International Conference on the Major Forest (11 March 2010, 32 pp.), available at <http://www.developpement-durable.gouv.fr/Conference-internationale-sur-les,14577.html> (last consulted on 11 May 2010).

72 Press Kit - International Conference on the Major Forest (11 March 11 2010, 32 pp.), available at <http://www.developpement-durable.gouv.fr/Conference-internationale-sur-les,14577.html> (last consulted on 11 May 2010).

donor countries.^{73 74 75} 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+. 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 requested to play regarding REDD+, stating that more than 20 percent of fast-start funding should be devoted to REDD+.

Other programmes used to relay REDD+ funding include the United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in developing countries (UN-REDD Programme), the Government of Norway’s International Climate and Forest Initiative and the World Bank’s Forest Carbon Partnership Facility (FCPF).

The creation of REDD+ constitutes a milestone in combating deforestation, but eliminating deforestation will need much more financing. 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

aid.⁷⁶ 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.

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 leakage.⁷⁷

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 accounting and trading system and a smallholder climate change readiness fund.⁷⁸

Non-UNFCCC Financing

A wide array of mechanisms have been instituted to finance climate change mitigation actions in developing countries. See Annex A for a non-exhaustive summary table of funding initiatives. The following section provides an overview of efforts accomplished by Multilateral Development Banks (MDBs) and donor countries to support climate change mitigation efforts.

Multilateral Development Banks. MDBs are public financial institutions that aim to

73 See <http://www.developpement-durable.gouv.fr/Conference-internationale-sur-les,14577.html> (last consulted on 11 May 2010).

74 ICTSD - Bridges Trade BioRes (Vol. 10, No. 8, April 30, 2010), at 4. Available at <http://ictsd.org/downloads/biores/biores10-8.pdf> (last consulted on 11 May 2010). Donor countries have contributed the following amounts as of March 2010: Norway (USD 1 billion), United States (USD 1 billion), Japan (USD 500 million), United Kingdom (USD 480 million), France (USD 375 million) and Australia (USD 120 million).

75 See Press Kit - International Conference on the Major Forest (11 March 2010, 32 pp.), available at <http://www.developpement-durable.gouv.fr/Conference-internationale-sur-les,14577.html> (last consulted on 11 May 2010).

76 See ICTSD - Bridges Trade BioRes (Vol. 10, No. 8, 30 April 2010), at 3. Available at <http://ictsd.org/downloads/biores/biores10-8.pdf> (last consulted on 11 May 2010).

77 AWG-LCA Report - opportunities and challenges for mitigation in the agricultural sector (7 April 2009, 4 pp.), at para. 22.

78 FAO - Enabling Agriculture to Contribute to Climate Change Mitigation (6 February 2009, 13 pp.), at 10.

reduce poverty through project and policy financing in developing countries. MDBs use a variety of financial instruments (concessional loans, grants, guarantees, etc.) to funnel large sums of money in support of development goals.

MDBs invested an estimated annual average of USD 44.7 billion from 2003 to 2007 in developing countries and EITs, approximately half of which went to sectors relevant to climate change mitigation.⁷⁹

The public nature of MDBs and the sheer magnitude of investments they oversee highlight the crucial role bestowed upon them in the fight against climate change. Yet among MDBs, only the European Bank of Reconstruction and Development (EBRD) is known to explicitly appraise and rate all projects for energy-efficiency potential.⁸⁰

The World Bank has valued commitments to clean energy and energy efficiency in developing countries at USD 4.1 billion annually for 2006 and 2007, 85 percent up from a USD 2.2 billion annual average from 2000 to 2005 (without accounting for the Climate Investment Funds).⁸¹ The World Bank itself is managing USD 2.1 billion through ten

carbon funds and facilities.⁸² Approximately USD 1.6 billion out of 2.1 billion has already been committed; the remainder (USD 4.1 billion) is expected to be committed over the next two years. A significant part of this mitigation-specific capital is invested to purchase CERs from the CDM or Emission Reduction Units (ERUs) from the JI scheme of the Kyoto Protocol. The funds designed to manage these capital assets will be phased out following the transfer of assets to participants.

The Asian Development Bank (ADB) has spearheaded a variety of programmes to support climate change mitigation in developing countries, after launching its Energy Efficiency Initiative in July of 2005. The ADB reported investments of USD 1.6 billion for 2008 alone under this initiative. The ADB adopted a new energy policy in 2009 and expects to increase its investments in clean energy and energy efficiency to USD 2 billion a year from 2013 onward.⁸³

The ADB also launched the “Energy for All” initiative in 2009 with financial support from the Netherlands, a programme aiming to provide access to safe, clean, affordable and modern energy to an additional 100 million people in Asia and the Pacific by 2015. The ADB has leveraged more than USD

79 OECD - IEA - Financing Climate Change Mitigation and MRV (October 2009, 50 pp.), at 23.

80 OECD - IEA - Financing Climate Change Mitigation and MRV (October 2009, 50 pp.), at 23.

81 OECD - IEA - Financing Climate Change Mitigation and MRV (October 2009, 50 pp.), at 23.

82 The Umbrella Carbon Facility (USD 719 million – managed by the International Bank for Reconstruction and Development (IBRD)), the Forest Carbon Partnership Facility (USD 300 million), the Spanish Carbon Fund (USD 278.6 million), the Prototype Carbon Fund (USD 180 million), the Community Development Carbon Fund (USD 128.6 million), the Netherlands Clean Development Facility, the Italian Carbon Fund (USD 155.6 million), the Biocarbon Fund (USD 91 million), the Danish Carbon Fund (USD 68.5 million), the Carbon Fund for Europe (USD 65 million), and the Carbon Partnership Facility (no specified amount).

83 See IISD - Investing in a sustainable future - Multilateral development banks' investment in energy policy (November 2009, 47 pp.), at 12 and see <http://www.adb.org/Documents/Clean-Energy/CE-Evolution.pdf> (last consulted on 14 May 2010).

122 million in access to energy investment through this initiative.⁸⁴

The Inter-American Development Bank (IDB) introduced its Sustainable Energy and Climate Change Initiative (SECCI) in 2006 to integrate mainstream sustainable energy approaches into its operations. IDB also participates in the Initiative for Integration of Regional Infrastructure in South America (IIRSA), which focuses on roads, gas pipelines and power plants that can help generate electricity.

Finally, in 2008 the IDB began its Renewable Energy, Energy Efficiency and Bioenergy Action Program, which tackles regulatory barriers to clean energy deployment in Caribbean countries. Under this programme, the IDB has been involved in various efforts that contribute to climate change mitigation, including support to rural electrification (Guatemala), enhancing energy efficiency in electricity (Costa Rica) and electricity regulation and policies (Panama).

The Climate Investment Funds (CIFs) were created in 2008 thanks to concerted efforts of the World Bank, the IDB, the African Development Bank, the IBD and the EBRD. CIFs encompass the Strategic Climate Change Fund (SCCF), which supports testing of innovative approaches to climate change, and the Clean Technology Fund (CTF), which is meant to scale up investments in low-carbon technologies.⁸⁵

At Cancun, the Cancun Adaptation Framework was established and the Adaptation Committee aimed to support better international planning and implementation and cooperation on adaptation. While the Cancun conference didn't

result in a new agreement among member countries on the post-Kyoto framework for limiting GHG emissions, governments agreed to continue work on identifying a goal for substantially reducing global emissions by 2050 and a time frame for the peaking of global emissions. It was also agreed that a review of the progress toward meeting the necessary timetable (and whether it will require stronger action) will be initiated in 2013 and completed by 2015. Meanwhile negotiations on a post-Kyoto agreement continued in 2011 and are expected to be taken up again at the next Climate Change Conference in Durban, South Africa.

Also at Cancun, there were conferences held to strengthen steps aimed at enhancing global action on climate change. The following new mechanisms and instruments were developed: (i) a Green Climate Fund to house the international management, deployment and accountability of long-term funds for developing country support; (ii) a Technology Mechanism to get clean technologies to the right place, at the right time and most effectively; (iii) an Adaptation Framework to boost international cooperation to help developing countries protect themselves from the impacts of climate change; and (iv) a Registry where developing countries will detail their voluntary plans to limit GHG emissions and the support they need to achieve them.

ODA and Rio Marker on Climate Change. Bilateral ODA is the concessional finance monitored by the OECD DAC-CRS. The "Rio Marker on Climate Change", established by the DAC Secretariat with the help of the UNFCCC in 1998, provides an account of ODA specifically aimed at climate change mitigation efforts. As a result, every aid activity reported to the CRS is generally screened to determine whether climate change mitigation represents a principal or significant objective of the aid activity at issue.

84 See IISD - Investing in a sustainable future - Multilateral development banks' investment in energy policy (November 2009, 47 pp.), at 12 and see <http://www.adb.org/Documents/Clean-Energy/CE-Evolution.pdf> (last consulted on 14 May 2010).

85 More info at <http://www.climateinvestmentfunds.org/cif/>.

From 2003 to 2009, ODA increased from USD 974 million to USD 2.3 billion. Approximately 24 percent of ODA is estimated as relevant to climate change mitigation.⁸⁶ Donor countries undertook 4,504 climate-change related aid activities between 2005 and 2007. Based on value, approximately 90 percent of climate-change-related aid was devoted to energy, transport, storage, general environmental protection, water and forestry.⁸⁷

Annual ODA specific to climate change mitigation increased by 65 percent in 2003-2007 compared to 2000-2002; however it still only amounts to less than 4 percent of ODA relevant to climate change mitigation between 2003 and 2007.

Guidelines for Funding Climate Change Mitigation in Developing Countries

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 purpose.⁸⁸ Notwithstanding the particular path chosen, OECD proposes the following key principles as guidelines for international financing for climate change.⁸⁹

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 complementary and coordinated fashion as opposed to in silos.

Second, developing countries should pilot climate change mitigation activities to ensure that the 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 a national climate change strategy and fully integrate it 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. International financing should be streamlined and the number of funding mechanisms reduced to take advantage of economies of scale and greater coordination resulting from sharing administrative capacities.

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 before reaching the project level. A programmatic approach also enhances country ownership as developing countries play a greater role in overseeing 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.

Fifth, all current and future international financing directed towards developing

86 OECD - IEA - Financing Climate Change Mitigation and MRV (October 2009, 50 pp.), at 18.

87 OECD - Measuring aid targeting the objective of the United Nations Framework Convention on Climate Change (November 2009, 4 pp.), at 1.

88 See table from UNFCCC - Investment and financial flows to address climate change - an update (26 November 2008, 111 pp.), at 94.

89 See OECD Factsheet - Key Principles to Inform Climate Change Financing (October 2009, 2 pp.).

countries from public and private sectors should favour more sustainable and climate-friendly project 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.

Chapter 4

Agriculture, Multilateral Trade Rules and Climate-Smart Policies

Climate Change and Global Agricultural Trade

The most challenging question for world trade that is posed by efforts to adapt to and mitigate climate change is whether the rules-based global trade system can achieve a balance between ensuring an open and fair multilateral trading system while providing sufficient scope for implementing multilateral and unilateral climate change policies. The chasm that exists among countries in reaching a Post-Kyoto, multilateral agreement on climate action portends a future where countries increasingly may pursue unilateral policies on climate change with transborder consequences, leading inevitably to disputes and tensions and bringing into question the continued relevance of current multilateral rules in the age of global warming.

Global Trade Rules and Environmental Policies

Global trade is governed by the General Agreement on Trade and Tariffs (GATT). This multilateral trade agreement to reduce trade tariffs and other barriers to international trade was signed in 1947 by 23 countries and has since been ratified by 153 countries.

GATT is based on two fundamental non-discrimination principles: most favoured nation (MFN) and national treatment. The MFN principle (GATT Article I) requires that each party treat imported products from every other party in the same way it treats like products from its most favoured trading

partner. National treatment (GATT Article III) requires that each party treat products from other parties at least as favourably as it treats its own products.

With respect to climate change, another key rule underlying GATT is that countries may not apply prohibitions or restrictions to imports, except tariffs or other charges, that do not also apply to like domestic products (GATT Article XI). Any such measures must comply with the national treatment principle.

Even in 1947, parties foresaw that a certain number of national concerns could override non-discrimination among trade partners. Among the exceptions provided for in GATT are environmental concerns, measures necessary for the protection of human or animal life or health, and measures related to the conservation of exhaustible natural resources. These exceptions can be justified despite violating one or more GATT provisions as long as they do not constitute either unjustifiable or arbitrary discrimination between countries where the same conditions prevail or as a disguised restriction on international trade.

In 1994, GATT parties signed the Marrakesh Agreement that established the WTO. This transition did not introduce any amendments to the GATT rules to address environmental concerns.

In principle, therefore, WTO Members are free to adopt domestic climate change mitigation policies provided they do not violate the national treatment principle. In practice,

however, the situation is more complex and the parameters of GATT law with respect to nations' climate policies have largely been defined through the resolution of trade disputes on environmental policies that have been brought before the Dispute Settlement Body of the WTO (DSB). The DSB has therefore held a central role in defining GATT/WTO law as

it relates to countries' environmental policies. The three environment-related trade disputes that have had the most impact in this respect are the Tuna-Dolphin, Gasoline and Shrimp-Turtle cases (see Box 2).

Box 2: The Greening of WTO Case Law

During the early 1990s a number of trade dispute cases were brought before the GATT that tested the environmental clauses of existing GATT rules. One of the earliest was the US versus Mexico Tuna-Dolphin dispute. Key questions that were raised and answered in the case include whether one country can impose environmental regulations on another and whether trade rules allow a country to take action based on the process and production methods (PPM) used to produce goods rather than only on the characteristics of the goods themselves. The position laid out in the Tuna-Dolphin case in respect of product likeness under GATT Article III suggested that environmental differences between products that went beyond their physical characteristics could not be invoked to distinguish products and thus could not serve as a basis for differential treatment

The reasoning of the Tuna-Dolphin case implied more generally that no import restriction designed to address environmental concerns outside the jurisdiction of a country could be justified under GATT Article XX. Moreover, an environmental measure that addressed internal environmental concerns was faced with passing a stringent test before being justified.

In the "EC-Asbestos" case, instituted in 1998, Canada argued that a French ban on products containing asbestos violated GATT Article III, given that asbestos-laden products were "like" substitute products made in France that did not contain asbestos and that this less favourable treatment violated the national treatment principle. However, the WTO Appellate Body rejected Canada's claim. The decision leaves the door open for environmental characteristics of products to be raised when evaluating likeness, although it does not reverse the Tuna-Dolphin case in respect of PPMs.

Recognizing such flexibility in identifying valid health policy objectives under GATT Article XX(b) bodes well for identifying valid environmental policy objectives. Such flexibility is also granted to countries in choosing their desired level of protection, thus avoiding the pitfall whereby trade would bring down environmental protection.

The WTO Appellate Body overturned the conclusions of the Tuna-Dolphin case in respect of GATT Article XX(g) (measures regarding exhaustible natural resources)

in two cases known as Gasoline and Shrimp-Turtle I. The Gasoline case involved US regulations, following the Clean Air Act Amendment of 1990, that required US refiners and importers to ensure that their gasoline was at least as clean as it was in 1990. Refiners and importers had to establish an individual gasoline cleanliness baseline for 1990; if available data were insufficient, refiners could use post-1990 data, while importers had to use a statutorily imposed baseline equal to the average cleanliness of all US gasoline in 1990. The statutorily imposed baseline represented a more difficult standard than its own baseline for a refiner or importer whose gasoline was dirtier than average in 1990. Given that the individual baseline option was available to refiners and not importers in a situation of insufficient data, Brazil and Venezuela claimed that the US violated the national treatment principle (GATT Article III) by according less favourable treatment to imported gasoline than to domestic gasoline.

The WTO Appellate Body agreed with the US position, arguing that Article XX(g) did not impose a “least GATT-inconsistent” test to a trade measure dealing with exhaustible natural resources. The Appellate Body also stated that the requirement that trade measures be “made effective in conjunction with restrictions on domestic production or consumption” simply meant “even-handedness in the imposition of restrictions, in the name of conservation, upon the production or consumption of exhaustible natural resources”. The US met this requirement of even-handedness by regulating domestically produced gasoline as much as imported gasoline.

Another similar decision came up in the Shrimp-Turtle I case. Sea turtles, like dolphins, are often incidentally captured and drown as result not of tuna fishing, but rather shrimp trawls. In 1987, the US started requiring that US shrimp trawlers use “turtle excluder devices” (TEDs) in their nets when in areas that show a significant likelihood of encountering sea turtles. In 1989, the US enacted a law banning the importation of shrimp harvested with technology that may adversely affect sea turtles unless the harvesting nation could certify having a regulatory programme and an incidental sea turtle take-rate comparable to that of the US.

This requirement essentially meant that countries among whose waters sea turtles could be found and which harvested shrimp with mechanical means had to impose on their fishermen requirements comparable to those borne by US shrimpers (i.e. the use of TEDs) if they wished to qualify as certified shrimp exporters to the US market. In early 1997, India, Malaysia, Pakistan and Thailand filed a joint complaint against the US ban of their shrimp products. The plaintiff countries argued that the US shrimp ban violated GATT Article XI, which prohibits restrictions on imports, and which was not disputed by the US.

The focus then turned to GATT Article XX(g). The WTO Appellate Body stated that the expression “exhaustible natural resources” included living organisms such as sea turtles. The Appellate Body did not specifically overturn the Tuna-Dolphin case on the issue of extraterritoriality, but considered that the US trade measures in respect of sea turtles showed a “sufficient nexus” with the US as sea turtles circulated in waters under US jurisdiction. The “sufficient nexus” test constituted a novel approach compared to the Tuna-Dolphin case, which did not consider the fact that

the dolphins the US aimed to protect also circulated in waters under US jurisdiction. The Appellate Body therefore broadened the reach of GATT Article XX(g). Moreover the Appellate Body decided that the US shrimp ban related to the conservation of an exhaustible natural resource and that it was made effective in conjunction with similar domestic restrictions. The US shrimp ban therefore met the requirements of GATT Article XX(g). In the end, the broader approach taken by the WTO Appellate Body towards GATT Article XX(g) gives environmental measures a better chance to pass muster.

Overall, the message that has come through a review of the WTO dispute cases can be summarized as follows: the WTO Appellate Body has adopted interpretations of GATT provisions that now give environmental measures a better chance to pass muster. DSB rulings have established that unilateral trade measures can be justified as long as they are applied flexibly and in connection with good-faith negotiating efforts to reach a multilateral agreement on the policy issues that eventually prompted the unilateral trade measures. Unilateral trade measures in accordance with trade restrictions embedded within a Multilateral Environmental Agreement (MEA), even if applied to countries that are not parties to the MEA, could likely be justified as long as membership to the MEA is open to all countries to which the trade restrictions apply.

WTO's Evolving View: Climate First, Trade Second

The environmental principles embodied by the WTO are grounded in the cardinal belief that an open trading system benefits the environment because it leads to more efficient resource use and stimulates economic growth, which can lead to reduced poverty and higher standards of living, including a better environment.⁹⁰ However, the WTO itself conditioned the positive environmental effect of trade liberalization on two elements: appropriate environmental regulations and

policies must be in place; and prices must reflect the full production, including environmental, costs associated with goods, which requires mechanisms that internalize environmental costs into prices.

During the Doha Ministerial Conference in November 2001, WTO members agreed to launch negotiations on a variety of issues, including certain aspects of the relationship between trade and environment. Known as the Doha Development Agenda, the work programme of the Doha round of negotiations was announced in a ministerial declaration.

Within the preamble to the Doha Ministerial Declaration, WTO members strongly reaffirmed their commitment to sustainable development and expressed their conviction that an open and non-discriminating multilateral trading system, protecting the environment and sustainable development, "can and must be" mutually supportive. WTO members also reiterated that WTO rules do not prohibit a country from taking measures for the protection of human, animal or plant life or health, or of the environment at the levels it considers appropriate subject to GATT/WTO agreements.

The WTO prepared a list of benchmarks for climate change mitigation policies. These stress consistency with GATT/WTO rules, inclusiveness, consideration of the capabilities of developing countries, and the legitimate objectives of the importing country that is instigating the measure. The WTO membership

⁹⁰ WTO - Trade and Environment at the WTO (2004, 86 pp.), at 31.

has also emphasized that developing countries must be actively involved in the design and development of environmental measures in order to minimize negative – and often avoidable – trade effects.⁹¹

Recognizing the strong linkage between climate change and trade, an “Informal Trade Ministers Dialogue on Climate Change”, initiated by the Government of Indonesia, was held for the first time in Bali in December 2007, in conjunction with the UNFCCC COP-13 meetings. The ITMD essentially consisted of an exchange of views on ways that international trade can support climate change objectives. Trade ministers concluded that international trade, development and climate change can be mutually supportive and that international trade must play an important role in addressing climate change issues to ensure future sustainable development. Trade ministers also insisted on the importance of consensus-based multilateral frameworks to reach agreement on climate change targets, approaches and instruments. Most important, this meeting provided recognition that multilateral trade rules henceforth must be designed to facilitate climate change objectives.

This new notion of “climate first, and trade second” is beginning to be embraced by the global WTO community.⁹² WTO Director-General Pascal Lamy has stated that the WTO would “greet with open arms a new international climate accord,” stressing that no form of unilateral action would suffice to solve climate change and that the tremendous complementarity that exists between trade and climate change has yet to be fully exploited.⁹³

He also called for the signing of a multilateral environmental agreement within the UNFCCC framework that would apply to all major polluters and send clear signals to the WTO as to how trade rules and resources at the WTO’s disposal can be used to combat climate change. While the WTO cannot take the lead in the fight against climate change, it can at least ensure that trade rules do not hinder a switch to more sustainable patterns of consumption and production and that trade rules encourage such a switch where possible.

Greening the Trade Rules for Climate-Smart Policies

Overall, the long and arduous process of slow adjustment of GATT/WTO trade rules to environmental concerns has demonstrated the primacy of trade over environmental concerns. Many trade rules need to be substantively reconfigured in light of mounting concerns over the sustainability of natural resources and the increasingly pressing challenges posed by climate change.

It is not clear if existing trade rules are sufficient unto themselves or a major rethink is required, accompanied by action by the WTO membership on greening GATT/WTO rules. In part, the current stalemate of the Doha negotiations may be due to the unresolved clarity of the future role of the trading system in the age of climate change and sustainability.

While simultaneously engaging in the UNFCCC efforts to achieve concerted global action on climate change, many countries therefore are choosing to move forward unilaterally to implement national climate change mitigation programmes. Where these have trade implications, the boundaries and complementarities of GATT/WTO trade rules and unilateral actions on climate change will need to be tested, better defined, and perhaps “greened” to better support the adoption of “climate-smart” policies.

91 WTO - Trade and Environment at the WTO (2004, 86 pp.), at 15.

92 WTO - Speeches - Lamy - Bali meeting - Doha could deliver double-win for environment and trade (9 December, 2007, 3 pp.).

93 WTO - Speeches - Lamy - Urgency of Responding to Climate Crisis (2 November 2009, 3 pp.).

Multilateral action on climate change, too, may require a “greening” of current GATT/WTO rules, either to impose greater disciplines on some distorting policies or to encourage policies that promote climate change mitigation.

Following are nine proposed areas in which countries can, unilaterally or through multilateral collaboration, adopt climate-smart policies that have potentially large payoffs in the fight against climate change, but for which – in some cases – current global trade rules must be “greened.”

Reduce Fossil Fuel Subsidies

Production and use of energy are priority areas of action for climate change mitigation. GHG emissions from the energy sector can be reduced, for developed and developing countries alike, by increasing energy efficiency and by switching from fossil fuels to renewable energy sources that emit little or no GHGs. Most, if not all, climate change mitigation policies strive to accomplish, either directly or indirectly, one of these two means of reducing GHG emissions.

A key first step in the fight against climate change consists of removing fossil fuel subsidies as these subsidies directly contribute to GHG emissions by facilitating energy consumption and discouraging energy efficiency and low-consumption technology innovation. Energy subsidies are particularly high in Russia and many Eastern European countries, as well as in major developing countries, including India.

The International Energy Agency (IEA) has estimated that energy subsidies amounted to USD 300 billion in 2007⁹⁴, which is most likely below the true mark as it only accounts for consumer subsidies in the 20 non-OECD

countries that subsidize the most.⁹⁵ IEA and OECD have suggested in a joint analysis that removing these subsidies in 20 emerging economies and developing countries could translate into a 30 percent GHG emission reduction in some of these countries and a global 10 percent GHG emission reduction by 2050 compared to a business-as-usual scenario.⁹⁶

In September 2009, G20 leaders committed to “rationalize and phase out over the medium term inefficient fossil fuel subsidies that encourage wasteful consumption”.⁹⁷ Within the Doha Development Agenda negotiations, WTO members have agreed to clarify and improve disciplines applicable to subsidies.⁹⁸

Discussion on energy subsidies has also taken place within the Committee on Trade and Environment (CTE) of the WTO, although no definitive conclusions have been reached.⁹⁹ These discussions have focused on the revised rules for export subsidies provided in the Subsidies and Countervailing Measures Agreement (the SCMA), whereby taxes on energy used to produce exports can be refunded without the refunds being treated as an export subsidy (which are prohibited under the SCMA). Annexes 1 and 2 of the SCMA specify that exemption or remission of taxes on physical, energy, fuel or oil inputs that are consumed in the production of the exported product do not amount to a subsidy on exports. Some WTO members have argued that this

⁹⁴ OECD - Key Messages - Financing Climate Change Action, Supporting Technology Transfer and Development (2009, 8 pp.), at 3.

⁹⁵ Global Subsidies Initiative - The Politics of Fossil-Fuel Subsidies (October 2009, 34 pp.), at 7.

⁹⁶ OECD - Key Messages - Financing Climate Change Action, Supporting Technology Transfer and Development (2009, 8 pp.), at 3.

⁹⁷ OECD - Key Messages - Financing Climate Change Action, Supporting Technology Transfer and Development (2009, 8 pp.), at 3.

⁹⁸ Doha Ministerial Declaration, para. 28.

⁹⁹ WTO - Trade and Environment at the WTO (2004, 86 pp.), at 26-27.

provision encourages the greater use of energy-intensive technologies for exports.

The WTO could contribute to reducing fossil fuel subsidies by removing this favourable exemption and prohibiting fossil fuel subsidies aimed at encouraging exports. As an alternative, WTO members could negotiate a cap on fossil fuel subsidies.

Increase Renewable Energy Subsidies

Technological advances and the diversification of energy sourcing into alternatives like wind and solar power are improving the prospects for greater global use of renewable energies. In particular, wind and solar power offer alternative energy sources for developing countries with limited alternative options for renewable energy, such as bioenergy, hydropower and nuclear energy.

The emerging importance of renewable energy sources makes it critical that the WTO revisit its rules regarding the use of subsidies to encourage alternative energy development and use.¹⁰⁰ Under the Agreement on Agriculture, environmental subsidies may be authorized under certain conditions. A similar provision can be found in the SCMA, which authorizes certain research and development (R&D) and “green subsidies”.¹⁰¹

Because the SCMA provisions expired, and WTO members failed to agree to their extension, both R&D and green subsidies are now prohibited. In practice, however, no complaint has been lodged to the WTO that these subsidies violate the SCMA,¹⁰² but this

regulatory insecurity arguably has a chilling effect on their use.

WTO members could negotiate a set of renewable energy subsidies that they would refrain from challenging. They could achieve this in two ways: first, WTO members could revive the SCMA provisions or negotiate a new exemption to be included in the SCMA that would authorize renewable energy subsidies; second, WTO members could start with a “peace clause” whereby WTO members would enter into a political agreement to not challenge certain renewable energy subsidies for a specified length of time.

Liberalize Trade in Biofuels

In recent years, the US, the EU and, much earlier, Brazil have led the development of biofuels derived from the conventional production of food crops. The US is now the main producer of biofuels. In 2009, the US produced 40 billion litres, compared to 25 billion for Brazil and 3.7 billion for the European Union in 2009.¹⁰³ Demand for biofuels has grown rapidly in the transport sector of these economies and their use in transport fuel consumption has risen significantly since 1990.¹⁰⁴ However, despite rapid growth in their production, biofuels still account for a tiny share of global energy supply.

While the US and the EU produce biofuels largely for domestic markets, Brazil has emerged as a major exporter of bioethanol and the US a major importer of ethanol. The EU is a major importer of biodiesel.¹⁰⁵ International trade in biofuels has potential for substantial growth in the future as cost-efficiency and GHG

100 WTO - Speeches - Lamy - international trade cooperation is relevant to the energy sector (22 October 2009, 4 pp.).

101 “Green subsidies” for the “promotion of adapting existing facilities to new environmental regulations” were authorized under SCMA Article 8.2(c).

102 UNCTAD - Trade & Development Report, 2009 - Climate Change Mitigation & Development (218 pp.), at 158, footnote 16.

103 See Table 1 from FAO - State of Food and Agriculture - Biofuels - Prospects, Risks & Opportunities (2008, 138 pp.), at 15; see Figure 3.4 from UNEP - Assessing Biofuels (2009, 120 pp.), at 34.

104 From FAO - State of Food and Agriculture - Biofuels - Prospects, Risks & Opportunities (2008, 138 pp.), at 4.

105 See Figures 3.5 and 3.6 from UNEP - Assessing Biofuels (2009, 120 pp.), at 36.

mitigation considerations gain more ground in the perspectives of markets and decision makers.

Many developing countries intend to take advantage of the growing export opportunities offered by biofuels while at the same time reducing their own dependence on fossil fuels. For instance, Malaysia, the world's largest palm oil producer, is planting large acreages of palm oil and building biodiesel plants; the Philippines is expanding its production of coconut oil and jatropha plants used to produce biofuels; Guatemala and Peru show great potential for producing biofuels from sugarcane cultivation; and China, India, Indonesia, Thailand and South Africa are increasing or intend to increase their production of biofuels using a variety of feedstocks.¹⁰⁶

Developing countries interested in developing biofuels need to balance the economic opportunities from increased production, exports and lower reliance on fossil fuels, with the need to preserve the productive capacity of food crops to ensure domestic food security. Diverting too much land from food production to energy crops can also cause sharp rises in food prices, and expose small farmers to undue barriers when trying to participate in the biofuel market.¹⁰⁷

Given that most of these developing countries have the potential to produce biofuels at higher cost-efficiency and GHG mitigation levels than developed countries, their exports should attract significant interest from purchasers in developed countries, especially since domestic production of biofuels in the US and the EU face constraints imposed by high production costs

and limited availability of suitable agricultural lands.¹⁰⁸

When measured in terms of their impact on GHG emissions, however, "first-generation" biofuels, which are derived from crops, animal fats and vegetable oils, have come under mounting criticism, particularly as produced in the US and the EU. The effects on land use change (and possible deforestation), intensive fossil energy use and expansion of mono-cropping reduce their appeal from the environmental perspective and in terms of their potential for GHG emission reduction.

The current distribution of biofuel production across countries reinforces the impression that biofuels are not produced with a view to optimize the reduction of GHG emissions, as the main producing countries do not necessarily focus on the types of biofuels that hold the greatest promise of GHG mitigation. When looking at the GHG mitigation potential of various types of biofuels,¹⁰⁹ sugarcane from Brazil and palm oil (which is grown mainly in Malaysia, Indonesia, Nigeria and Thailand¹¹⁰) appear to be the most promising first-generation sources of biofuels, significantly ahead of biofuels produced from maize in the US or from sugar beet and rapeseed in the EU. Moreover, biofuels from feedstocks (especially in temperate regions) have also been criticized for their perceived negative impact on food security.

Growth in biofuel production and trade has been distorted by production subsidies and tariffs in some countries. For instance, total liquid biofuel support in 2006 amounted to

106 UNCTAD - The Emerging Biofuels Market - Regulatory, Trade and Development Implications (2006, 52 pp.), at 14-23 and IPC-Howse - WTO Disciplines and Biofuels Opportunities and Constraints (2006, 44 pp.), at 5.

107 UNCTAD - The Emerging Biofuels Market - Regulatory, Trade and Development Implications (2006, 52 pp.), at 1-2, 29, 32-34.

108 IPC-Howse - WTO Disciplines and Biofuels Opportunities and Constraints (2006, 44 pp.), at 4-5.

109 See Figure 23 from FAO - State of Food and Agriculture - Biofuels - Prospects, Risks & Opportunities (2008, 138 pp.), at 57.

110 UNEP - Assessing Biofuels (2009, 120 pp.), at 45 and FAO - State of Food and Agriculture - Biofuels - Prospects, Risks & Opportunities (2008, 138 pp.), at 16.

USD 6.33 billion in the US and USD 4.7 billion in the EU.¹¹¹ Energy security concerns and the need to protect their emerging domestic biofuel industries led the US and the EU also to impose import tariffs on biofuels from more efficient producers (ethanol from Brazil, palm oil from Malaysia).

The justification for support and protection policies is that biofuels contribute to decreased reliance on fossil fuel and to reducing GHG emissions. However, motivations for government intervention also include the energy security concerns felt by countries that are dependent on oil imports and exposed to their unpredictable availability and price. Government support to biofuels also offers new commercial outlets for farmers.

Current biofuels tariffs and subsidies, particularly in the EU and the US, thwart the most cost-effective and GHG-mitigating biofuels from reaching their full potential through international trade. Climate change mitigation calls for promoting GHG emission reductions at the lowest cost possible, and an increased liberalization of trade in biofuels holds the promise of providing cheaper climate change mitigation options.

Considering that global trade in biofuels is heavily distorted, tariffs and subsidies constitute a priority area to address with respect to current multilateral trade rules. WTO Members should focus their efforts on eliminating tariffs on biofuels. Subsidy support to the biofuels industry should be limited to measures targeted at encouraging public goods, such as R&D and infrastructure, and in internalizing environmental costs.

The elimination of trade barriers and domestic support for products, in general, is linked to their classification as “industrial” or

111 See Table 6 from FAO - State of Food and Agriculture - Biofuels - Prospects, Risks & Opportunities (2008, 138 pp.), at 15.

“agricultural” goods in the Harmonized System (HS), the internationally standardized system of product classification. The way in which a biofuel is classified matters not only for tariffs, but also for determining the set of WTO rules applicable to domestic subsidies. Ethanol is classified as an agricultural product and is subject to the AOA in addition to the SCMA (HS Chapter 22), but biodiesel is an industrial production (HS Chapter 38) and is not subject to the AOA.¹¹²

Treating ethanol as an agricultural product entails more leniency under WTO rules regarding tariffs and subsidies compared to subsidies authorized for biodiesel, which is characterized as an industrial product.¹¹³ In practical terms, this distinction allows countries to provide larger subsidies to domestic producers of ethanol and to impose higher tariff rates on ethanol imports as compared to biodiesel. Biodiesel and ethanol are thus subject to different levels and disciplines under WTO rules despite the absence of a clear rationale for such a discrepancy.

The expiration in 2004 of the WTO’s peace clause that exempted agricultural subsidies and tariffs from challenges by WTO parties creates the possibility that complaints regarding agricultural subsidies – and by implication ethanol production subsidies – could be lodged in the foreseeable future.¹¹⁴

Options to further liberalize trade in biofuels include amending the HS within the World Customs Organization (WCO) forum to ensure that ethanol, biodiesel and other biofuels are subject to the same tariffs and WTO rules, and to distinguish biofuel components used as fuels

112 See IPC-Howse - WTO Disciplines and Biofuels Opportunities and Constraints (2006, 44 pp.), at 10.

113 Machado-Filho – Climate Change and the International Trade of Biofuels (CCLR 1-2008, pp. 67-78), at 73-74.

114 IPC-Howse - WTO Disciplines and Biofuels Opportunities and Constraints (2006, 44 pp.), at 16.

from those used for other purposes (e.g. ethanol used for alcohol), thus facilitating a push for the liberalization of trade in biofuels in the context of the liberalization of environmental goods and services (EGS).

Another option would consist of WTO Members negotiating an agreement that would address only the elimination of tariffs on biofuels notwithstanding the current HS classification.¹¹⁵ WTO Members could rely on the 1996 WTO Information Technology Agreement (ITA) as a precedent. WTO Members who ratified the ITA were bound to liberalize tariffs on two lists of products: an “A” list, based on HS classifications, and a “B” list, describing specific products, whereby the obligation to liberalize would apply regardless of how those products might fit within existing HS classifications. Each country that ratified the ITA would then have the responsibility of reflecting the tariff reductions on the B list using its national nomenclature.

WTO Members could then enter into an Agreement on Biofuels to agree to reductions or eliminations of tariff on biofuels. Such an agreement could also provide for limitations on certain trade-distorting subsidies targeting domestic biofuels industries. Otherwise, limitations on authorized subsidies to domestic biofuels industries could form part of broader negotiations targeting renewable energy subsidies.

In addition to actions that could be taken by the WTO, some countries are contemplating the implementation of mandatory GHG mitigation standards in order to ensure that biofuels are produced in an environmentally sustainable manner and that their production ensures a reduction in GHG emissions. Voluntary certification and labelling schemes have also been created and are being developed by the non-governmental and private sectors. These

¹¹⁵ See IPC-Howse - WTO Disciplines and Biofuels Opportunities and Constraints (2006, 44 pp.), at 12.

responses are intended to dispel fears that biofuels do not succeed in mitigating climate change.

Liberalize Trade in Environmental Goods and Services

Liberalization of trade in EGS would contribute to increased availability and affordability of climate change mitigation options for importing countries while creating new commercial opportunities for exporting countries. Liberalization of trade in EGS also would create the possibility of including biofuels as environmental goods in a negotiated agreement.

While positive, the results of trade liberalization in EGS would have limitations. High tariffs are only one of the factors that determine access to and affordability of climate-friendly goods and technologies.¹¹⁶ Other factors such as subsidies and preferential procurement policies of governments in developed countries and local content requirements in developing countries further distort trade in EGS.¹¹⁷

WTO Members have thus far been hampered in their EGS negotiations for a number of reasons. On one end of the negotiating spectrum, market access is a main objective for developed countries, especially in developing country markets. However, demand for EGS by developing-country markets may not currently be strong enough for sophisticated and expensive EGS imports from developed countries.¹¹⁸ Developing countries would need assistance in promoting viable domestic consumer markets for EGS.

¹¹⁶ See UNCTAD - Trade & Environment Review (November 2009, 230 pp.), at 178-184.

¹¹⁷ See UNCTAD - Trade & Environment Review (November 2009, 230 pp.), at 184-190.

¹¹⁸ See ICTSD - Trade Negotiations Insight (December 2009), at 8-9.

On the other end of the EGS spectrum, export market creation is the main objective of developing countries. Therefore they tend to resist granting complete access to their markets for fear of losing any possibility of creating their own domestic EGS industries.¹¹⁹

Following from these contrasting objectives are disagreements on a viable negotiating strategy, the scope of the liberalization to be accomplished and the outcome (a stand-alone agreement on EGS and/or amendments to other WTO agreements, multilateral or pluri-lateral agreement, etc.), definitions of environmental goods and environmental services, and an update process for the list of EGS to reflect rapidly evolving technologies.¹²⁰

Some WTO Members have proposed eliminating tariffs on biofuels by characterizing biofuels as environmental goods and including them in the ongoing Doha Development Round negotiations to liberalize EGS conducted under Paragraph 31(iii) of the Doha Ministerial Declaration.

Since HS classifications serve as the basis for tariff bindings in WTO Member's schedules, the lack of HS classifications more precisely targeted at the substances in question when used as fuels may impede efforts to liberalize tariffs on biofuels. WTO environmental and energy security reasons may motivate some WTO Members to push for tariff reductions on these substances when used as fuels, but these same Members may not wish to reduce tariffs on these substances when they are destined for other uses for which they compete with domestic products.¹²¹

119 See ICTSD - Trade Negotiations Insight (December 2009), at 8-9.

120 See UNCTAD - Trade & Environment Review (November 2009, 230 pp.), at 178-184 and UNCTAD - The Emerging Biofuels Market - Regulatory, Trade and Development Implications (2006, 52 pp.), at 39.

121 See IPC-Howse - WTO Disciplines and Biofuels Opportunities and Constraints (2006, 44 pp.), at 10.

Negotiating Proposals. Several proposals on ways to liberalize trade in EGS have been put forward. Some WTO Members have suggested establishing a list of EGS based on national submissions. India has suggested adopting an environmental project approach whereby EGS would be liberalized within the framework of environmental projects undertaken at the national level and approved by national authorities. Argentina has suggested combining the environmental project approach with the list approach.¹²²

Some observers have remarked that environmental goods are essentially industrial goods used for a variety of purposes and thus do not exhibit any specificity with respect to non-tariff barriers (NTBs).¹²³

Given that EGS considerations extend beyond trade in goods because they raise questions related to investments, services, technology and subsidies among other areas, some Members have suggested that the cross-sectoral nature of EGS is incompatible with a WTO agreement specific to EGS. For instance, instead of negotiating a WTO agreement specific to EGS, the elimination of tariffs on EGS could be negotiated under WTO non-agricultural market access negotiations, as part of a broader agreement to reduce and/or eliminate tariffs.¹²⁴

Defining Environmental Goods and Services. Before the suspension of negotiations conducted under the Doha Development Agenda in July of 2006, ten WTO Members had submitted lists of products that they deemed to be environmental goods.¹²⁵

122 UNCTAD - The Emerging Biofuels Market - Regulatory, Trade and Development Implications (2006, 52 pp.), at 39.

123 See UNCTAD - Trade & Environment Review (November 2009, 230 pp.), at 194-196.

124 See UNCTAD - Trade & Environment Review (November 2009, 230 pp.), at 194-196.

125 IPC-Howse - WTO Disciplines and Biofuels Opportunities and Constraints (2006, 44 pp.), at 9-10.

The list of potential environmental goods came close to 500 products.

Some WTO Members consider that environmental goods include renewable energy products, such as ethanol and biodiesel. However, ethanol is classified as an agricultural product under the HS, which means that the Non-Agricultural Market Access Negotiating Group, responsible for drawing up the modalities for any tariff reductions affecting environmental goods, could not, at least technically, discuss tariff reductions regarding ethanol.

WTO Members then started considering a set of parameters to streamline the product list and to take into account additional criteria such as technology transfer, special and differential treatment, and win-win-win (trade, environment and development) results.¹²⁶ Various criteria for the definition or identification of environmental goods were debated, and concerns were raised on the following unsettled issues:¹²⁷

- How dual-use (some climate-friendly, some not) products would be classified: liberalizing tariffs may adversely impact established domestic industries in developing countries that produce goods that also indirectly happen to have climate-friendly uses. Moreover, isolating products of single environmental use is technically difficult and time-consuming while some goods inherently display dual-use functions;¹²⁸
- Whether process and production methods (PPMs) and end-use criteria would be needed to define environmental goods;

¹²⁶ UNCTAD - The Emerging Biofuels Market - Regulatory, Trade and Development Implications (2006, 52 pp.), at 39.

¹²⁷ WTO - Trade and Environment at the WTO (2004, 86 pp.), at 34.

¹²⁸ UNCTAD - Trade & Environment Review (November 2009, 230 pp.), at 178-184.

- How the WCO HS would classify environmental goods; and

- How the relative concept of “environmental friendliness” would be tackled: like goods can be viewed as environmentally friendly by some countries and environmentally unfriendly in others; moreover, an environmental good may be environmentally preferable, but nonetheless environmentally harmful.

Box 3: “Unincorporated” Process and Production Methods (PPMs)

The PPM dilemma remains a contested issue that has yet to be clarified by a WTO panel or the Appellate Body. While there is consensus that countries can define criteria for the way products are produced when the production method leaves a trace in the final product (e.g. cotton grown using pesticides, with pesticide residue in the cotton itself), WTO members disagree over the WTO consistency of measures based on what are known as “unincorporated” PPMs, which leave no trace in the final product (e.g. cotton grown using pesticides, with no trace of the pesticides in the cotton). Many developing countries argue that measures which discriminate between products based on unincorporated PPMs, such as some eco-labels, should be considered WTO-inconsistent.¹²⁹

The issue of unincorporated PPMs has triggered a legal discussion in the WTO on the extent to which the TBT Agreement covers and allows unincorporated PPM-based measures. Currently, a major challenge to the effectiveness of the TBT Agreement is the increasing use (not only in the area of the environment) of process-based, as opposed to product-based, regulations and standards. This may require added reflection on the rules of the TBT Agreement relating to equivalence and mutual recognition as a means of addressing the problems posed by differing environmental standards across countries.

¹²⁹ Trade and Environment at the WTO (2004, 86 pp.), at 17.

Given all these potential sources of conflicts, one suggestion is that negotiators focus on identifying a narrow choice of climate-friendly goods that would foster broader agreement among WTO Members, such as: energy efficiency; renewable energy equipment; and products, technologies and services used for small-scale CDM projects, such as micro-hydro projects, efficient cooking and efficient lighting.¹³⁰

The definition of environmental services also has posed some challenges. The WTO Services Sectoral Classification List (SSCL), which is largely based on the United Nations Provisional Central Product Classification

(CPC), includes the following as environmental services: sewage services, refuse disposal services, sanitation and similar services, and other environmental services. Although the “other” category does not refer to any CPC item, it possibly includes the remaining elements of the CPC environmental services category, e.g. cleaning of exhaust gases, noise abatement services, nature and landscape protection services, and other environmental protection services not included elsewhere.¹³¹

Consultancy services. The entry into force of the Kyoto Protocol has contributed to create climate change consultancy services, most notably regarding the trading of

¹³⁰ See UNCTAD - Trade & Environment Review (November 2009, 230 pp.), at 178-184.

¹³¹ WTO - Trade and Environment at the WTO (2004, 86 pp.), at 32-34.

emissions rights, CDM projects, sustainability assessments and carbon footprinting. According to the SSCL, consultancy services fall under the general category of “other business services”. A question has arisen as to whether consultancy services may be classified as environmental or energy services, with some WTO Members proposing that, in addition to “core” environmental and energy services, services such as engineering, R&D and consultancy services should be subject to liberalization commitments applicable to environmental services.¹³²

Other elements which will likely need to be taken into account in an eventual EGS agreement include differential treatment between developed and developing countries, as reflected by longer implementation periods for developing countries and less than full reciprocity regarding liberalization commitments, optional participation for least developed countries, as well as technical and financial assistance to be provided to developing countries in order to create domestic and export EGS markets.¹³³

Mandatory and Voluntary Standards, Certification and Labeling Schemes

Mandatory energy efficiency (EE) labeling and performance requirements serve to phase out inefficient products from the market and to increase the market share of energy efficient ones. Examples of mandatory technical regulations and standards that have been introduced in recent years include: EE building codes and contractor certification (e.g. regarding the equipment used by contractors in construction and their proper training in installing EE systems), transport and fuel efficiency standards, technology standards,

¹³² UNCTAD - The Emerging Biofuels Market - Regulatory, Trade and Development Implications (2006, 52 pp.), at 40.

¹³³ UNCTAD - Trade & Environment Review (November 2009, 230 pp.), at 178-184.

GHG emission performance standards, labeling for consumer protection and information purposes, and broad environmental performance requirements related to the entire life-cycle of the product.

Mandatory requirements can deliver market results only when applied to both domestic and imported products. Developed countries apply such mandatory requirements to their imports by means of technical regulations, mandatory standards, conformity assessment procedures, or sanitary and phytosanitary prescriptions.¹³⁴ In turn, mandatory requirements can be disseminated and amplified through international trade.¹³⁵

In addition to the important role being played by NGOs in this arena, retailers and more generally the private sector also are developing their own certification and labeling schemes in an attempt to demonstrate their corporate commitment to reducing GHG emissions (i.e. corporate social responsibility (CSR) commitment), to differentiating their products according to “green” consumer preferences (i.e. marketing purposes), and to identifying carbon “hotspots” within the supply chain and taking measures to reduce them (i.e. cost-saving purposes).¹³⁶ These non-governmental initiatives are growing in number and their importance is ever increasing as control over which products reach consumers in practically all developed country markets progressively shifts to global retailers.¹³⁷

¹³⁴ WTO - Working Group on Trade and Transfer of Technology - Communication from Cuba (14 March 2006, 3 pp.), at 1.

¹³⁵ UNCTAD - Trade & Environment Review (November 2009, 230 pp.), at 62.

¹³⁶ UNCTAD - Trade & Environment Review (November 2009, 230 pp.), at 101. See pp. 101-102 for different examples of carbon labeling initiatives by retailers.

¹³⁷ Groser (New Zealand - Speech) - Climate change, trade and agriculture - Address to Federated Farmers (4 November 2009, 9 pp.), at 6-8.

WTO Members generally recognize that voluntary labeling schemes can effectively inform consumers about environmentally friendly products in a less trade-restrictive fashion than other instruments, but these schemes must allow for participation of developing-country exporters in their design and must be transparent.

The main obligations of the Agreement on Technical Barriers to Trade (TBTA) apply only to mandatory requirements (see Box 4 on the TBTA and Agreement on the Application of Sanitary and Phytosanitary Measures - SPSA.)

Voluntary labeling and certification schemes are addressed by the Code of Good Practice for the Preparation, Adoption and Application of Standards (TBTA Annex 3), which refers to the activities carried out by any standardization body, including NGOs, that develops standards with which compliance is not mandatory. The acceptance of the Code by such standardization bodies is optional.¹³⁸

¹³⁸ UNCTAD - The Emerging Biofuels Market - Regulatory, Trade and Development Implications (2006, 52 pp.), at 40-42.

Box 4: TBTA and SPSA

Essential to protect life, health and the environment, product standards long rattled trade negotiators, who suspect that countries sometimes use them as protectionist measures. For instance, countries could introduce new standards without providing sufficient information or time to allow foreign producers to comply; standards could be based on design rather than performance characteristics, thus favoring domestic rather than foreign production methods; and testing requirements or certification systems could be construed to penalize foreign producers.

Considering that product standard could appear non-discriminatory on its face while still achieving protectionist aims, two GATT/WTO agreements were concluded: the Agreement on Technical Barriers to Trade (1979, amended in 1995) (the TBTA) and the Agreement on the Application of Sanitary and Phytosanitary Measures (1995) (the SPSA).

The TBTA applies to mandatory technical regulations such as standards, packaging, marking and labeling requirements, reporting and verification requirements, and to procedures for conformity assessment; it embodies the principles of national treatment and most-favored-nation. The SPSA requires parties to adopt and apply SPS measures “only to the extent necessary to protect human, animal or plant life or health” on the basis of scientific principles and that SPS measures not be maintained without sufficient scientific evidence (SPSA Articles 2.1 and 2.2). As does the TBTA, the SPSA requires countries to use international standards as a basis for their SPS measures and creates a rebuttable presumption of validity for SPSA measures that conform to international standards. However, the SPSA allows parties to provide a higher level of protection than that of international standards only if there is a scientific justification or in accordance with a detailed procedure (SPSA Article 3.3).

The fears of environmentalists in respect of the TBTA and the SPSA centered on the criterion of not constituting “unnecessary obstacles to trade”, as the most effective

environmental standards and measures will often entail an increased trade restrictiveness as opposed to other, less environmentally efficient solutions.

Given the similarities in the language used by the TBTA and the SPSA and the willingness of the WTO Appellate Body to apply interpretations reached under one agreement to the similar terms found in the other agreement, taking a look at rulings under both agreements is a worthwhile exercise.

With respect to the requirement that a measure not be more trade-restrictive than necessary to fulfill a legitimate objective (TBTA), or not more trade-restrictive than required to achieve the appropriate level of SPS protection (SPSA), the WTO Appellate Body¹³⁹ stated that an SPS measure will fail this requirement only if there exists a reasonably available alternative that is significantly less trade-restrictive and that still achieves the intended level of protection of the party that adopted the SPS measure. The Appellate Body also clarified that the plaintiff country bears the burden of proving the existence of such an alternative.¹⁴⁰

With respect to relying on international standards, the WTO Appellate Body¹⁴¹ stated that even if a domestic SPS measure does not use an international standard as a basis, the burden of proof still remains on the complainant to show that the SPS measure does not comply with the SPSA. The WTO Appellate Body reiterated this position in respect of the TBTA.¹⁴²

Moreover, the WTO Appellate Body decided¹⁴³ that even though a domestic SPS measure that sets a higher protection level than that of international standards must rely on a risk assessment, it need not be grounded only in the majority view held by the scientific community – the risk assessment must simply reasonably support the SPS measure.

Thus the WTO Appellate Body interpreted both the TBTA and the SPSA in a way that reassured the environmental community: it confirmed the right of every country to adopt a measure that entailed a higher level of protection than the corresponding international standard; it stated that SPS measures with levels of protection higher than the relevant international standard need not be supported by the mainstream scientific view, and it decided that the party challenging an SPS or TBT measure is faced with a substantial burden of proof even if the measure exceeds the related international standard.

139 WTO Appellate Body Report on Australia - Measures Affecting Importation of Salmon, WTO Doc. WT/DS18/AB/R (20 October 1998), at para. 194.

140 WTO Appellate Body Report on Japan - Measures Affecting Agricultural Products, WTO Doc. WT/DS76/AB (22 February 1999), at para. 126.

141 WTO Appellate Body Report on EC Measures Concerning Meat and Meat Products (Hormones), WTO Doc. WT/DS26/AB/R (16 January 1998).

142 WTO Appellate Body Report on European Communities - Trade Description of Sardines, WTO Doc. WT/DS231/AB, (26 September 2002).

143 WTO Appellate Body Report on EC Measures Concerning Meat and Meat Products (Hormones), WTO Doc. WT/DS26/AB/R (16 January 1998).

The previous overview of GATT/WTO case law shows that the WTO Dispute Settlement Body has attempted to reconcile trade rules with environmental concerns. Two main elements can shed some light on why this happened: first, the GATT/WTO panels and Appellate Body adopted a more literal interpretation of trade rules without overextending them by invoking trade liberalization as an overarching concern; second, in ensuring that their decisions would be legitimized by and would generate political agreement, the panels and Appellate Body turned to non-trade evidence, such as MEAs, that suggested political agreement on a variety of environmental issues. These principle contributed in turn to integrate environmental considerations in GATT/WTO case law.

Unfortunately, developed countries and the private sector occasionally adopt technical requirements and testing methods compliance which are beyond the means or technological capabilities of developing countries.¹⁴⁴

Examples of difficulties met and concerns voiced by developing countries when having to comply with developed-country requirements and private sector schemes include:

- Lack of equipment or technology for the requisite testing and/or the absence of any accredited national body to carry out the testing;
- High cost of the equipment or technology needed for the requisite testing and no possibility of purchasing it within a reasonable period of time;
- High cost of equipment or technology that involves adapting industrial processes in order to meet the requirement in question;

- Existence of plans that are cumbersome and very detailed for infrastructures that are not well developed, which implies additional production costs;
- Lack of international standards and mutual recognition/equivalence in many areas;
- Rapid proliferation of non-governmental certification and labeling schemes that sometimes set higher requirements than the regulations applicable to the domestic market of the importing country;
- High cost of multiple inspection and certification requirements associated with non-governmental certification and labeling schemes;
- Lack of scientific basis of some non-governmental certification and labeling schemes and the large variety of methodologies used; and
- Lack of transparency of some mandatory requirements and non-governmental schemes and difficulties faced by producers when wishing to participate in the development of these requirements and schemes.¹⁴⁵

For developing and least developed countries, these situations often translate into a loss in export earnings, a limitation on the expansion and diversification of their exports and/or the partial or total loss of destination markets.

Although raised only for discussion purposes, and not as official negotiating points, the Doha Ministerial Declaration explicitly mentions the need to discuss and examine the effect of environmental measures on market access,

¹⁴⁴ WTO - Working Group on Trade and Transfer of Technology - Communication from Cuba (14 March 2006, 3 pp.).

¹⁴⁵ WTO - Working Group on Trade and Transfer of Technology - Communication from Cuba (14 March 2006, 3 pp.). See also WTO - Report of the Committee on Trade and Environment (30 October 2009, 5 pp.).

labeling requirements for environmental purposes and technology transfer.

Important principles that could help guide the discussion on mandatory requirements and voluntary certification and labeling schemes include:

- Harmonization, through mutual recognition arrangements, relying on the same testing methods and developing international standards, all of which allow reductions in conformity assessment costs;
- Coordination, through regulatory and/or institutional cooperation arrangements whereby national regulators and/or private bodies collaborate when developing mandatory requirements and/or non-governmental schemes, allowing for information sharing (e.g. expertise, best practices) and greater consideration granted to exporting country concerns; and
- Transparency, through providing sufficient advance notice and greater involvement of the industry and relevant exporting countries in criteria design.¹⁴⁶

A number of international initiatives involving governments, industry and other stakeholders in major developed and developing countries attest to the increasing importance of international coordination and cooperation in promoting worldwide market diffusion of EE through transparent and cost-effective policies and measures.¹⁴⁷

In 2000, the WTO TBT Committee agreed on a set of “Principles for the Development of International Standards”, which provide useful

guidance.¹⁴⁸ However, some WTO Members have called for rules governing private labeling and certification schemes that go beyond transparency disciplines.

Moreover, while international standards could facilitate trade by promoting the convergence of national and non-governmental requirements, developing countries can be penalized by their limited or ineffective capabilities to participate in the development of such international standards.¹⁴⁹

A recurring limitation of developing countries, when complying with mandatory requirements and/or voluntary certification and labeling schemes, concerns their technological capabilities. Considering the importance of technological capabilities in complying with TBTs and SPS measures, it has been suggested that technical assistance and special and differential treatment obligations under the TBTA (Articles 11 and 12) and the SPSA (Articles 9 and 10) should lead to greater technological transfer towards developing countries and greater participation of developing countries in designing mandatory requirements implemented by developed countries.¹⁵⁰

Technology Transfer, R&D and TRIPS

In a country presentation to the WTO Working Group on Trade and Transfer of Technology, the Philippines identified the following as key policy challenges it had faced in creating a sound knowledge and technological base: technology contracts containing provisions relating to exclusive rights for the supply of machinery; technology contracts demanding guarantees against changes in taxes, tariffs,

¹⁴⁶ UNCTAD - Trade & Environment Review (November 2009, 230 pp.), at 62-63.

¹⁴⁷ See UNCTAD - Trade & Environment Review (November 2009, 230 pp.), at 53-56 for examples of international initiatives.

¹⁴⁸ WTO - Trade and Environment at the WTO (2004, 86 pp.), at 18.

¹⁴⁹ WTO - Trade and Environment at the WTO (2004, 86 pp.), at 16-20.

¹⁵⁰ WTO - Working Group on Trade and Transfer of Technology - Communication from Cuba (14 March 2006, 3 pp.).

currency exchange rates, remittances and royalties; and contracts containing provisions for the excessive use of foreign technicians, limited use of competing technologies as well as the high cost of technology transfer.¹⁵¹

A few of these challenges lead us to the WTO Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS Agreement), whose objective is to promote effective and adequate protection of intellectual property rights (IPRs) believed to encourage innovation.¹⁵² However, the TRIPS Agreement also embodies the need for balance to ensure that promoting IPRs does not impede the advancement of broader public policy objectives.¹⁵³

Article 7 of the TRIPS Agreement states that protecting and enforcing IPRs should in turn contribute “to the promotion of technological innovation and to the transfer and dissemination of technology, to the mutual advantage of producers and users of technological knowledge and in a manner conducive to social and economic welfare [...]”. Article 8 of the TRIPS Agreement provides that measures “may be needed to prevent the abuse of intellectual property rights by right holders or the resort to practices which [...] adversely affect the international transfer of technology.”

Article 66.2 of the TRIPS Agreement requires developed country WTO Members to “provide incentives to enterprises and institutions in their territories for the purpose of promoting

and encouraging technology transfer to least-developed country Members.”¹⁵⁴

Moreover, two Articles of the TRIPS Agreement open the door to using a patented invention without the patent holder’s consent. Article 30 of the TRIPS Agreement grants WTO Members the right to impose limited exceptions to IPRs although the TRIPS Agreement does not define these circumstances, which relate to national policies and objectives. Article 31 of the TRIPS Agreement allows a third party to apply before a judicial or administrative body in order to obtain a compulsory license without the patent holder’s consent.¹⁵⁵

Many remain skeptical about whether the TRIPS Agreement has contributed to balance IPRs and technology transfer or whether it has effectively spurred technology transfer in least developed countries. Whether technology transfer even takes place thanks to the TRIPS Agreement remains an unsettled issue.

However, a quick read of the TRIPS Agreement shows that TRIPS flexibilities could, at least on paper, contribute significantly to the transfer of climate-friendly technologies. Moreover, the use of these flexibilities for climate change has not yet been challenged.

One way to tip the balance a little bit more in favour of greater access to technology would be to limit the scope of patentability under Article 27.1 of the TRIPS Agreement by providing a set of criteria within a definition of patentability that has yet to be added to the TRIPS Agreement. This would reduce the extent of products and processes that could be subject to patent claims.

151 WTO – Report of the Working Group on Trade and Transfer of Technology (12 November 2009, 6 pp.), at 2.

152 WTO - Trade and Environment at the WTO (2004, 86 pp.), at 41-43.

153 Kacker - Technology Transfer and Financing - Issues for Long Term Climate Policy in Developing Countries (CCLR 3-2009, pp. 292-303), at 295.

154 WTO - Report of the Working Group on Trade and Transfer of Technology (12 November 2009, 6 pp.), at 2.

155 Kacker - Technology Transfer and Financing - Issues for Long Term Climate Policy in Developing Countries (CCLR 3-2009, pp. 292-303), at 295-296.

A second avenue is based on the already considerable, yet practically unused, flexibilities within the TRIPS Agreement with respect to climate change technologies. Difficulties faced by developing countries in accessing technology for public health purposes led to the adoption of the Doha Declaration on the TRIPS Agreement and Public Health back in 2001.¹⁵⁶ In response to concerns that patent rules might prevent developing countries from accessing affordable medicines in controlling diseases such as HIV, tuberculosis and malaria, the Declaration stated that “the TRIPS Agreement does not and should not prevent Members from taking measures to protect public health” and re-affirmed the right of WTO Members to make full use of the flexibilities to IPRs within the TRIPS Agreement in order to protect public health and enhance access to medicines. The Declaration reinforced the political legitimacy of WTO Members that wished to make use of the TRIPS flexibilities.

The idea of adopting a similar declaration for climate change technology transfer purposes was put forward in the context of UNFCCC negotiations, more particularly during the 2007 conference in Bali.¹⁵⁷

A third avenue, outside the direct realm of trade, consists of using Articles 10 (Financial Mechanism) and 10(A) (Technology Transfer) of the Montreal Protocol on Substances that Deplete the Ozone Layer as models for setting forth recommendations on technology transfer that would address climate change concerns.¹⁵⁸

156 See http://www.who.int/medicines/areas/policy/doha_declaration/en/index.html (last consulted on 24 May 2010) for more information.

157 Kacker - Technology Transfer and Financing - Issues for Long Term Climate Policy in Developing Countries (CCLR 3-2009, pp. 292-303), at 295-296. See also ICTSD - Innovation and Technology Transfer to Address Climate Change - Lessons from the Global Debate on Intellectual Property and Public Health (June 2009, 52 pp.), at 26-28 for more information.

158 WTO - Report of the Working Group on Trade and Transfer of Technology (12 November 2009, 6 pp.), at 5-6.

The WTO would then simply need to adjust to such rules put forth in a more appropriate forum (such as the UNFCCC).

Increase in AfT and EIF directed to GHG mitigation

The Aid-for-Trade (AfT) initiative sponsored by the WTO is based on the recognition that participation in international trade is fundamental to sustainable economic growth and poverty reduction. AfT aims to help developing countries, and especially LDCs, build the requisite supply-side capacity and trade-related infrastructure to fully partake in international trade and benefit from WTO Agreements.¹⁵⁹ AfT constitutes the part of ODA targeted at trade-related programmes and projects and was launched in 2005 at the WTO Hong Kong Ministerial Conference. Given how broad an activity trade is, AfT is broad and not readily defined.¹⁶⁰

The (Enhanced) Integrated Framework (EIF) constitutes the part of AfT that is exclusively available to LDCs. The EIF is an international partnership, through which the IMF, ITC, UNCTAD, UNDP, the World Bank and WTO (the IF Core Agencies) combine their efforts with those of LDCs, donors and other development partners, such as UNIDO, to respond to the trade development needs of LDCs. The EIF aims to mainstream trade into LDCs' national development plans and to develop the capacity of LDCs to become full and active players and beneficiaries of the multilateral trading system. Among other things, the EIF has been used to develop trade policy and trade administration capacity, enhancing efficient management of import and export procedures to supply-side constraints, meeting international standards, developing infrastructure, developing export

159 WTO - Second Global Review of Aid For Trade (28 October 2009, 123 pp.), at para. 15.

160 WTO - TRIPS Council - Aid For Trade & Least Developed Countries (26 October 2009, 7 pp.), at 1.

promotion capacity and developing targeted economic sectors.¹⁶¹

AfT is progressively being characterized as a tool to build capacities that can eventually lead to a healthier environment.¹⁶² AfT is also expected to provide investments in quality assurance and training and enforcement of compliance with international standards, which could lead to the establishment of regional standards offices.¹⁶³ In addition, AfT has emerged as a tool to provide assistance to Small, Vulnerable Economies (SVEs), and their needs to confront the challenges of climate change have been highlighted in relation to AfT.¹⁶⁴ Certain WTO Members, such as Japan and Sweden, have started targeting environmental and climate change objectives through their contributions to AfT.¹⁶⁵

It has been suggested that AfT could constitute a channel of choice to deliver the necessary technical support, capacity-building and infrastructural needs of developing-country members in order to enable them to fully participate in an agreement that would liberalize trade in EGS.¹⁶⁶ However, fears that developed countries would simply divert ODA to climate change purposes instead of providing additional financial aid have started to gain some ground as it appears that no scaled-up and additional financing will be provided to

support climate change mitigation efforts, at least not in the short term.¹⁶⁷

International Climate Change Mitigation Investments and Projects and TRIMS

Developing countries may wish to use climate change mitigation projects and investments as a catalyst and an opportunity for further capacity building, technology transfer and the creation of export and domestic markets for EGS.

In order to accomplish these objectives, developing countries may attempt to insert conditions into project and investment agreements to hire locally, transfer technology to a local firm, export a certain percentage of the goods produced, sell a percentage of goods produced on the domestic market or use a certain percentage of domestically produced components.

The WTO Agreement on Trade-Related Investment Measures (TRIMs Agreement) prohibits WTO Members from using five TRIMs deemed inconsistent with the national treatment principle and the prohibition of quantitative restrictions.

TRIMs prohibited on the basis that they violate national treatment include:

- Obligation to purchase or use products of a domestic origin or source (local content requirement); and
- Limiting the imported products used or purchased to the volume or value of local products exported (trade-balancing requirements).

161 WTO - TRIPS Council - Aid For Trade & Least Developed Countries (26 October 2009, 7 pp.), at 4-6.

162 WTO - Second Global Review of Aid For Trade (28 October 2009, 123 pp.), at paras. 22, 24.

163 WTO - Second Global Review of Aid For Trade (28 October 2009, 123 pp.), at paras. 204, 547.

164 WTO - Second Global Review of Aid For Trade (28 October 2009, 123 pp.), at para. 418.

165 WTO - Second Global Review of Aid For Trade (28 October 2009, 123 pp.), at paras. 127-129 and 134.

166 UNCTAD - Trade & Environment Review (November 2009, 230 pp.), at 192.

167 See WTO - Second Global Review of Aid For Trade (29 October 2009, 123 pp.), at para. 164 and ICTSD - Bridges Trade BioRes (Vol. 10, No. 8, 30 April 2010), at 3.

TRIMs deemed to infringe upon the prohibition of quantitative restrictions on imports and exports include:

- Restrictions on imports related to the quantity or value of exported products (trade-balancing requirements that constitute restrictions on imports);
- Restrictions on access to foreign exchange to an amount attributable to the enterprise (foreign exchange restrictions that constitute restrictions on imports); and
- Export specifications based on the volume or value of local production (i.e. domestic sales requirements that constitute restrictions on exports).

Under the TRIMs Agreement, foreign investors could therefore challenge the above-mentioned measures contemplated by developing countries, undermining their efforts to combine climate change mitigation and economic development objectives. Moreover, the Kyoto Protocol provides that CDM project activities should assist developing countries in achieving sustainable development and should promote real, measurable, and long-term benefits.

A potential conflict between the objectives of the Kyoto Protocol and the TRIMs Agreement could be looming, although it has not yet proved to be problematic.¹⁶⁸

Putting a Price on Carbon and the Problems with Border Tax Adjustments

Many developed countries are contemplating or have implemented mechanisms to internalize the cost of GHG emissions into production and consumption costs. The two most common mechanisms are carbon taxes and cap-and-trade schemes, described in Box

5. Since these mechanisms are contemplated or implemented in only a few countries, these countries fear that the competitiveness of their industries will be negatively impacted due to greater production costs. Moreover, these countries fear that energy-intensive industries will relocate to countries that lack similar mechanisms (i.e. “carbon leakage”). Fears of reduced competitiveness and carbon leakage have led countries to consider adopting “border tax adjustments” (BTAs) in order to impose similar costs on foreign producers.

Depending on its design, a BTA under the guise of a tax that would be implemented in conjunction with a domestic carbon tax would generally not raise any legal issue under GATT, as long as the amount of the BTA equals the amount imposed on domestic like products.¹⁶⁹ However, a BTA based on PPM considerations would trigger the WTO-consistency alarm as this issue has yet to be resolved (see Box 5).¹⁷⁰

A BTA implemented in conjunction with a domestic cap-and-trade scheme is another story. In such circumstances, a BTA might not constitute a tax adjustment, but rather a customs duty, given the uncertainty that a cap-and-trade scheme can qualify as an internal tax or charge or that a BTA would equal the amount imposed to like products under a cap-and-trade scheme. If such a BTA is characterized as a customs duty, it would be prohibited under GATT Article II(1)(b), which prohibits an importing country from imposing any duties or charges other than bound tariffs on or in connection with importation.¹⁷¹

168 Werksman - Will International Investment Rules Obstruct Climate Protection Policies - An Examination of the Clean Development Mechanism (September 2002, 28 pp.), at 68 and 75.

169 ICTSD-IISD - Trade and Environment - a Resource Book (2007, 274 pp.), at 63 and UNCTAD - World Trade Law (WTO) and Renewable Energy - the Case of Non-Tariff Barriers (2009, 22 pp.), at 2.

170 WTO - Trade and Environment at the WTO (2004, 86 pp.), at 21.

171 Quick - Border Tax Adjustment to Combat Carbon Leakage - A Myth (2009, 6 pp.), at 355.

Box 5: Carbon Taxes and Cap-and-Trade Schemes

Carbon taxes and cap-and-trade schemes constitute the two most frequently used mechanisms for internalizing environmental costs. These two mechanisms put a price on GHG emissions released by energy consumption or generated in the production and/or consumption of goods.

Carbon taxes are generally imposed on fossil fuel consumption according to their carbon content. Many European countries, including Denmark, Estonia, Finland, Italy, Norway, Slovenia, Sweden and Switzerland, have already implemented national carbon taxes.¹⁷² Many non-European countries contemplated the adoption of carbon taxes but ultimately decided against it. Some of these countries have instead adopted energy consumption taxes to promote energy efficiency and energy savings. Thus far, the US has balked at the idea of carbon taxes, especially since the 2010-midterm congressional elections.

A different approach consists of fixing a cap on total GHG emissions, dividing the allowable amount of GHG emissions into allowances, auctioning these allowances or granting them free of charge and creating a trading market for these allowances at market-determined prices. The most striking example of a cap-and-trade scheme is the EU Emissions Trading System (EU ETS), the world's largest tradable permits programme to date. The EU ETS was launched in 2005 and it applies to close to 11,500 installations across the EU. The system covers more than 40% of the EU's total CO₂ emissions and includes facilities from the electric power sector and other major industrial sectors. The first phase of the EU ETS ran from 2005 until 2007 and the second phase began in 2008 and lasts through to 2012, coinciding with the five-year Kyoto Protocol commitment period.¹⁷³

The pros and cons of carbon taxes and cap-and-trade schemes have often been discussed in academic circles and in the political arena. On one hand, carbon taxes offer financial certainty, with the political body that imposes it fixing its amount and estimating the financial returns generated by said tax; however, GHG emission reductions caused by carbon taxes are unpredictable and left to industry players to determine through their actions.

On the other hand, cap-and-trade schemes offer GHG emission reduction certainty, with the political body fixing the authorized amount of GHG emissions; however, financial returns generated by auctioning or trading the GHG emission allowances are unpredictable and left to be determined by the market.

¹⁷² Tamiotti-Kulacoglu - Key UNEP WTO findings on Climate Change Mitigation Measures re Trade Rules (2009, 30 pp.), at 11-17.

¹⁷³ IPCC - Climate Change Mitigation - Policies, Instruments and Co-operative Arrangements (2007, 64 pp.), at 5-7.

Beyond the strict consistency with GATT/WTO rules, BTAs would generate many bureaucratic obstacles to imports and command important administrative customs resources. Moreover, BTAs raise difficult design and implementation issues because of the high costs of establishing the levels of GHG emissions associated with imported products. It also appears, if not impossible, at least financially and technically very demanding to distinguish exporting countries on the basis of which exporter meets the GHG emission requirements set by the importing country.

BTAs may also lead to retaliation, with developing countries responding with their own BTAs based on lifecycle analyses (LCA) of imported goods (subject to the PPMs dilemma under WTO rules) or on GHG emissions per capita of the exporting country. Such unilateral measures could spark a trade war that would end up serving no one.

Chapter 5

Conclusion

Agriculture is one of the sentinels of the effects of climate change on our planet. Warming temperatures, changes in rainfall patterns, more frequent occurrences of climate extremes like drought and floods, and higher CO₂ concentrations in the environment – all have significant, direct, and mostly negative, effects on agricultural productivity and production levels.

As a significant source of GHG emissions, agriculture also has the potential to make a substantial contribution to efforts to mitigate climate change. Exploiting this potential, however, will require effective national action, concerted multilateral action within the UNFCCC and WTO multilateral frameworks, and far more financial support for adaptation and mitigation actions by developing countries, which are at the front lines of the fight against climate change, than has been marshaled thus far.

Compounding the problem of the slow pace of Post-Kyoto negotiations on further emission reduction mandates, it also has so far proven to be a challenge to define a sectoral approach to agriculture. This difficulty reflects the diversity of world production systems, the large numbers of producers, and the differing roles of agriculture in the trade, development and food security agendas of UNFCCC member countries. The rules-based global trade framework under the GATT/WTO also must evolve to fully realize the principle of “climate first, trade second.” Multilateral action in the WTO is needed to not only remove hindrances to climate change efforts, but also to actively

support multinational and unilateral actions that have climate change objectives, but that impact international trade.

Fully incorporating agriculture into global efforts on climate change adaptation and mitigation will require not only an increase in political will and commitment, but also the resolution of many questions whose answers will be difficult to determine. This report is intended to catalyse thinking about agriculture’s role in climate change – it has raised some questions and many more will emerge. While it will be challenging to find answers to many of them, this is not a reason for inaction, but a call to the world community to address with even greater urgency the problems and potentials of including agriculture in adaptation to, and the fight against, climate change while supporting development objectives and ensuring food security.

Annexes

Annex A. Non-UNFCCC International Financing for Climate Change Mitigation Measures (Non-Exhaustive)¹⁷⁴

Fund	Administrator (and funding)	Description/Sample Projects
Climate Investment Trust Funds (CIF) that encompasses the Strategic Climate Change Fund (SCCF) and the Clean Technology Fund (CTF) ¹⁷⁵	USD 6.3 billion ¹⁷⁶ ADB, EBRD, IADB, World Bank ¹⁷⁷	<p>Piloting new approaches or scaling up activities in developing:</p> <ul style="list-style-type: none"> The SFC: on increasing climate resiliency; reducing emissions from deforestation and forest degradation (under consideration); and scaling up renewable energy. The CTF on demonstrating and transferring low-carbon technologies.
Forest Carbon Partnership Facility (FCPF) ¹⁷⁸	USD 300 million ¹⁷⁹ World Bank	Focusing on mitigation through REDD.

¹⁷⁴ For more info and funds see <http://www.climatefundsupdate.org/>. For sustainable forest management funding, see <http://www.fao.org/forestry/cpf-source-book/en/>.

¹⁷⁵ See IISD - Investing in a sustainable future - Multilateral development banks' investment in energy policy (November 2009, 47 pp.), at 19-21. Includes a table summarizing CTF investment plans in Turkey, Mexico and Egypt.

¹⁷⁶ According to OECD - IEA - Financing Climate Change Mitigation and MRV (October 2009, 50 pp.), at 23 and UNFCCC - Investment and financial flows to address climate change - an update (26 November 2008, 111 pp.), at 83.

¹⁷⁷ See <http://www.climateinvestmentfunds.org/cif/designprocess>; and <http://www.climateinvestmentfunds.org/cif/>

¹⁷⁸ <http://wbcarbonfinance.org/Router.cfm?Page=FCPF&ItemID=34267&FID=34267>.

¹⁷⁹ According to OECD - IEA - Financing Climate Change Mitigation and MRV (October 2009, 50 pp.), at 23.

Fund	Administrator (and funding)	Description/Sample Projects
Carbon Partnership Facility (CPF)	USD 470 million, World Bank	Supporting developing countries towards lower carbon development paths. Components of the Investment Framework for Clean Energy and Development (CEIF).
Congo Basin Forest Fund (CBFF) ¹⁸⁰	USD 200 million, AfDB	Promoting biodiversity conservation, natural resource management and mitigation through REDD.
Congo Basin Forest Partnership (CBFP)		
The Amazon Fund	http://www.amazonfund.org/	
Strategic Priority on Adaptation (SPA)	USD 50 million, GEF	A 3-year pilot programme for adaptation planning.
UN-REDD Programme ¹⁸¹	USD 35 million, UNDP	Focusing on mitigation through REDD.
MDG Achievement Fund – Environment and Climate Change window (MDG)	USD 90 million , UNDP	Focusing on adaptation and general mitigation.
EU-Global Climate Change Alliance (GCCA) ¹⁸²	USD 300 million (€220m), EU	Focusing on adaptation, general mitigation and REDD.

¹⁸⁰ <http://www.cbfp.org/home.html>. See also Press Kit - International Conference on the Major Forest (11 March 2010, 32 pp.), at 9-11.

¹⁸¹ <http://www.undp.org/mdf/un-redd/overview.shtml>.

¹⁸² http://ec.europa.eu/development/policies/ginterventionareas/environment/climate/climate_en.cfm.

Fund	Administrator (and funding)	Description/Sample Projects
Cool Earth Initiative (Japan)	USD 10 billion, Japan	Focusing on adaptation and mitigation activities. Bilateral initiative with funding of USD 10 billion committed over five years. The programme intends to provide assistance for improved access to clean energy of up to USD 8 billion; the remaining funds will support other activities to address climate change.
Environmental Transformation Fund (UK)	USD 1.2 billion (£800m), UK	Focusing on adaptation and mitigation with some components administered by World Bank and AfDB (Congo Basin Forest Fund).
International Forest Carbon Initiative (Australia)	USD 180 million (AUD 200m), Australia	Focusing on mitigation through REDD.
Clean Technology Fund FRES (Foundation Rural Energy Services)	FRES (Foundation Rural Energy Services) is a non-profit foundation, founded by Dutch electricity company Nuon in 2004. ¹⁸³	

¹⁸³ <http://www.fres.nl/english/>

Fund	Administrator (and funding)	Description/Sample Projects
Biocarbon Fund ¹⁸⁴	USD 91 million, World Bank	<p>Based on a public/private partnership model which aims to deliver cost-effective emission reduction and support biodiversity conservation and poverty alleviation.</p> <p>Example of project: Facilitating Reforestation for Guangxi Watershed Management in Pearl River Basin in China. Afforestation of 4,000 ha, 75% with native species and 25% eucalyptus. Social benefits are additional employment, direct income increases through sale of non-timber products and benefits from CER</p>
Community Development Carbon Fund ¹⁸⁵	USD 128.6 million, World Bank	<p>Targets LDCs – community benefits are a requirement.</p> <p>Spread benefits of carbon finance to the poorest countries and poor communities in all developing countries, which would otherwise find it difficult to attract carbon finance because of country and financial risk. It is a multi-donor Trust Fund – a public/private partnership. All CDM projects, including AFOLU, are eligible.</p>

¹⁸⁴ FAO - Carbon Finance Possibilities for Agriculture, Forestry and Other Land Use Projects in a Smallholder Context (February 2010, 24 pp.), at 15. See also <http://wbcarbonfinance.org/Router.cfm?Page=Funds&ItemID=24670>

¹⁸⁵ FAO - Carbon Finance Possibilities for Agriculture, Forestry and Other Land Use Projects in a Smallholder Context (February 2010, 24 pp.), at 15. See also <http://wbcarbonfinance.org/Router.cfm?Page=CDCF&ItemID=9709&FID=9709>

Fund	Administrator (and funding)	Description/Sample Projects
CASCADe programme ¹⁸⁶ (created in 2007 during Bali Conference for 3 years)		<p>Seven target countries (Benin, Cameroon, Democratic Republic of the Congo, Gabon, Madagascar, Mali, Senegal).</p> <p>Aims to enhance African expertise to generate carbon credits in LULUCF to open up opportunities for African participation in the CDM and voluntary carbon markets. AFOLU sector, REDD and bioenergy activities.</p> <p>Madagascar: Large scale application of restoration techniques and management of soil fertility, especially in cropping systems with permanent vegetative cover minimum tillage in the region Bongolava in an area of 1000 ha over five years.</p> <p>Senegal: Improving the living conditions of the local population of the Sine-Saloum Delta through mangrove ecosystem restoration over 14 years on 410 ha of mangrove plantations.</p>

¹⁸⁶ FAO - Carbon Finance Possibilities for Agriculture, Forestry and Other Land Use Projects in a Smallholder Context (February 2010, 24 pp.), at 16. See also http://www.cascade-africa.org/Accueil_en/tabid/56/language/en-US/Default.aspx.

Fund	Administrator (and funding)	Description/Sample Projects
<p>German Climate Protection Fund¹⁸⁷ (created in 2008)</p>	<p>Project can be carried out by federal implementing agencies, government organizations, NGOs, business enterprises, universities and research institutes, and by international and multinational organizations and institutes, e.g. development banks, United Nations bodies and programmes.</p> <p>(funding: from €500,000 to €2,500,000 per project)</p>	<p>Targets developing, newly industrializing and transition countries</p> <p>All projects run one to five years.</p> <ul style="list-style-type: none"> • promoting a climate-friendly economy • promoting measures for adaptation to the impacts of climate change and • conserving biodiversity with climate relevance (carbon sinks, especially of forests and other ecosystems such as wetlands) <p>Mexico: Climate Change Mitigation in Five Representative Ecosystems: The project will maintain existing carbon reservoirs in forests and wetlands and will enable the affected regions and their populations to better adapt to climate change impacts.</p> <p>Philippines: Adaptation to climate change and Protection of biodiversity (GTZ, National Department of Environment and Natural Resources).</p>

¹⁸⁷ FAO - Carbon Finance Possibilities for Agriculture, Forestry and Other Land Use Projects in a Smallholder Context (February 2010, 24 pp.), at 16. See also http://www.bmu-klimaschutzinitiative.de/en/home_i.

Fund	Administrator (and funding)	Description/Sample Projects
International Climate Initiative of Germany ¹⁸⁸	USD 170 million, Germany	Uses some of the revenue raised from auctioning allowances for its domestic emissions trading scheme for national and international climate initiatives. The international component has a budget of about USD 170 million in 2008, with a smaller allocation in subsequent years. Half of this amount will be used to fund sustainable energy supply projects. The other half will support climate change adaptation and measures to conserve biodiversity, mainly through bilateral projects.
Environmental Transformation Fund of the United Kingdom	Has committed about USD 1.6 billion over three years from 2008	Support programmes and projects to address climate change. A part of the funding would be channelled through other multilateral sources.
Italian National Carbon Fund	USD 155.6 million, World Bank	
Dutch National Carbon Fund	Netherlands	
Danish Carbon Fund	World Bank, USD 68.5 million	
Climate and Forest Initiative (Norway) ¹⁸⁹		
Spanish Carbon Fund	World Bank, USD 278.6 million	
Prototype Carbon Fund	World Bank	

¹⁸⁸ <http://www.oecd.org/dataoecd/38/61/40633487.pdf>.

¹⁸⁹ <http://www.regjeringen.no/en/dep/md/Selected-topics/klima/why-a-climate-and-forest-initiative.html?id=526489>. And http://unfccc.int/files/meetings/ad_hoc_working_groups/lca/application/pdf/norway_acra.pdf.

Fund	Administrator (and funding)	Description/Sample Projects
Netherlands Clean Development Facility	World Bank	
Carbon Fund for Europe	World Bank	
Umbrella Carbon Facility	USD 719 million – managed by the International Bank for Reconstruction and Development - IBRD	
Sustainable Energy Initiative	EBRD (launched in May 2006) ¹⁹⁰	
Energy Efficiency Initiative ¹⁹¹	Asian Development Bank (ADB) (launched in July 2005)	
Turkish Clean Technology Fund (CTF) ¹⁹²	Turkish government, the World Bank, the International Finance Corporation and EBRD, USD 5.2 billion	Established in the first half of 2009 to provide support for the low carbon objectives in Turkey's Ninth Development Plan (2007 to 2013). Via joint efforts with the private sector, the CTF targets 19 GW of wind power in its Accelerated Emission Reduction Case.
Mediterranean Solar Plan ¹⁹³	Union for the Mediterranean	Likely to initiate a wave of new projects on the south shore of the Mediterranean Sea. Of a total of 20 GW renewable energy capacities expected by 2020, half or more might be CSP plants. Exports of renewable electricity to the European Union would provide a strong incentive.

¹⁹⁰ See <http://www.ebrd.com/new/pressrel/2006/54may19.htm>.

¹⁹¹ See IISD - Investing in a sustainable future - Multilateral development banks' investment in energy policy (November 2009, 47 pp.), at 12.

¹⁹² IEA - Technology Roadmap - Wind Energy (2009, 52 pp.), at 40.

¹⁹³ See http://www.eurec.be/files/Oldenburg.%2028th%20July%202008/07_Union%20for%20the%20Mediterranean.pdf and IEA - Renewable Energy Essentials - Concentrating Solar Thermal Power (2009, 4 pp.), at 2.

Fund	Administrator (and funding)	Description/Sample Projects
UNEP's Rural Energy Enterprise Development (REED) Programme ¹⁹⁴ (created in 2000)		<p>Targets energy: open to all regions, but focuses on Five African countries (A-REED), Brazil (B-REED) and China (C-REED).</p> <p>Initiative offering enterprise development services and start-up financing to 'clean energy' enterprises.</p> <p>REED has financed 44 enterprises that are now returning capital each year to an investment fund that is then re-invested in new enterprises.</p>
Renewable Energy, Energy Efficiency, and Climate Change - REACH	ADB ¹⁹⁵	
Kreditanstalt fuer Wiederaufbau Bank (KfW)	German state-owned Kreditanstalt fuer Wiederaufbau Bank (KfW) invested USD 230 million (€340 million) in renewable energy projects in developing economies in 2008 ¹⁹⁶	

194 FAO - Carbon Finance Possibilities for Agriculture, Forestry and Other Land Use Projects in a Smallholder Context (February 2010, 24 pp.), at 16. See also <http://www.unep.fr/energy/activities/reed/areed.htm>.

195 See <http://www.adb.org/Clean-Energy/reach.asp>.

196 IEA - Technology Roadmap - Wind Energy (2009, 52 pp.), at 40.

Annex B. Examples of Coordinated International R&D and Technology Promotion Goal/Activities

Name of Initiative	Year of Creation	Members	Goals/Activities
International Partnership for a Hydrogen Economy ¹⁹⁷	April 2003	15 countries plus European Commission: Australia, Brazil, Canada, China, European Commission, France, Germany, Iceland, India, Italy, Japan, Korea, New Zealand, Norway, Russian Federation, United Kingdom and the US.	<p>Advance the global transition to the hydrogen economy, with the goal of making fuel cell vehicles commercially available by 2020. The Partnership will work to advance the research, development and deployment of hydrogen and fuel cell technologies and to develop common codes and standards for hydrogen use.</p> <p>IPHE serves as a mechanism to organize and implement effective, efficient and focused international research, development, demonstration and commercial utilization activities related to hydrogen and fuel cell technologies. The organization also provides a forum for advancing policies as well as common codes and standards that can accelerate the cost-effective transition to a global hydrogen economy to enhance energy security and environmental protection.</p> <p>IPHE key accomplishments:</p> <ul style="list-style-type: none"> • Endorsement of 30 international collaborative projects covering a broad spectrum of topics including: demonstrations; fuel cells; hydrogen production; hydrogen storage; regulations, codes & standards; transmission and distribution; and socioeconomics of hydrogen; • Organization of workshops and conferences that brought together more than 500 technical experts from more than 25 countries to identify key areas for R&D on issues ranging from hydrogen production to utilization; • Development of a “Priority Scorecard” that identifies key challenges, priorities and opportunities for international cooperation.

¹⁹⁷ See: www.iphe.net (last consulted on 17 May 2010).

Name of Initiative	Year of Creation	Members	Goals/Activities
Carbon Sequestration Leadership Forum (CSLF) ¹⁹⁸	2003	<p>23 countries plus European Commission: Australia, Brazil, Canada, China, Colombia, Denmark, European Commission, France, Germany, Greece, India, Italy, Japan, Korea, Mexico, Netherlands, New Zealand, Norway, Poland, Russia, Saudi Arabia, South Africa, United Kingdom, and the US.</p> <p>CSLF member countries represent over 3.5 billion people, or approximately 60% of the world's population.</p> <p>Membership is open to national governmental entities that are significant producers or users of fossil fuels and that have a commitment to invest resources in research, development and demonstration activities in CO₂ capture and storage technologies.</p> <p>Members of the carbon sequestration stakeholder community are involved with the CSLF and are encouraged to participate and interact with the CSLF.</p>	<p>CSLF is a Ministerial-level international climate change initiative that is focused on the development of improved cost-effective technologies for the separation and capture of CO₂ for its transport and long-term safe storage. The mission of the CSLF is to facilitate the development and deployment of such technologies via collaborative efforts that address key technical, economic and environmental obstacles. The CSLF will also promote awareness and champion legal, regulatory, financial and institutional environments conducive to such technologies.</p> <p>In July 2005, the G-8 Summit endorsed the CSLF in its Gleneagles Plan of Action on Climate Change, Clean Energy and Sustainable Development, and identified it as a medium of cooperation and collaboration with key developing countries in dealing with GHGs.</p> <p>Similar designations were also made in bilateral activities that include: the joint statement of the US-European Union Summit on Energy Security, Energy Efficiency, Renewables and Economic Development; and the Mainz Declaration of Germany and the US on Cleaner and More Efficient Energy, Development and Climate Change.</p> <p>In 2006 and 2007, the International Energy Agency (IEA) and CSLF held three workshops for invited experts from around the world on the topic of near-term opportunities for carbon capture and storage. Recommendations from these workshops were formally adopted by the CSLF and sent forward to G8 leaders.</p>

198 See: www.cslforum.org (last consulted on 17 May 2010).

Name of Initiative	Year of Creation	Members	Goals/Activities
Renewable Energy and Energy Efficiency Partnership ¹⁹⁹	2002	REEEP is an international NGO.	REEEP initiates and funds clean energy projects, develops and supports policy-maker networks, disseminates and replicates knowledge through various forms and activities, supports awareness-raising events at senior stakeholder level, and works closely with other NGOs, regional agencies, development banks and international organizations such as the UN and the World Bank to promote the importance of energy efficiency and renewable energy sources.
Asia-Pacific Partnership on Clean Development and Climate ²⁰⁰	January 2006	Australia, Canada, China, India, Japan, Republic of Korea and the US.	<p>Public-private effort that focuses on technology development related to climate change, energy security and air pollution. Eight public/private task forces were created to address: (1) fossil energy, (2) renewable energy and distributed generation, (3) power generation and transmission, (4) steel, (5) aluminum, (6) cement, (7) coal mining, and (8) buildings and appliances.</p> <p>Sample projects:</p> <ul style="list-style-type: none"> • Managing bauxite residue in aluminum production; • Cooperating to standardize energy efficient lighting; • Transforming waste to fuel in cement kilns; • Improving carbon capture technology for coal-fired power plants; • Developing coal mining health and safety strategies; • Sharing best practices in power generation; • Promoting solar power deployment; and • Increasing usage of cleaner steel technologies.

¹⁹⁹ See : <http://www.reeep.org> (last consulted 17 on May 2010).

²⁰⁰ See: <http://www.asiapacificpartnership.org> (last consulted on 17 May 2010).

Name of Initiative	Year of Creation	Members	Goals/Activities
EU-China Partnership on Climate Change ²⁰¹	2005	EU, China.	<p>Aims to promote the development and deployment of “zero emissions” and carbon capture and sequestration technologies; lower the costs of major clean energy technologies to enhance their diffusion and use; and support the mutual goal of improving energy efficiency.</p> <p>Creation of an EU-China “hotline” on climate issues, regular ministerial dialogue, inauguration of the EU-China Clean Energy Centre in Beijing.</p>
Energy and Climate Partnership of the Americas ²⁰²	April 2009	Open; countries and organizations involved include Brazil, Canada, Chile, Colombia, Costa Rica, Dominica, Mexico, Peru, Trinidad and Tobago, and the US, as well as the IDB and Organization of American States (OAS).	<p>The goal of ECPA is to foster partnerships across the Americas among government, industry and civil society to achieve low carbon economic growth and development. ECPA is a flexible mechanism through which all governments in the Western Hemisphere, on a voluntary basis, may lead multi-country initiatives to promote clean energy, advance energy security, fight energy poverty, and reduce greenhouse gas emissions.</p> <p>Sample projects: advancing a Caribbean electrical grid interconnection; launching an IDB Innovation Center; developing biomass resources in Colombia; hosting an earthquake preparedness workshop, and signature of a Memorandum of Understanding that promotes cooperation between the US Department of Energy and the Argentine Energy Secretariat on clean energy technologies.</p>

201 See EU and China Partnership on Climate Change (PPoint, 30 March 2006, 24 pp.); [http://www.se2009.eu/polopoly_fs/1.25563!menu/standard/file/statemento91130.pdf](http://europa.eu/rapid/pressReleasesAction.do?reference=SPEECH/10/197); http://www.europa.eu-un.org/articles/en/article_5000_en.htm (last consulted on 17 May 2010).

202 See <http://www.ecpamericas.org/> (last consulted on 17 May 2010).

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**Global Action on
Climate Change in Agriculture:
Linkages to Food Security, Markets
and Trade Policies in Developing
Countries**

The objective of this report is to catalyse thinking about the ways in which agriculture – which has a vital role in global food security, development and natural resources use – can and must be fully integrated into national strategies and a consensus-based multilateral framework to address the challenges of climate change. The report brings forth questions that will occupy the world community over the next decade or more regarding the role of agriculture in climate change adaptation and mitigation. The report offers some answers and concrete proposals – while recognizing that much more needs to be learned, more questions formulated, and more experience gained, to build an effective strategy to support global agricultural adaptation while harnessing its significant potential contribution to climate change mitigation and taking into consideration development objectives and food security concerns.

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