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Global negotiations on climate change: The greatest show on earth

By Ana Maria Kley Meyer

As this article goes to press, the United Nations Framework Convention on Climate Change (UNFCCC) is forging through yet another round of discussions and negotiations that strive to secure our common future. While nations around the world are scrambling to find solutions to their avalanching economies, scientists and small island states announce anxiously - and ever more frequently - the escalating impacts of a changing climate on the world's vulnerable communities and fragile ecosystems. It is, without a doubt, currently the greatest show about and on earth.

The challenge of solving the global climate crisis is monumental. In the abstract, the multilateral discussions on climate change mitigation are about tons of carbon dioxide and baseline years; in reality, they are about production, consumption, and myriad other aspects of human activity. Climate change cuts across nearly every sector and activity of society, posing complexities that surpass common environmental or economic challenges. In order to address the issue fully and effectively, the climate negotiations promise outcomes that will shape the future in terms of economic and development practices. At the heart of the matter, though, are fundamental concerns about *how* to address the climate crisis and *who* will bear the burdens - financial and otherwise - of any change. To many, this is a frightening prospect. Behind every unfurled flag lies the development interest of each and every country and a keen hunger for prosperity.

Throughout the negotiation discussions, compelling and complex issues such as 'atmospheric space' - the term increasingly used when evaluating the amount of greenhouse gases (GHGs) the world can continue to emit within the parameters of global safety - abound.¹ In a final solution to the problem, the limited quantity of future emissions must be budgeted carefully to avoid catastrophic results. Thus, any solution involves a careful and equitable allocation of the amount that

countries may emit over the foreseen future and serious regulation of human behaviour and economic activities to do so. In terms of both *national* and *global* politics, this is a highly contentious proposition.

Counting down

The UNFCCC meetings held in Bonn, Germany from 1-12 June cover such a commotion of concurrent issues and discussions that they evoke the feel of a three-ringed circus. The Ad-hoc Working Group on the Kyoto Protocol (AWG-KP) worked towards concluding negotiations on a second commitment period, beginning in 2013, for developed country parties.² The Subsidiary Bodies for Implementation (SBI) and for Scientific and Technological Advice (SBSTA) continued to pursue their mandates under the Kyoto Protocol, addressing issues ranging from reduced emissions from deforestation and degradation to a financial mechanism to support implementation.³

In the centre ring at the Bonn meetings, is the Ad-hoc Working Group on Long-term Cooperative Action (AWG-LCA), the group tasked with negotiating the text of a new global deal to address climate by the time of the Copenhagen Conference of the Parties (CoP) in December 2009.⁴ The AWG-LCA, looks specifically at a set of issues framed



in a decision referred to as the 'Bali Action Plan', agreed to in Indonesia in 2007. Parties are taking their first stab at a newly compiled negotiation text of a deal to effectively implement the UNFCCC, a process that this year moved into 'full negotiating mode'. The final text will encompass a wide range of climate change mitigation and adaptation activities and their associated financial and technological support mechanisms.⁵

Distilling the climate brou-ha-ha: environment or economics

One may wonder how these nebulous groups with quixotic titles hold the key to our future. Beyond the politician's off the cuff answer that "they serve to address the challenge of climate change" - in essence, the UNFCCC negotiations are laying down the rules that dictate specifically how *countries* will change. On the one hand, this change can refer to their production, consumption, transportation, and forest preservation practices in order to reduce global emissions of greenhouse gases (GHGs), and on the other hand, changes to the business-as-usual approach to security, social and economic development in order to dampen the blow of climate change to their citizens, economies and ecologies through adaptation to the impacts of the changing climate are also under scrutiny. But there is more to these two hands than meets the eye, because of the added complexities of financing and technology. In other words, the real questions are: first, how to develop and deliver the best technologies for both goals into the hands of every and any country that needs them, and then who will pay the costs of these technologies and other measures necessary to ensure adequate mitigation and adaptation world-wide?

But don't let the simplicity of a one-paragraph explanation fool you. The plot continues to thicken. In addition to defining approaches to "enhanced" mitigation, adaptation, technology development and transfer, and financing for climate change, the Parties to the Convention and its Protocol must grapple with the reality of a globalised world where international trade rules, millennium development goals, competition, multinational companies, overseas development assistance, and one of the greatest financial catastrophes of the last century already are a cacophonous musical score with many of the stanzas already written. "Don't mind those minor distractions, climate is at the top of the agenda," you might say. But the negotiators do mind. Because back home, those number two, three, four issues are number one.

Many of the negotiation issues are intertwined and highly contentious, and it is difficult to identify areas of consensus. The dynamics between the groups of countries and even within those groups are complex, compounding the difficulty of agreeing on anything within the next six months. To complicate matters, we may see the fifty-three page text jump up to at least twice that as parties during this session address form and content.

The agreed outcome of the AWG-LCA will increase participation of developing countries in mitigation activities and seeks to bring the United States - who signed but never ratified the Kyoto Protocol - on board in a manner comparable to those required of other developed countries. In deciphering the US submission and statements in this forum, they steer away from a compliance-based (Kyoto-style) arrangement towards what they call an "Implementation Agreement," where action is defined and regulated at the national level, which they promise will not create a congressional obstacle in their federal treaty process. They further call for significant carbon 'offsets' - activities that counteract continued emissions in one place by reducing, avoiding or sequestering carbon

emissions elsewhere to compensate (i.e., reforestation projects or mitigation in developing countries) - as ways to reach eventual mitigation targets. These approaches surprise many countries and organisations who expected the US to take a rigorous tack since the change of administration. Large numbers of carbon offsets paired with the lack of a robust compliance scheme risk a business-as-usual scenario in the future. Furthermore, the enforceability of the outcome is key to ensuring the mitigation and adaptation results, and particularly key for converting the promises of technology transfer and financing into reality - promises that under the 1990 Convention have yet to see the light of day.

Trade in the mix

Trade issues filter into the negotiations through a number of diverse channels. This may explain why, starting in 2008 at a meeting parallel to (but conveniently miles away from) the Climate Conference of the Parties (CoP), the Government of Indonesia convened a meeting of Trade Ministers to discuss the question of climate change, followed by a similar meeting involving industry ministers at the CoP last year in Poland. Such meetings are now on the agenda of most Finance Ministers and heads of state meetings, including the G8.

Without wandering into an endless labyrinth of details, a quick glance into the negotiations reveals a number of levels at which the trade regime and its associated aspects intersect. The first group of issues, and most prominent in the global media, are those related to the AWG-LCA.

Trade issues also arise in relation to development concerns, both on the mitigation and adaptation sides, where the questions of economic security, development, and diversification are key. Then there is the question of the transfer of low-carbon and energy efficient technologies, which criss-crosses the trade world at bilateral, regional, and multilateral levels. Additionally, the question of subsidies, as countries strive to support their agriculture, transportation, energy, and building sectors (to name a few) to adapt and survive in a low-carbon universe. Also on the climate change docket, questions arise regarding how to enhance policies and measures that stimulate low carbon pathways (or dissuade high-carbon practices) and the many competitiveness concerns that emerge as a result of any or all of these approaches. Finally, the impact of climate policies to export markets is of particular concern to many countries in this forum, not only in relation to oil exporters but also energy or carbon intensive products such as steel, aluminium, and cement.

Trade and climate concerns cut both ways. The question of how trade measures might impact efforts to address climate change requires further attention. For example, further liberalisation of trade on goods and services could, if carefully tailored, support climate change objectives. Or, it could complicate matters if, for example, increased consumption of wood products increases deforestation, which in turn releases CO₂ into the atmosphere and decreases the world's precious 'carbon sinks' that absorb CO₂ out of the atmosphere.

But while trade remains on the sidelines of the current round of meetings, parties are increasingly exploring the potential synergies as well as pitfalls of the trading system in order to better understand the implications of the decisions they make. Notably, increasing attention to these topics brings the overlapping issues into sharper focus. Certainly, the commonalities in terms of development objectives and global cooperation make these better allies than foes.

Agriculture: Growing in importance in mitigation and adaptation

Agriculture accounts for 14 percent of GHG emissions. The impacts of climate change to the agriculture sector are also predicted to be great. In a few cases, these impacts could be positive, but in most - as a result of increased floods, droughts, and even the expansion of biofuel production - global food security could be considerably threatened.

Countries and the global community are concerned. The UNFCCC recently convened a workshop and produced a report at the behest of the Parties with a view to strengthening the issue's role in the Copenhagen deal.⁶ Innumerable non-governmental and intergovernmental organisations are also studying the multiple climate dimensions of the issue and presenting on the sidelines of the negotiations.

It is worth underlining that this is an issue that in some respects unifies parties from both developed and developing countries interested in collaborative research on mitigation and adaptation, as well as research and development of technologies in the sector as related to climate. Areas that require further consideration include: scientific and technological advances on how to mitigate CO₂ emissions from a sector which, for many countries is their leading source of carbon emissions, information on the potential impacts on global food security as food demand doubles approaching the year 2050, the trade implications of major shifts in agricultural production, and - perhaps most urgently - pressing solutions for rural areas where predominantly poor populations rely on agriculture for subsistence.

Technology development, transfer, and other magic acts

Apart from agricultural considerations, trade implications also arise in a number of discussions on technology development and transfer where market access and intellectual property rights pose potential obstacles to the access countries have to leading technologies for mitigation or adaptation. Increasing information on the availability of technologies continues to emerge, yet little happens in terms of actual development or transfer under the UNFCCC. Developed countries agreed under the Convention to finance the costs of technology transfer in developing countries to address climate change; however, advances to date remain at the level of studies and discussions with no mechanism or program in place - other than the limited Clean Development Mechanism - to increase access.⁷

Needless to say, the issue touches upon propriety and profits, compounding the difficulty for governments vis a vis the private sector. And although global economic meetings, such as Davos, get front page coverage as top CEOs discuss the role of business in resolving climate change, more involvement is required and consistently referred to by government delegations, especially for sources of financing to foot the bill for the climate crisis. Some private sector groups now attend climate change negotiations as observers; many are concerned about the costs of carbon caps to their business and wary of what governments will do under mounting public pressure. Although they may be invisible players within the negotiations, implementation will inevitably fall in their hands, and their cooperative engagement is crucial.

Looking forward to Copenhagen - The final act

Before the end of the year, negotiators will meet four more times to work on the text of the protocol, the last of which is the Copenhagen CoP. Yet the Bonn talks in June mark a critical moment for the Convention process. Only six months remain

until Copenhagen, with a tremendous amount of work yet to cover. At the political level, leaders insist they are prepared to do whatever is necessary to solve the problem, but true colours are seen on the negotiation field, where Parties must put into clearer terms precisely *what* they are willing to do. The many contentious issues could mean a breaking down of the discussions; or, Parties may be able to work through the complexities creatively, employing the tools and experiences from other international forums, such as the General Agreement on Tariffs and Trade and the World Intellectual Property Organization, to construct a lasting and effective solution.

When confronted with questions about which will take priority, the climate or economic crisis, political leaders vow that the financial challenges will not deter their commitment to addressing climate change. Some countries have even included climate change measures, such as support for renewable energy and policy changes, as integral parts of their economic stimulus packages. The hard question will be in terms of numbers. The renowned climate economist, Nicholas Stern, underlines that "at \$40 per tonne CO₂e a total world allocation of rights [to emit] would be worth 1.2 trillion per annum".⁸ Will leaders be able to access the same levels of funding required for climate as they did for their bail-outs?

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Additional Information / References:

ICTSD Global Platform on Climate Change, <http://ictsd.net/programmes/energy/publications/>
Stilwell, M., *Improving Institutional Coherence: Managing Interplay Between Trade And Climate Regimes* (Oxford 2007).

- 1 The Stern Review on the Economics of Climate Change explains that 'The risks of the worst impacts of climate change can be substantially reduced if greenhouse gas levels in the atmosphere can be stabilized between 450 and 550 ppm CO₂ equivalent. Stabilization in this range requires emissions to be at least 25% below current levels by 2050, and perhaps much more. Ultimately, stabilisation—at whatever level—requires that annual emissions be brought down to more than 80% below current levels.' NASA's leading climate scientist, James Hansen, argues that a target of 350 ppm CO₂ may be required to avoid triggering abrupt and irreversible climate change. See Hansen, Makiko Sato, Reto Ruedy, Ken Lo, David W. Lea, and Martin Medina-Elizade, "Global Temperature Change," Proceedings of the National Academy of Sciences (2006).
- 2 The AWG-KP focused on two documents. The first addresses possible amendments to the Protocol, while the second looks at 'other' topics, including land use, land use change and forestry, the flexibility mechanisms developed to enable developed countries to achieve their commitments (the Clean Development Mechanism, Joint Implementation, and Emissions Trading Systems), and a number of emissions measurement issues (metrics, sector and source categories, etc.).
- 3 The SBI, which discusses issues that are ahead on the path to implementation, addresses technology transfer, capacity building, national communications and the financial mechanism of the Convention. SBI's slower and more cautious sibling, the SBSTA, considers the Nairobi Work Programme on impacts, vulnerability and adaptation to climate change, reducing emissions from deforestation in developing countries (REDD), technology transfer, and various methodological issues under both the Convention and the Kyoto Protocol.
- 4 Ad Hoc Working Group On Long-Term Cooperative Action Under The Convention Chair's Negotiating Text FCCC/AWGLA/2009/8.
- 5 In broad brush strokes, the elements of the text include: a Shared Vision (as of yet to be defined, but essentially guiding principles and a "Global Goal" for emissions reduction), Adaptation, Mitigation, Technology Development and Transfer, and Financing. The current state of the text is a piecemeal patchwork of the comments and submissions made by Member States over the course of last year's discussions, but it does not yet reflect any kind of consensus.
- 6 AWG-LCA Report on the workshop on opportunities and challenges for mitigation in the agricultural sector on 4 April 2009 (<http://unfccc.int/resource/docs/2009/awglca5/eng/crp02.pdf>).
- 7 United Nations Framework Convention on Climate Change, Arts. 4.3 and 4.1 on financing and technology development and transfer, respectively (1992, entry into force 1994).
- 8 Nicholas Stern, in *The Global Deal* (2009).

Climate change, agriculture and trade: Understanding the linkages

By Charlotte Hebebrand

Climate change will impact agricultural production and productivity around the world and the agricultural sector will have to adapt to climate change if we are to achieve global food security. Indeed, food security features prominently in the UN Framework Convention on Climate Change (UNFCCC), which calls for a stabilisation of greenhouse gas (GHG) concentrations in the atmosphere to be “achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.”

Agriculture, which is a significant emitter of greenhouse gas emissions, can also play an important role in climate change mitigation, but it is not yet clear how the sector will be included in a new international climate change regime. The trade of food and agricultural products can contribute to both climate change adaptation and mitigation, and trade measures will likely be used as carrots or sticks by policymakers to encourage mitigation. In this context of climate change and agriculture, it is imperative to identify and implement both correct international climate change *and* agricultural trade rules.

Impact of climate change on agriculture

Studies on the likely impact of global warming on agriculture differ in their conclusions, and there is a great deal of uncertainty about the localised impacts. Most recent studies point to the likelihood of small but beneficial impacts on cereal crop yields in middle-high latitude temperate zones, due to small temperature increases (1-2 °C). These positive effects would, however, be followed by subsequent losses as temperatures increase. There is a consensus that low latitude, tropical zones are most negatively affected, since they are already experiencing temperatures at levels that are close to or beyond a threshold at which further increases will reduce rather than increase agricultural yields. Not only are temperatures higher in low-latitude countries, but these countries have less capacity to adapt (i.e., increase irrigation) and derive a larger percentage of their GDP from agriculture.

Beyond warming, climate change is projected to increase the frequency and severity of extreme climate events (i.e., droughts, floods), which will impact agricultural production and food security. Elevated CO₂ levels can lead to positive crop responses, but these are considered to be lower than previously thought.

Agriculture can play an important mitigating role.

While most human-induced GHG emissions derive from the use of fossil fuels, one third of the total comes from land use changes, which includes agriculture. The livestock sector alone is considered to contribute more GHGs than the transport sector. The agricultural sector provides significant potential for relatively cost-effective GHG emissions reduction through: 1) a reduction of its own emissions via improved management practices; 2) sequestering carbon in agricultural soils via improved agricultural practices; and 3) avoiding fossil fuel emissions.

Measuring emissions from agriculture, however, is more difficult than tracking emissions from industrial activities due to complex biological and ecological processes; monitoring methodologies need to be improved to more accurately calculate agricultural emissions. Under the Kyoto Protocol's Clean Development Mechanism (CDM), developing country producers can receive financing for specific afforestation and reforestation projects, emissions reductions from which can be used by developed countries as offsets. Given the significant mitigation potential

found in the agricultural sector, UNFCCC negotiators will have to address whether and, if so, how to expand the role of agriculture in an international climate change regime.

The role of trade

The UNFCCC importantly calls upon parties to cooperate in preparing for adaptation to the impacts of climate change. The convention refers in particular to water resources and agriculture and calls for the promotion, application, and diffusion of technologies, practices, and processes to reduce or control emissions from agriculture and forestry. Financing for successful adaptation and mitigation in agriculture will figure largely in the international negotiations leading up to the UNFCCC's much-anticipated climate change conference in Copenhagen.

An open trade regime for food and agriculture will also contribute to adaptation and mitigation efforts. At a most basic level, trade of food and agricultural products will be required to offset both climate-induced changes in agricultural production and shortages due to sudden climatic events. Moreover, an undistorted trading system will level the international playing field and facilitate increased investment in the agricultural sectors of countries, many of which have suffered from decades of neglect. Increased trade opportunities for poor countries, still heavily dependent on their agricultural sectors, will increase economic growth.

An open trade regime greatly improves access to inputs, which can trigger dramatic productivity increases on existing agricultural land and restore degraded lands, thus taking pressure off of forests. An elimination of trade-distorting domestic support by developed countries to their agricultural sectors should also lead to more environmentally prudent production choices.

Trade measures used as sticks and carrots

Climate change-related issues such as border tax adjustments are relevant to the trade of all products, and will have to be carefully considered. WTO Director-General Pascal Lamy has rightly called for an international consensus on the relationship between international trade and climate change rules, without which, disparate national actions are unlikely to meet their objectives - in either the climate change or the trade arena.

As the international community seeks to conclude a climate change agreement by the end of the year, it is well advised not to lose focus on the need for further agricultural trade liberalisation. The agricultural sector faces significant challenges, not least among them climate change and the need to double agricultural production by the year 2050. Given these challenges, policy coherence between international climate change and trade rules is vital.

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Environmental provisions in economic partnership agreements: Implications for developing countries

By Beatrice Chaytor

Bilateral and regional trade agreements (RTAs)¹ have proliferated over the past decade, and even as they set out the basis for their respective parties' trade relations, their provisions have increasingly included environmental provisions. This trend has grown rapidly and stems from the recognition that economic and environmental policies are interlinked and should take account of each other. The countries leading this trend are mainly OECD countries (including the United States, Canada and the European Union). The attempt to achieve mutual supportiveness of trade and environmental measures within international and regional trade agreements has therefore become more or less routine.² Having said that, the degree to which environmental issues are included in trade agreements is still controversial.

Developing countries, in particular, have been cautious about incorporating trade and environment at the multilateral level. Many are therefore wary of incorporating trade and environment in regional trade agreements for fear of prejudicing their multilateral positions. Nevertheless, the EU has incorporated environmental provisions into the agreements it is negotiating with African, Caribbean and Pacific countries and they reflect varying degrees of substance and ambition ranging from mere exception clauses to a full chapter on environment.

As the first EPA to be concluded and signed, the Agreement between the CARIFORUM States and the European Union (C-EPA) was always going to be the benchmark against which the other EPAs would be measured, so it is not surprising that countries continuing to negotiate with the EU will look at the C-EPA for the environmental provisions it contains in order to learn lessons.

The environmental provisions in the C-EPA and the interim EPAs range from comprehensive provisions involving a chapter on environmental issues (the C-EPA) to minimum provisions limited to exception clauses to the general trade provisions of the agreement (most interim EPAs).³ Generally, the integration of environmental issues into the C-EPA follows the same broad standard of integrating environment in trade adopted by other recent RTAs.

Sustainable development

Sustainable development is the broad remit of all the EPAs with the EU, where it is reflected in the preamble and objectives as well as in the existing environmental provisions. Thus, in the C-EPA the issue of environment is not limited to trade; instead it is part of a broad based, more cooperative approach covering a whole range of issues under the rubric of sustainable development. Under Part I, which is titled 'Trade Partnership for Sustainable Development', Article 3 recalls key aspects of the Cotonou Agreement in reaffirming the prime objective of sustainable development. This general approach is reflected in most

interim EPAs, where sustainable development references are contained in the preamble (recalling the Cotonou Agreement's objectives and provisions) and objectives of the agreements. Thus, the references to environment or sustainable development in the Cotonou Agreement are more or less the minimum standards that will be applied in any EPA, and they will usually be recalled in the preamble or the 'objectives' provision in the EPA. The exception is the interim agreement between Côte d'Ivoire and the EU, which only mentions sustainable development by recalling the objectives of the Cotonou agreement; the agreement does not itself contain sustainable development as a specific objective.

Natural resources and the environment

The scope of the environment issues under the C-EPA environment chapter appears to be rather broad and generic; pursuant to their commitment to sustainable development, the parties in the C-EPA are "resolved to conserve, protect and improve the environment".⁴ The reference to "sustainable management of natural resources and the environment" in Article 183 recalls environment and natural resources as cross-cutting and thematic issues in the Cotonou Agreement.⁵

Also included in the scope of environmental issues under the C-EPA are: environmental technologies, renewable and energy-efficient goods and services and eco-labelled goods.⁶ The East African Community (EAC) interim EPA does not spell out the precise scope of environmental issues; instead a marker is set down for future provisions on trade, environment and sustainable development in the *rendez-vous* clause.⁷

Other thematic areas

Environmental standards are not only promoted in Chapter 4 of the C-EPA, but also in other chapters, such as the chapter on agriculture and fisheries (Chapter 5 of Title I), the chapter on commercial presence (Chapter 2 of Title II)

and Section 7 on tourism services (Chapter 5 of Title II). Public health issues are also covered by the commitments to environmental protection.⁸

"All the EPAs contain a general exception clause exempting measures to protect or preserve human, plant, and animal health from general trade obligation."

In the EAC interim EPA, the focus of environment issues is on fisheries, which is a key economic resource for the EAC partner states.⁹ Co-operation between the parties is to include, *inter alia*, fisheries management and conservation issues; development of fisheries and fisheries products; and marine aquaculture. Forest resources and production of forestry products are priorities for the Central African region and measures for their sustainable management are therefore reflected in the Cameroon interim EPA. Sanitary and phytosanitary (SPS) measures are also a main thematic area in the C-EPA and the interim EPAs in so far as the protection of animal and plant health is at issue.¹⁰ In the EAC interim EPA, SPS measures are a topic for future negotiation.¹¹

All the EPAs contain a general exception clause exempting measures to protect or preserve human, plant, and animal health from general trade obligation. Such a clause is a minimum environmental protection provision found in all EPAs. In this respect, the provisions either repeat the language of GATT Article XX or they explicitly refer to, or incorporate it.

Environmental cooperation

In the C-EPA, the Parties agree to cooperate on a range of issues where trade and environment intersect such as *inter alia*: support for trade in environmental products and services; compliance with relevant products and other standards in the EU market, and relevant labelling and accreditation schemes. No precise procedures or a timeframe for the cooperation on environment issues is specified in the agreement. Neither does it state how the cooperation mechanisms will be developed and implemented.

The extent of reporting, the involvement of specific stakeholders, and the funds to be dedicated to such co-operation all remain undefined. In this respect, an opportunity was missed to elaborate the substance of a provision that could be used as a demonstration of positive trade instruments to support environmental protection, and to promote mutual supportiveness of trade and environment measures. Moreover, the lack of detail has implications for implementation.

International environmental agreements

Pursuant to their commitment to sustainable development, the parties in the C-EPA are resolved to protect the environment, "including through their participation in regional and international environmental agreements."¹² The Parties "*recognise the importance of establishing effective strategies and measures at the regional level,*"

rather than *commit to* establishing such strategies and measures. Where there are no national or regional environmental standards, international standards are to be the benchmark for environmental protection measures.¹³ This has the effect of potentially bringing the international environmental obligations into the domestic law of CARIFORUM states.

The C-EPA does not specify the precise international environmental agreements in question, leaving the provision fairly general. The implication is that it refers back to Article 183 (4), so it will be the international standards contained in the international conventions to which the countries are party. Thus, two issues are of note. First, what happens when CARIFORUM states are not party to a particular international convention but the EU is? Do the international standards in that particular multilateral environment agreement (MEA) apply to the C-EPA nevertheless and therefore bind the CARIFORUM states? Second, it appears that the reference to international environmental standards came at the insistence of the CARIFORUM states, which had rejected the EU proposals to use certain EU regional standards as the benchmarks and which exceeded international standards.¹⁴

Where MEAs are referred to by name, their provisions will expressly bind the parties. The Cameroon interim EPA specifically references the Convention on Trade in Endangered Species of Flora and Fauna (CITES): Article 53 stipulates that "trade in timber and forest products shall be governed in line with the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The EAC interim EPA mentions the UN Convention on the Law of the Sea (UNCLOS) as well as regional and sub-regional fisheries agreements.¹⁵

National laws on environment

C-EPA, like most recent RTAs provides that parties should ensure 'high levels' of environmental protection under their respective domestic laws, while allowing the parties to set their own minimum standards. The interim EPAs concluded with Pacific and East, West and Central African countries do not have this provision. The phrase 'high levels' is not precisely defined, nor referenced against any precise international levels of environmental protection, despite the specific reference in the C-EPA that international standards should be applied in the absence of national or regional standards. The inference is that with references made to regional and international environmental agreements, parties will choose to apply those same high levels of environmental protection in their domestic laws.

"The C-EPA does not oblige the parties to enforce their national environmental laws."

There is no general mechanism in EPAs to enforce these 'high levels' of environmental protection. So, for instance, the C-EPA does not oblige the parties to enforce their national environmental laws; the exception is foreign direct investment. The commitment not to lower levels of

environmental protection in order to attract investment is strongly emphasised in C-EPA. Subject to their sovereign right to regulate, in Article 188, the EU and CARIFORUM Parties “agree not to encourage trade or foreign direct investment to enhance or maintain a competitive advantage by:

- (a) lowering the level of protection provided by domestic environmental and public health legislation;
- (b) derogating from, or failing to apply such legislation”

Dispute Settlement

The general dispute settlement procedures in the C-EPA apply also to disputes on environmental issues,¹⁶ although the environment chapter sets out a separate consultation process for resolution of environmental disputes.¹⁷ The indication is that this process of consultation through the EU-CARIFORUM Consultative Committee should be exhausted first before recourse to the ordinary dispute settlement procedure in the C-EPA.¹⁸ The usual sanctions for the disputes are fines, and although suspension of trade concessions is possible, they are ruled out for disputes concerning environment issues.¹⁹ This exclusion of trade sanctions as remedies for environmental disputes is a similar provision to that under the US-Chile Free Trade Agreement.

“Developing countries are still uncomfortable with the idea that negative trade instruments should be used to enforce environmental obligations.”

The separate remedy for environmental disputes, and the fact that trade sanctions are not allowed for environmental disputes, provides an insight into the lingering reservations concerning the trade and environment debate. In particular, it shows that developing countries are still uncomfortable with the idea that negative trade instruments should be used to enforce environmental obligations. The provisions on environment within EPAs still strongly favour negotiation and consultation over use of trade sanctions. The balance therefore remains tipped towards the use of more positive rather than negative trade instruments for environmental purposes in order to achieve the mutual supportiveness of trade and environment.

Lessons from the C-EPA and the interim EPAs

Environmental issues are firmly established in the EPAs and despite the lack of substantive provisions in the interim EPAs, more detail will come in the full Agreements to be concluded with Pacific and East, West and Central African countries. The Cotonou Agreement which already has significant references to sustainable development and environmental issues reflects the minimum standard which these EPAs will maintain. It is likely that their environmental

provisions will go further, but the degree to which they will seek to have a balance in the mutual supportiveness goal will differ from region to region. There is already a clear delineation among the interim EPAs where certain economic issues are prevalent, and competitiveness issues are paramount. For instance, the Pacific interim EPA has the bare minimum environmental provisions referencing Cotonou, whilst EAC and Central African interim EPAs build on Cotonou’s standard with more substantive provisions on natural resources and an indication of more detailed provisions to follow in the full EPAs.

C-EPA clearly improves upon Cotonou and its hybrid of binding and non-binding measures may also be a benchmark for some environmental provisions in EPAs. International standards are clearly embraced, however, where enforcement of those standards are concerned, there is a hesitation in using traditional trade sanctions; instead, political dialogue and consultation are preferred, possibly as a recognition that non-compliance with environmental standards is due to lack of capacity or understanding of the obligations, rather than a deliberate neglect of responsibilities on environmental protection. Thus, the mutual supportiveness objective is present but cautiously approached.

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- ¹ In this paper, RTAs refers in a generic sense to bilateral, and regional trade agreements.
- ² This objective is contained in numerous political statements including the 1992 Rio Declaration.
- ³ See e.g. Article 42 of the interim EPA between the EU and Pacific Island states and Article 40 of the interim EPA between the East African Community and the EU.
- ⁴ C-EPA, Article 183 (3).
- ⁵ This is placed in the context of broader sustainable development principles by Article 183.1.
- ⁶ See Article 183.5. The Parties are resolved to make efforts to promote such trade.
- ⁷ See EAC interim EPA, Article 37(Areas for future negotiations). The EAC partner states and the EC have agreed to conclude a comprehensive EPA by 31st July 2009.
- ⁸ Article 184 refers to “domestic environmental and public health protection and ...sustainable development priorities” in the same context, thereby linking them to each other.
- ⁹ A whole chapter (III) is dedicated to fisheries, and includes marine and inland fisheries and aquaculture development.
- ¹⁰ E.g., C-EPA, chapter 7 (Articles 52-59) ; Cote d’Ivoire interim EPA, Title III, chapter 4 (Articles 36-43); Cameroun interim EPA, Chapter 4 (Articles 40-47); Pacific interim EPA, chapter 5 (Articles 33-41).
- ¹¹ EAC interim EPA, Article 37 (c).
- ¹² C-EPA, Article 183.3.
- ¹³ Article 185.2.
- ¹⁴ This assertion comes from Audel Cunningham, Legal Advisor to the Caribbean Regional Negotiating Machinery, in Philipp Schukat, CARIFORUM EPA and Beyond: Recommendations for Negotiations on Services and Trade Related Issues in EPAs, GTZ Study on Social Aspects and Environment, BMZ Working Paper, 2008.
- ¹⁵ EAC interim EPA, Articles 28, 31 (1) (d);
- ¹⁶ See C-EPA, Article 203.1: “This part shall apply to any dispute concerning the interpretation and application of this Agreement.”
- ¹⁷ See C-EPA Article 189.
- ¹⁸ Ibid, Article 204.
- ¹⁹ Ibid, Article 213.2: “...In cases involving a dispute under Chapter 4...of Title IV, appropriate measures shall not include the suspension of trade concessions under this Agreement...”

Trading the environment: The importance of trade in climate change negotiations

By Solveig Crompton

As climate change has in recent years come to the fore of the international agenda, increasing attention is being paid to the linkages between trade and climate change. A noteworthy example of this was the inclusion of a meeting of trade ministers on the sidelines of the thirteenth UN Framework Convention on Climate Change (UNFCCC) Conference of the Parties in Bali, Indonesia in December 2007. However, in terms of the agreement that Parties to the Convention are currently negotiating -which is due to be concluded by the end of 2009 - it is less obvious where the trade issues specifically lie.

Both the Convention and the Kyoto Protocol seek to minimise the adverse effects on trade caused by the measures Parties put into place in their efforts to address climate change. Article 3 of the Convention includes the provision that "Parties should cooperate to promote a supportive and open international economic system that would lead to sustainable economic growth and development in all Parties, particularly developing country Parties." Furthermore, in the same sub-paragraph, Parties agreed that "[m]easures taken to combat climate change, including unilateral ones, should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade."¹ Article 2.3 of the Protocol requires that Annex I Parties, or industrialised countries, "strive to implement policies and measures under this Article in such a way as to minimise adverse effects, including...effects on international trade, and social, environmental and economic impacts on other Parties, especially developing country Parties."

Parties to both the Framework Convention and the Kyoto Protocol clearly recognised that in order to achieve sustainable development, a mutually supportive relationship between the multilateral trade and climate change regimes is necessary. On the road to Copenhagen, Parties have reaffirmed this recognition, but face even greater challenges in this respect.

The general position of the developing countries has been that discussions around trade issues belong in the World Trade Organization (WTO), and should not be addressed within the scope of the climate change discussions. Unlike their compatriots in the WTO however, Parties negotiating climate change have only a few formal meetings during the year in which they aim to resolve the entire negotiating mandate of climate change.

Possibilities within the WTO to address climate change concerns

Negotiations on the Doha Development Agenda are now in their eighth year, and trade negotiators are still grappling with resolving a few particularly difficult issues, especially in the Agriculture and Non-Agricultural Market Access (NAMA) negotiations.

Within the context of the so-called "Paragraph 31"² negotiations on trade and environment, the issue of climate change has been explicitly raised only in reference to environmental goods and services (EGS). The exception followed an informal proposal made by the EC and US to fast-track specific goods and services that help to address climate change concerns. Progress in the EGS negotiations is dependent on the resolution of issues in the Agriculture and NAMA negotiations, in particular the latter, as the level of tariff cuts agreed within NAMA will serve as the baseline for determining the tariff cuts for environmental goods.

Developing countries are not convinced that goods that assist in addressing climate change should be prioritised above other

environmental goods. Furthermore, the WTO negotiations do not sufficiently address issues around technology transfer, and developing country Members argue that sustainable development will not be achieved if they become mere importers of cleaner technology products and equipment from industrialised countries.

WTO negotiators will need to approach these negotiations in a more integrated manner for the liberalisation of goods and services to benefit climate change in the manner envisaged by the UNFCCC: supportive of the sustainable development of Parties, particularly developing country Members.

While the outcome of the negotiations on Paragraph 31(i), which seeks to address "the relationship between existing WTO rules and specific trade obligations set out in multilateral environmental agreements (MEAs)," may have implications for climate change, this is not given, as it could be argued that neither the UNFCCC nor the Kyoto Protocol contains "specific trade obligations," and as such these agreements would fall beyond the scope of the mandate.⁴

In the absence of an outcome on these Paragraph 31(i) negotiations, the question of the relationship between the UNFCCC, the Kyoto Protocol and WTO rules remains open. For example under a proposal made by the European Union⁵ in 2006, there could be implications for the relationship between trade measures implemented by Parties in fulfilment of their climate change commitments under the Convention and/or Protocol and the WTO compatibility of those measures. WTO Members remain divided on whether the scope of the negotiations precludes consideration of the relationship of the WTO Dispute Settlement Understanding (DSU) and specific trade obligations under MEAs.

One WTO forum that does offer an opportunity to create and harness synergies with the climate change discussions is that of the Working Group on Trade and Technology Transfer (WGT TT). The Bali Action Plan identified technology transfer as one of the four pillars of work. The WGT TT could offer a useful forum to contribute to the work of the climate change discussions by providing inputs on the relationship between trade and technology transfer.

At this point, the negotiations in the WTO are for all intents and purposes on an entirely separate and unrelated track from that of the climate change negotiations. The broad position of developing countries, who insist that the Paragraph 31(i) negotiations should not legitimise environmental barriers to trade, will ensure that the balance between the trade and environment regimes is largely maintained.

Trade issues within the climate change negotiations

There is no explicit reference to any trade issues under the mandate of the Ad Hoc Working Group on Further Commitments

for Annex I Countries of the Kyoto Protocol (AWG-KP), or of the Ad Hoc Working Group on Long-Term Cooperative Action under the Convention (AWG-LCA). However, there has been an implicit acknowledgement that the balance achieved in the Convention and Protocol (as noted above) needs to be maintained. The work programmes of both working groups reflect this symbiosis, allowing for consideration of trade implications of response measures undertaken when addressing climate change.

The AWG-KP, at its sixth session in August 2008, included an agenda item on "Information on Potential Environmental, Economic and Social Consequences including Spillover Effects, of Tools, Policies, Measures and Methodologies available to Annex I Parties." A workshop was held on this issue at the March/April 2009 session of the working group. It was however evident that there remain challenges around building a common understanding among Parties as to the kind of 'unintended consequences' which should be addressed and how best to address those consequences.

Under the AWG-LCA, the agenda item on economic and social consequences of response measures has already elicited inputs with respect to trade. At the June meeting of the AWG-LCA, Parties are considering a draft negotiating text⁶. On this question, it appears that Parties are seeking to maintain the existing understanding that climate change measures should not lead to trade restrictions or discrimination.

Trade in climate change negotiations should not be underestimated

Trade is merely one of many elements of the broader climate change discussions. There is certainly little scope to broaden discussions within the WTO until trade delegates have completed their current work programme under the Doha Development Agenda. Thus, opportunity exists within climate change discussions to ensure that the mutually supportive relationship between trade and climate change measures is maintained.

It may be helpful to consider the issue from a slightly different angle, however. The overarching objective of the climate change negotiations is to agree on the required action needed to stabilise concentrations of greenhouse gases in the atmosphere at a level that would prevent anthropogenic interference with the climate system.⁷ Developing countries must simultaneously ensure that the developmental and poverty eradication objectives of their countries are in no way compromised through these actions.

Key principles of the UNFCCC include that action to address climate change be taken "on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities."⁸ In light of the dire situation of climate change, developing countries are strongly arguing that the historical responsibility for climate change lies firmly with the developed countries. As such, developing countries feel that the onus is on industrialised nations to take the lead in the response to climate change.

Industrialised countries are, however, consistently trying to 'share' their responsibility with developing countries. One of the ways they are doing this is through the use of trade measures. A key concept in much of the literature on trade and climate change is that of 'carbon leakage' - the result of production shifting from countries with more stringent climate change regimes to those with lower standards, and the associated increase in CO₂ emissions. This has been a long-standing concern of industrialised countries, particularly those in the European Union, and it must be emphasised that it is likely to be an even greater concern in the context of the global recession in terms of the implications this has for the competitiveness of domestic industries and employment.

A number of developed countries are in the process of exploring the use of a 'border tax adjustment' (BTA) as a means of addressing such carbon leakage. Effectively, this means that through the BTA, imported goods would be subject to an

additional duty upon entry into the country to compensate for the lower carbon price of inputs in the exporting country. There has been some debate over the practicality of implementing such a measure, and even over whether such a measure would be WTO compliant.⁹ Furthermore, the looming threat of industrialised countries applying such a measure has annoyed many developing countries who criticise the measure as protectionism veiled behind environmental objectives.

The use of such a measure can be seen as a 'stick' incentive - as opposed to a 'carrot' - to persuade developing countries to do more when it comes to climate change. In such economically sensitive times, such a threat may be achieving its desired effect.¹⁰ In addition, as industrialised countries have been trying to use sectoral approaches as a back-door means of extracting additional concessions from developing countries, trade measures, such as BTAs may amount to the same thing.

Climate change is a key priority for all countries, but even for developed countries, it is not the only priority. The role that the global recession will play in the negotiating positions of parties should not be underestimated. Trade measures in this context become a key weapon in the hands of climate change negotiators. Developing countries, which face considerable capacity challenges at the best of times, cannot afford to underestimate the 'lethal' nature of trade in the climate change context. Trade measures may very well become the means by which developed countries ultimately circumvent their historical responsibility for climate change, by 'exporting' the costs onto developing countries, through the use of trade measures such as BTAs.

Conclusion

The risks posed by trade measures within climate change should not be underestimated. This risk is even greater within the current context of the need to respond adequately both to climate change and the global economic crisis. Trade measures can be seen as the interface between these two challenges. Now more than ever, developing countries must adopt an approach that fully integrates the economic and environmental sectors. While trade negotiators may have their hands full trying to conclude the Doha Development Agenda, they can ill afford not to pay attention to the trade issues under discussion on the road to Copenhagen.

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- 1 This provision is in direct line with the Preamble of Article XX of GATT 1994 which states that exemptions to WTO rules are permitted, as long as "such measures are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade".
- 2 The trade and environment mandate is contained within Paragraph 31 of the Doha Ministerial Declaration, WTO document: WT/MIN(01)/DEC/1
- 3 Paragraph 31(i), Doha Ministerial Declaration, WTO Document: WT/MIN(01)/DEC/1
- 4 It should however be noted that there remains no agreement among WTO Members as to what constitutes a 'specific trade obligation' or even, which agreements should be seen as 'multilateral environmental agreements'.
- 5 Proposal by the European Union to the Committee on Trade and Environment in Special Session, WTO Document: WT/TE/W/68, dated 29 June 2006.
- 5 This draft negotiating text (UNFCCC document FCCC/AWG/LCA/2009/8, dated 19 May 2009) has been prepared by the Chair of the AWG-LCA under his own responsibility, taking into account previous discussions and inputs from Parties. I
- 6 Proposal by the European Union to the Committee on Trade and Environment in Special Session, WTO Document: WT/TE/W/68, dated 29 June 2006.
- 7 United Nations Framework Convention on Climate Change, Article 2.
- 8 Article 3.1 of the United Framework Convention on Climate Change

Carbon labelling: Moral, economic and legal implications in a world trade environment

By Olga Nartova

Carbon labelling is the latest in an ever-growing trend of buzz concepts within the environmentalist community. The concept came into being in the United Kingdom in 2007 as an act by the Carbon Trust, in association with the British Standards Institute. Simply stated, carbon labelling strives to emblazon a product with a visible representation of the quantity of carbon emissions generated by the creation of that product and delivering it to consumers. The primary focus of carbon labelling is frequently the issue of air miles- the process of freighting products by airplane is extremely carbon intensive, more so than any other method of transportation. However, it has frequently been challenged that other factors should be given proper weight in identifying a product's true carbon footprint value, including manufacturing standards, storage practices, and even the tiniest details involved with the stores that sell the products, right down to their electricity consumption and the number of miles customers must drive to purchase the product. Also raising controversy is the way in which carbon labelling is used within the global economy. Is it merely to raise environmental consciousness, or are there ulterior motives involved to inhibit international trade and further the interests of the countries imposing the labels? These are all questions this study will strive to examine from different perspectives.

A green point of view: the consumer perspective

'Carbon Footprint' is a term used to describe an estimate of the amount of harmful environmental emissions created by a person, organisation or process. At present there is no precise method of how to measure or determine an exact value for this figure, though numerous approaches have been proposed to provide rough estimates for personal use, ranging from basic online calculators to sophisticated analysis or input-output-based methods and tools. Scientifically there is no consensus on how to measure or quantify a carbon footprint.

In the view of the average consumer, a carbon footprint is determined by everyday activities. And while academia can argue over the exact phrasing behind determining a carbon footprint, the average consumer needs a much simpler definition. Carbon labelling programs are currently in use in a number of markets. A variety of high profile companies worldwide have instituted both carbon labelling and carbon disclosure policies on their products, but none of these companies use any standardised method of reporting carbon values. Some, like Home Depot, use a simple estimate provided by their suppliers, while others, such as Wal-Mart, use more advanced methods that take into account 'embodied carbon'.

The largest effect of these new labelling initiatives has been to spur local food initiatives, encouraging consumers to buy only goods that were produced within their communities. This has given rise to the term 'localvore' for those that only consume locally produced goods. The carrying purpose behind these movements is to limit the distance travelled by products, thereby reducing the carbon value generated by mass transport by air, sea, and land freight. Such groups typically include farmers' cooperatives which have seen strong growth throughout Europe and North America. Within the United States, farmers markets have expanded from an estimated 1,755 in 1995 to 4,385 in 2006, according to the USDA's Agricultural Marketing Service. Supporters argue that restricting consumption to local goods is healthier in addition to being more environmentally aware, as such goods require far fewer chemical preservatives to maintain freshness. The movement also encourages consumption of only in-season fruits and vegetables, as those products not in season must be grown in warmer climates and imported. These movements have become a major point for controversy when it comes to local versus global foods, as social, economic and environmental issues abound.

Labelling standards and flaws

The first of many questions posed to the application of carbon labelling is the significance of 'food miles', which is the primary form of labelling currently in place in today's supermarkets. Food miles labels rely strictly on the distance travelled by a product to determine its carbon value - the further a food item travels, the more it contributes to climate change through negative emissions. Today, food travels an average of 1,500 to 2,000 miles (2,400 to 3,200 km) before reaching the consumer - 25 percent farther than in 1980. Some environmentalists consider this growth in overseas food trade to be a significant contributor to the increase in environmental pollution emissions seen since then.

Unfortunately, using this view of food miles immediately raises questions related to issues, such as transportation methods used to deliver these products to market. Air freight is inarguably the most carbon-intensive method of transport, producing nearly three times the amount of emissions of ground transport by large truck. Sea transport, the method used to transport many types of agricultural products, is actually believed to be more efficient than trucking; this, in many cases would give products produced abroad and transported by ship a carbon advantage over nationally produced goods transported by truck. Based largely on these discrepancies, studies of total carbon footprint involved in food production within the US have largely found food miles to be an insignificant part of the equation. Such studies give far higher importance to emissions resulting from the methods of production used, including pesticides and fertilisers, and energy sources consumed by farm and processing equipment.

Studies have resulted in a number of carbon emission assessment methods that examine the entire production process associated with a product, rather than merely how far it has travelled. These key techniques include life-cycle analysis, carbon footprint identification and hybrid life-cycle analysis. Until a method of analysing the amount of carbon emissions created through the entire life-cycle of a product is more widely accepted and applied, it seems difficult to make meaningful comparison between products produced locally and abroad.

WTO perspective on product labelling

In the context of carbon labelling, the term 'non-product-related processes and production methods' (NPR-PPMs) refers

to carbon emissions associated with a product's production or transport that are indiscernible in the final product. For example, how much carbon was produced generating the electricity used to manufacture the product, or to transport it by ship or plane to the country of sale. The applicability of the Technical Barriers to Trade (TBT) Agreement to NPR-PPMs is one of the principal uncertainties regarding the application of the TBT Agreement to carbon standards and labelling schemes. The applicability of the Agreement is also the primary question for the WTO to ultimately answer as labelling programs become more prevalent in today's markets.

For many energy-using products, the energy cost over the lifetime of the product is of a similar, or greater, magnitude to the cost of producing the product in the first place. This is a very important factor in the economic consideration of a product's carbon efficiency. In the absence of carbon performance labelling, manufacturers have little commercial incentive to minimise a product's energy consumption. Prior to the introduction of energy labelling in the EU, the least efficient refrigerators on the market used eight times more energy than the most efficient models to provide the same cooling service, and lifetime in-use energy costs exceeded the purchase price several times over.

Such labelling systems can be voluntary or mandatory within any market and they can provide simple, straightforward information or be of a 'comparative' type, providing consumers with easily processed benchmarks by which to gauge the product's environmental impact. In the case of a simple label, they frequently report how much energy a product uses. Comparative labels also compare that to the energy used by competing products providing an equivalent service level. Experience has shown that simple information labels have significantly less impact on consumer decisions than more detailed comparative labels, and therefore comparative labelling is a much more useful system.

Issues with the WTO begin to arise, however, with the question of whether or not such labels can be applied to imported goods, or merely domestic ones. Efficiency standards and labels are reported to be the single largest cause of national notifications to the WTO under the TBT Agreement. Given their importance in stimulating highly cost-effective energy and emissions savings, this is likely to continue as governments worldwide continue to step-up environmentally conscious efforts. Whatever costs these regulations imply for industry and trade, it can be argued that they are generally less than the value of the energy savings they foster, and so there is a strong argument that trade regimes should not focus on discouraging or prohibiting such measures as non-tariff barriers to trade.

The key principle of trade law concerning the WTO on the subject of carbon labelling is non-discrimination: goods imported from foreign producers must get no worse treatment than like goods from domestic producers, and there must be no discrimination between similar goods produced in one foreign country than from any other foreign country. This raises the question of whether or not the application of carbon labels to products provides them with any commercial advantage or disadvantage. With respect to discrimination on the basis of embodied carbon, the million-dollar question is how to define 'like' goods. Is a pound of bananas grown using environmentally conscious farming methods 'like' a pound of bananas produced using more polluting means? If so, then tariffs based on embodied carbon may violate the principle of non-discrimination as set forth by the WTO. This interpretation of similar products depends on the meaning that one ascribes to the word 'related'. Does 'related' mean product-related (detectable in the final product)? Or does 'related' have a broader meaning, such as merely associated with a product, process or production method? The scope of the TBT Agreement will ultimately depend on the Organization's interpretation of the term 'related'.

It remains to be asked whether or not applying such labels has any effect on import versus domestic sales within the current

market. A WTO panel faced with a technical regulation or standard applicable to carbon emissions is likely to turn first to the TBT Agreement. The TBT Agreement differentiates between technical regulations (mandatory measures) and standards (voluntary measures) and sets forth rules applicable to both which would apply to the subject of carbon labelling (Appleton). Mandatory application of carbon labelling would therefore have to be applied equally to imports and domestic goods, and must satisfy non-discrimination laws by proving that such labelling of imports does not put them at an unfair market disadvantage to domestic products.

Legal impact on developing economies

Evidence garnered from studies of developing economies shows that international trade promotes economic growth. However, if standards for carbon emissions were formally adopted within the WTO, the cost of complying with standards would likely be borne by the developing member country producers themselves, with no guarantee of the benefits they will reap in return. If the standards are a requirement for producers wishing to export to a certain market, and if the costs are too high, they can be excluded from the market altogether, which could jeopardise their livelihoods. This conclusion with inevitably violate the Organization's non-discriminatory policy.

The concept of embodied carbon, as relates to the entire life-cycle of a product intended for export to international markets also is important in the discussion of competitiveness issues, when applied to developed and non-struggling countries if it is not applied universally to all member nations. Those countries implementing emissions reduction policies will have to compete with exports from countries without mandatory emissions reductions, where costs of production, and therefore cost of the finished product - may be lower as a result. It has also been suggested that opening the door to the regulation of NPR-PPMs in internationally traded products, as related to carbon emissions, could open the door for trade discrimination based on other non-product-related criteria, including labour and human rights practices (Appleton). The impact this additional set of variables would have on the principles of fair and balanced trade between member countries is yet another consideration within the widespread effects of carbon labelling on the global community.

Conclusions

The issue of reducing carbon emissions is a global conundrum, both economically and politically. Environmental issues challenge fundamental notions of state sovereignty and jurisdiction, due in part to their cross-border implications. WTO Members are having difficulty reaching a consensus on how to manage the complex relationship between trade law and international environmental law, in particular with respect to the extent that trade measures can be used to encourage changes in foreign production practices (Appleton). Yet, there must be some middle-ground to be discovered where environmental concerns can be addressed while maintaining the proliferation of free trade. Article 2.2 of the TBT Agreement requires that technical regulations not create 'unnecessary' obstacles to international trade. Certain legitimate objectives are identified, including protection of human, animal or plant life or health, or the environment. These provisions are sufficiently broad to encompass carbon labelling schemes, as the underlying purpose is to preserve the environment for continued human, plant and animal use. Perhaps, then, there is room after all for current WTO policies to bend enough to encompass a globally accepted scheme for carbon labelling.

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BioRes interview: Appraising biodiversity

How much would you pay for a little biodiversity? While some may call environmental commodification repugnant, the UN Environment Programme's Green Economy Initiative is banking on the idea that economics holds much potential for biodiversity preservation. The Economics of Ecosystems and Biodiversity, or TEEB, project is looking to put a price on the work the environment does for humanity - such as water and air purification - to motivate biodiversity conservation. BioRes contacted Georgina Langdale at TEEB's office in Bonn, Germany to get a better understanding of the project.

What is the purpose of the TEEB initiative?

The TEEB study was launched by Germany and the European Commission in response to a proposal by the G8+5 Environment Ministers (Potsdam, Germany 2007) to develop a global study on the economics of biodiversity loss.

Taking inspiration from ideas developed in the Millennium Ecosystem Assessment, The Economics of Ecosystems and Biodiversity (TEEB) aims to promote a better understanding of the true economic value of ecosystem services and to offer economic tools that take proper account of this value.

In doing this, TEEB will communicate the urgency of action on ecosystems and biodiversity loss by presenting the economic, societal, and human value of the benefits of ecosystems and biodiversity as well as the scale of the benefits lost.

"One of TEEB's ultimate goals is to provide policy makers with the tools they need to incorporate the true value of ecosystem services into their decisions."

The Study aims to show how we can account for the value of ecosystems and biodiversity in our choices and decision-making processes. For example, one of TEEB's ultimate goals is to provide policy makers with the tools they need to incorporate the true value of ecosystem services into their decisions.

An interim report of the Study was presented at the 9th meeting of the Conference of the Parties to the Convention on Biological Diversity in May 2008. The second phase of the TEEB study is being led by UNEP with support from the European Commission, German Federal Ministry for the Environment, and the UK Department for Environment, Food and Rural Affairs.

What was accomplished during Phase I?

Phase I's Interim Report demonstrates the huge significance of ecosystems and biodiversity and the threats to human

welfare if no action is taken to reverse current damage and losses.

The interim report showed that the economic size and welfare impact of losses is enormous. It illustrated the tensions between biodiversity loss and the achievement of the MDGs, especially the goal of ending extreme poverty by 2025. For economists, Phase I showed that discount rates are an ethical choice and that we must measure what we manage. Despite the huge complexity of the task ahead, the Study also showed that biodiversity must become the responsibility of all with the power and resources to act.

The report's release created significant interest from a range of audiences from policy makers to the media. TEEB Study Leader Pavan Sukhdev is increasingly being asked to contribute to a wide range of discussions on the costs and benefits of biodiversity and ecosystems. At a time when traditional market mechanisms have failed, TEEB offers critical insights into how we may not just rebuild market mechanisms, but also improve them.

What has been the greatest challenge so far?

Some of the greatest challenges include the complexity of the subject matter itself, urgency of the task, and the challenge of strengthening the inter-relationships between science, economics and policy. Society struggles to find the 'value of nature'. Despite nature being the source of much value for us every day, it is mostly bypassed by markets, pricing and valuation tools. This lack of valuation is an underlying cause for the observed degradation of ecosystems and the loss of biodiversity. It's an enormous problem.

"In order to develop practical, flexible, and implementable recommendations, TEEB is inviting input and data from a wide range of sources across the world."

In order to develop practical, flexible, and implementable recommendations, TEEB is inviting input and data from a wide range of sources across the world, which will allow the

project to best reflect the range of biomes, trade sectors, ethical issues, and fiscal and policy instruments involved. This challenge also creates a significant opportunity for a truly collaborative and collegiate effort from the scientific, economic, business, political, and civil communities to address these urgent and unavoidable issues.

How does trade fit into your analysis?

Phase II will address the role of business and trade within the context of biodiversity benefit and loss. The study will examine how the context of business and biodiversity is changing; how business opportunities can relate to biodiversity and ecosystems; how business can measure and report impacts on biodiversity; what is needed to improve business-biodiversity relations and how business can manage the risks of biodiversity loss.

"There will be a particular focus on businesses directly impacting ecosystems and biodiversity such as mining, oil and gas and infrastructure."

There will be a particular focus on businesses directly impacting ecosystems and biodiversity such as mining, oil and gas and infrastructure; those that depend on health ecosystems and biodiversity for productivity such as agriculture and fisheries; the market 'gatekeepers' or enablers including commercial banks, asset managers, business services and insurance; and the pioneering markets for ecosystem services and biodiversity-related products such as eco-tourism, eco-agriculture, and bio-carbon. In addition the study will engage with related industry associations, CSR platforms, civil society partners, educators and media.

What do you hope to achieve during Phase II?

Phase II of the TEEB study sets out to continue the work initiated in Phase I and will seek to achieve five important goals:

- Firm up a 'science and economics framework' integrating ecological and economic knowledge to structure the evaluation of ecosystem services under different scenarios.

- Identify 'recommended valuation methodologies', applicable under differing conditions and date assumptions to the most tangible and significant economic values of biodiversity and ecosystem services, across the world's main biomes.
- Examine the economic costs of biodiversity decline and the loss of ecosystem services world-wide in a business-as-usual scenario and the costs and benefits of actions to reduce these losses in alternative scenarios, focusing on a medium-to-long-term perspective.
- Develop a 'policy toolkit' which supports policy reforms and integrated impact assessment at national, regional and local levels, to ensure that all relevant information is considered to analyse the pros and cons of different options, in order to foster sustainable development and better conservation of ecosystems and biodiversity.
- Engage key "end-users" at an early stage to ensure that the output of this study is relevant to their needs, accessible, practical, flexible and overall, useful.



In achieving these goals, TEEB hopes to answer some fundamental questions:

- How do we reward the benefits of conservation?
- What is the optimum way of recasting today's subsidies to meet tomorrow's priorities?
- How do we reward unrecognised benefits and tax uncaptured costs of ecosystem services and biodiversity?
- The majority of the world's poor depend on natural public goods, so how do we account for this and measure the 'GDP of the Poor'?
- How do we show discounting as an ethical choice?
- How do we measure what matters and what we manage?

In seeking answers to these fundamental questions, The Economics of Ecosystems and Biodiversity study will

provide a comprehensive foundation upon which to build better ecosystem and biodiversity management.

The Call for Evidence is currently open and contributions are welcomed. You can visit www.teebweb.info for further details.

ICTSD update

Patents and climate change added to list of issues to be addressed by WIPO patent committee

When the World Intellectual Property Organization (WIPO) Standing Committee on the Law of Patents (SCP) met earlier this year, it decided to include “patents and the environment, with a particular attention to climate change and alternative sources of energy” among the non-exhaustive list of issues identified at its June 2008 meeting for discussion in the context of its work programme.

Climate change related activities have been increasing in importance at WIPO. Climate Change will feature prominently on the agenda of a major WIPO conference on IP and public policy issues in July. WIPO chose green innovation as the theme of the World IP day this year on 26th April.

The diffusion of climate change technologies is considered a key element in addressing the wider climate change challenge. This issue is gaining increased attention in ongoing negotiations at the UN Framework Convention on Climate Change (UNFCCC), particularly in relation to its meeting in Copenhagen later this year, which many hope will provide a comprehensive response to climate change.

Many issues are cited as barriers to technological diffusion for climate change, including investment conditions, infrastructural constraints, a lack of incentives, IPRs, and the low levels of absorptive and innovation capacities in developing countries. With regard to IPRs, there is still need for significant research and analysis to achieve a better understanding of the exact impact of IPRs on the diffusion of climate friendly technologies and to adequately inform policy in this area.

“The diffusion of climate change technologies is considered a key element in addressing the wider climate change challenge.”

Against this backdrop and in the context of its Global Platform on Climate Change and Trade, ICTSD held two dialogues in the context of WIPO’s Standing Committee on Patents in relation to climate change technologies and IPRS. The objective of the dialogues was to contribute to an improved understanding of issues related to December’s UNFCCC Conference of the Parties and to be an input in discussions relating to the WIPO conference mentioned above.

The first dialogue, co-hosted with Chatham House on 24 March 2009, was organised around the theme of “*Innovation and Diffusion of Climate Technologies: What Role for WIPO?*” At the dialogue, Ilian Iliev, CEO of CambridgeIP, gave a presentation on patent mapping of clean energy technologies. Also, Thaddeus Burns, Senior IP Counsel for General Electric shared the private sector perspective. Burns indicated that 80 percent of research and development (R&D) on climate change technologies is done in the G8 countries. Since the private sector is responsible for most of the investment, Burns says that “IP is the enabling force that allows them to recoup the cost of such investments.”

Cristiano Berbert, of the permanent mission of Brazil provided a developing country perspective at the dialogue.

Berbert emphasised that WIPO should be brought into discussions on areas of public policy. “The IP system should be more responsive to UN goals,” Berbert argued. “The preservation of the environment and reversal of climate change are major UN goals.”

The second ICTSD dialogue held on 27 March was entitled *Climate Change, Transfer of Technology, and Intellectual Property Rights (IPRs): The Challenge of Evidence based Policy*. Nick Johnstone from the Organisation for Economic Co-operation and Development (OECD) presented his organisation’s recent analysis on how climate change technologies draw upon patent information. He emphasised that prices, public expenditure on R&D, certainty in policy incentives, and scientific capacities in the specific technology are the most important drivers for green innovation.

Frederick Abbott, a law professor at Florida State University, spoke on the lessons to be learned from global policy development on intellectual property and public health for negotiations on climate change, technology transfer and IPRs. He pointed in particular to the failure of zero-sum bargaining and the necessity of concrete mechanisms for technology transfer and the importance of competition law and capacity building in this field for developing countries.

Anthony Taubmann from WIPO raised several questions about the ‘climate’ of IPRs, climatology of IPRs and IP law and policy. He emphasised that the existence of a patent is not in itself a barrier to the transfer of technology and equally, enforceable patent rights are never a guarantee for technology transfer. However, he said, transparency in the patent system can be a major boost to technology transfer.

Konstantinos Karachalios from the European Patent Office (EPO) insisted that the magnitude of climate change challenge called for departing from ‘business as usual’ approaches to technology transfer in this area.

Dalindyabo Shabalala from the Centre for International Environmental Law (CIEL) indicated that the discussion on transfer of climate change technology and IPRs cannot be dissociated from the wider issue of financing in the climate change negotiations. Maria Mendeluce, from the World Business Council for Sustainable Development (WBCSD) welcomed WIPO’s stepped up role in addressing IPRs issues in relation to climate change technologies in view of its expertise on IP matters.

Discussions at both Dialogues reflected the need for further evidence based analysis to achieve a greater understanding of the interface between patents, transfer of technology, and climate change technologies with a view to enhance policies and measures which are effective in contributing to the rapid diffusion of climate change technologies.

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ICTSD update

Activities on climate change, agriculture and trade

The global agricultural sector must meet three major tests in the 21st century: 1) it must adapt to climate change and, where possible, play a role in climate change mitigation; 2) it must provide sustainable global food security for a growing population, and 3) it must make good on its promise of poverty alleviation - since some 70 percent of the world's poorest people live in rural sectors and rely on agriculture. While there is currently movement in the right direction, if these three challenges are addressed separately, the chances of success will be reduced.

Focusing on the climate change challenge alone, for example, could have negative impacts for food security and poverty alleviation. It is crucial to identify and better understand the connections between these three sets of challenges in order to formulate the appropriate policy response to address them.

Among the important questions to be explored are:

- What will climate change mean for future agricultural production and, in turn, for international trade flows?
- Which types of agricultural policies and practices need to be pursued to achieve global food security? What role do such policies and practices play in climate change mitigation and adaptation?
- How can poor smallholder farmers achieve greater income and food security? What does climate change mitigation and adaptation mean in this context?

Recognising the need to combat these major challenges in a coordinated manner, ICTSD and the International Food and Agricultural Trade Policy Council (IPC) propose to create an interdisciplinary platform of climate change, agricultural, and trade experts to promote increased policy coherence, to ensure effective climate change mitigation and adaptation, food security and a more open and equitable global food system. The ICTSD-IPC initiative will convene throughout 2009 and beyond, and focus primarily on the UNFCCC negotiations.

As part of this initiative, ICTSD and IPC organised a preliminary expert meeting on "Climate Change - the Role of Food and Agricultural Trade" alongside the UN Conference on Climate Change in December 2008, in Poznan, Poland. The discussions demonstrated the need for a greater understanding of agricultural policy, food security - in particular for the world's most vulnerable populations - and trade policy within the climate change negotiations. A second dialogue on "Climate Change, Agriculture and Trade: Promoting Policy Coherence" was held alongside the UNFCCC negotiations in April 2009 in Bonn, Germany. Its objective was to discuss issues at the interface of climate change, agricultural policy and trade to assist the UNFCCC negotiators understand the linkages to agriculture and trade, and likewise, inform agricultural policy, trade policy experts and stakeholders about the policy inter-linkages between these three fields. The dialogue also sought to outline priorities for research and analysis.

In May 2009, the ICTSD-IPC initiative organised a third dialogue in Salzburg, Austria alongside the IPC's international seminar on Food and Environmental Security. The objective of this meeting was to explore additional areas at the nexus of climate change and agricultural trade policy. The meeting brought together high level experts such as former agriculture commissioner Franz Fischler and former chair of the WTO General Council Carlos Perez del Castillo as well as respected academics including IPCC authors, farmers, civil society and private sector representatives. Substantive discussions focused on issues such as environmental payment and other trade related measures in developed countries to mitigate GHG emissions from agriculture as well as private standards and the debate on food miles. The meeting also went one step further in identifying broad recommendations on how to address issues at the interface between agriculture trade and climate change, targeting both the UNFCCC process and WTO negotiations.

In addition to providing a platform for dialogue, the project will produce a series of issue papers based on the recommendations of the experts' group. The issue papers will be completed by the end of 2009.

This initiative is part of ICTSD's Global Platform on Climate Change, Trade Policies and Sustainable Energy.

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Material from the BioRes Review can be used in other publications with full academic citation.

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UPCOMING EVENTS

- 9-11 June, Jakarta, Indonesia. INTERNATIONAL WORKSHOP ON ADVANCED MATERIAL FOR NEW AND RENEWABLE ENERGY. Organised by the Research Center for Physics, Indonesian Institute of Sciences.
- 12-14 June, Basel, Switzerland. FOREST MOVEMENT EUROPE MEETING 2009. Organised by the Bruno Manser Fund and FERN.
- 16-18 June, Addis Ababa, Ethiopia. SECOND AFRICA BIOENERGY CONFERENCE AND EXPO.
- 17-19 June, Venice, Italy. 2009 INTERNATIONAL ENERGY WORKSHOP. Sponsored by the Euro-Mediterranean Centre on Climate Change (CMCC) and the International Centre for Climate Governance.
- 18 June, New York, US. UNGA INFORMAL THEMATIC DIALOGUE ON ENERGY EFFICIENCY, ENERGY CONSERVATION AND NEW AND RENEWABLE SOURCES OF ENERGY. Organised by the UN General Assembly.
- 22-24 June, Vienna, Austria. INTERNATIONAL ENERGY CONFERENCE 2009: TOWARDS AN INTEGRATED ENERGY AGENDA BEYOND 2020: SECURING SUSTAINABLE POLICIES AND INVESTMENTS. Co-organised by UNIDO, IIASA, the Austrian Development Cooperation and the Austrian Energy Agency.
- 24-27 June, Amsterdam, Netherlands. 17th ANNUAL CONFERENCE OF THE EUROPEAN ASSOCIATION OF ENVIRONMENTAL AND RESOURCE ECONOMISTS. Organised by the European Association of Environmental and Resource Economists (EAERE).
- 30 June, Geneva, Switzerland. TRADE AND DEVELOPMENT BOARD, FORTY-SEVENTH EXECUTIVE SESSION. Organised by the United Nations Conference on Trade and Development (UNCTAD).
- 13-14 July, Geneva, Switzerland. CONFERENCE ON INTELLECTUAL PROPERTY AND PUBLIC POLICY ISSUES. Organised by the World Intellectual Property Organisation (WIPO).
- 20-24 July, Vancouver, Canada. SUMMER INSTITUTE IN SUSTAINABILITY. Organised by the University of British Columbia and the University of Washington.
- 23 August, Nairobi, Kenya. SECOND WORLD CONGRESS ON AGROFORESTRY. Organised by ICRAF-The World Agroforestry Centre, in collaboration with UNEP and the Institute of Food and Agricultural Sciences (IFAS) of the University of Florida.
- 21-22 September, Venice, Italy. 11TH ANNUAL BIOECON CONFERENCE: ECONOMIC INSTRUMENTS TO ENHANCE THE CONSERVATION AND SUSTAINABLE USE OF BIODIVERSITY. Hosted by the Fondazione Eni Enrico Mattei.
- 9 October, Location: León, Mexico. GLOBAL RENEWABLE ENERGY FORUM 2009: SCALING UP RENEWABLE ENERGY. Co-organised by the Ministry of Energy of Mexico and the UN Industrial Development Organization (UNIDO).
- 12-14 November, Washington, US. STATE OF THE WORLD FORUM 2009 - MOBILIZING TO SAVE CIVILIZATION: A TEN YEAR PLAN TO ADDRESS CLIMATE CHANGE.

RESOURCES

ICTSD Resources

ADDRESSING THE INTERFACE BETWEEN PATENTS AND TECHNICAL STANDARDS IN INTERNATIONAL TRADE DISCUSSIONS. ICTSD Intellectual Property Programme Policy Brief No. 3 (March 2009). <http://ictsd.net/downloads/2009/03/policy-brief-3.pdf>.

CLIMATE CHANGE AND TRADE ON THE ROAD TO COPENHAGEN. ICTSD Programme on Trade and Environment Policy Discussion Paper (February 2009). http://ictsd.net/downloads/2009/02/brochure-copenhagen_web1.pdf.

BIOFUEL TRADE, PRODUCTION, AND SUSTAINABLE DEVELOPMENT. ICTSD Agriculture Programme Policy Discussion Paper (December 2008). <http://ictsd.net/downloads/2009/05/biofuelswebready.pdf>.

Other Resources

THE 3RD UNITED NATIONS WORLD WATER DEVELOPMENT REPORT: WATER IN A CHANGING WORLD (WWDR-3). By the UN Educational, Scientific and Cultural Organization (UNESCO) (2009). <http://www.unesco.org/water/wwap/wwdr/wwdr3/tableofcontents.shtml>.

MANAGING CHEMICALS FOR SUSTAINABLE DEVELOPMENT. United Nations Development Programme (April 2009). <http://www.energyandenvironment.undp.org/undp/indexAction.cfm?module=Library&action=GetFile&DocumentAttachmentID=2527>.

RIISING TEMPERATURES, RISING TENSIONS: CLIMATE CHANGE AND THE RISK OF VIOLENT CONFLICT IN THE MIDDLE EAST. By Oli Brown and Alec Crawford, International Institute for Sustainable Development (2009). http://www.iisd.org/pdf/2009/riising_temps_middle_east.pdf.

PREFERENTIAL TRADE AGREEMENTS AND EUROPEAN UNION IMPORTS OF APPLES, PEARS, AND GRAPES: AN APPLICATION OF THE GRAVITY MODEL USING MONTHLY DATA. By Paola Cardamone, AgFoodTrade (2009). http://www.agfoodtrade.eu/public-working-papers/ploneexfile.2009-02-09.6234373673/attachment_download/file.

SECURING A SUSTAINABLE FUTURE IN THE ARCTIC: ENGAGING AND TRAINING THE NEXT GENERATION OF NORTHERN LEADERS. By Carolee Buckler, Linda Wright, and Laura Normand, International Institute for Sustainable Development (2009). http://www.iisd.org/pdf/2009/securing_sustainable_future_arctic_sum.pdf.

GLOBAL TRENDS IN SUSTAINABLE ENERGY INVESTMENT 2009. United Nations Environment Programme (2009). http://www.unep.org/pdf/Global_trends_report_2009.pdf.

WASTE WITHOUT BORDERS IN THE EU? TRANSBOUNDARY SHIPMENTS OF WASTE. By the European Environment Agency (EEA) (4 March 2009). http://www.eea.europa.eu/publications/waste-without-borders-in-the-eu-transboundary-shipments-of-waste/at_download/file.

SUSTAINABLE AGRICULTURE AND FOOD SECURITY IN ASIA AND THE PACIFIC. By the UN Economic and Social Commission for Asia and the Pacific (April 2009). <http://unesap.org/65/documents/Theme-Study/st-escap-2535.pdf>.

CLIMATE AND DEVELOPMENT. By Richard J.T. Klein (2009). <http://www.earthscan.co.uk/?tabid=29957>.

BUILDING THE GREEN ECONOMY: A GUIDE TO THE PRACTICE OF SUSTAINABLE DEVELOPMENT. By Nikhil Chandavarkar (December 2008).