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THE CLIMATE AND TRADE RELATION: SOME ISSUES

Martin Khor

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SOUTH CENTRE

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THE SOUTH CENTRE

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The South Centre enjoys support and cooperation from the governments of the countries of the South and is in regular working contact with the Non-Aligned Movement and the Group of 77. The Centre's studies and position papers are prepared by drawing on the technical and intellectual capacities existing within South governments and institutions and among individuals of the South. Through working group sessions and wide consultations, which involve experts from different parts of the South, and sometimes from the North, common problems of the South are studied and experience and knowledge are shared.

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ACRONYMS

ASEAN	Association of Southeast Asian Nations
BAMs	Border Adjustment Measures
CFCs	Chlorofluorocarbons
CTE	Committee on Trade and Environment
EC	European Communities
EGSA	Environmental Goods and Services Agreement
ESTs	Environmentally-sound Technologies
ETS	Emission Trading System
EU	European Union
GATT	General Agreement on Tariffs and Trade
GHGs	Greenhouse Gases
iCAP	Investing in Climate Action and Protection Act
IMF	International Monetary Fund
IP	Intellectual Property
IPCC	Intergovernmental Panel on Climate Change
IPRs	Intellectual Property Rights
LDCs	Least Developed Countries
LED	Light Emitting Diode
MEAs	Multilateral Environment Agreements
MFN	Most Favoured Nation Principle
NGOs	Non-governmental Organisations
ODS	Ozone-depleting Substances
OECD	Organisation for Economic Cooperation and Development
PPM	Processes and Production Methods
PTI	Press Trust of India
R and D	Research and Development
SPS	Sanitary and Phytosanitary Agreement
TBT	Technical Barriers to Trade
TEDs	Turtle Excluder Device
TREMs	Trade-related Environmental Measures
TRIPS	Trade-related Aspects of Intellectual Property Rights
TWN	Third World Network
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
WTO	World Trade Organization
WWF	World Wildlife Fund

THE CLIMATE AND TRADE RELATION: SOME ISSUES[*]

I. INTRODUCTION

Climate change has now been widely recognized not only as the most important environmental problem but also a major development issue. One reason for this is that climate change poses systemic challenges. Temperature rise at such a significant rate as projected through current and future trends threatens both the ecosystem and the survival of humanity.

The extent of the environmental crisis induced by climate change has been confirmed by the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), which has provided the most comprehensive analysis of the serious and potentially catastrophic effects of climate change, especially if the average global temperature increases beyond 2 degrees Celsius above the pre-Industrial Revolution level. Meanwhile, the developmental effects of climate change have also been well analysed in the United Nations Development Programme (UNDP)'s Human Development Report 2007-2008, which describes climate change as the defining human development challenge of the twenty-first century. According to the report, failure to respond to this challenge will stall and then reverse international efforts to reduce poverty (UNDP, 2007).

The double challenge arising from climate change to both the environment and to human development requires that the global battle against climate change should address both these aspects. In this context, one of the important issues is the linkage between climate change policies and trade-related policies. This has become increasingly significant because in their attempts to address climate change, several developed countries are now considering the use of trade measures. This is usually portrayed as required on environmental grounds, but often the reasons are openly or indirectly also linked to grounds of maintaining or increasing "economic competitiveness."

Another "trade-related" issue (so related because this issue is now a component of the rules of the World Trade Organization) that is increasingly linked to climate change is intellectual property rights (IPRs). It is widely recognized that technology development and transfer is a crucial element required for worldwide mitigation of and adaptation to climate change. IPRs can have an important influence on technology issues, including through its connection to innovation as well as access to technology at affordable cost, especially by developing countries.

The aim of this paper is to examine some important aspects of the linkage between climate change and trade-related issues. In particular, the paper looks at developments in policies taken by governments and the inter-governmental processes to deal with the crisis in climate change, including within the international climate change regime, the United Nations Framework Convention on Climate Change (UNFCCC), and their inter-linkages with the multilateral trade regime, in particular the World Trade Organization (WTO).

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[*] This paper is written by Martin Khor, Executive Director of the South Centre.

The paper thus analyzes the climate-trade links in the context of both the climate and the trade regimes.

The issues examined include the past and emerging issues in the debate on trade and the environment (including climate change) in the WTO, including the concept of process and production methods (PPM), perspectives on unilateral trade measures on environmental grounds, liberalization of environmental goods, and intellectual property rights.

The paper also examines the evolving policies in developed countries on the treatment of imported products (including border adjustment measures) in the context of economic competitiveness concerns, and the perspective of developing countries on such policy measures.

It also analyses the link between IPRs, technology transfer and climate change, and describes the proposals put forward on these issues by developing countries in both the WTO and the UNFCCC.

The paper begins with a description of some relevant aspects of the climate regime (the UN Framework Convention on Climate Change), in Part II. Part III examines the interface of trade, environment and climate issues in the context of the WTO. Part IV describes evolving concepts and policies in the developed countries on dealing with climate and trade issues. Part V examines the issues on intellectual property and on technology transfer in the UNFCCC, focusing also on the proposals by developing countries.

II. KEY ASPECTS OF THE CLIMATE REGIME

Climate change has emerged as the key environmental issue, as well as a development issue. It is now widely accepted that unless drastic action is taken immediately, the world will experience serious and possibly catastrophic consequences.

Multilateral negotiations are taking place in an effort to reach agreement on the actions to be taken to counter climate change. These negotiations also cover the means by which developing countries can take actions, especially financial resources and technology. The major negotiating forum on climate is the UNFCCC. This convention and its Kyoto Protocol have several equity and development principles, particularly the principle of common but differentiated responsibilities. One of the major aspects is that although both developed and developing countries have obligations to take actions to deal with climate change, the nature of their obligations is different. All parties under the Convention agree to collect and submit data and formulate and implement mitigation and adaptation measures (UNFCCC Article 4.1). Further, the developed countries also agreed to commit themselves specifically to "adopt national policies and take corresponding measures on the mitigation of climate change" (Article 4.2).

The developed countries also committed themselves to provide financial resources and transfer technology to developing countries. Article 4.3 on commitment on financial resources says that developed countries shall provide new and additional financial resources to meet the agreed full costs of developing countries in preparing

their national communications, and meet the full incremental costs of implementing their obligations under Article 4.1. Article 4.4 commits developed countries to assist developing countries (including through financing) in adaptation activities. Article 4.5 on technology says that developed countries "shall take all practicable steps to promote, facilitate and finance, as appropriate, the transfer of, or access to, environmentally sound technologies and know-how to other Parties, particularly developing country Parties" and to also support the development and enhancement of endogenous capacities and technologies of developing countries.

Article 4.7 of UNFCCC says that the extent to which developing countries implement their commitments under the Convention will depend on the effective implementation by developed countries of their commitments related to financial resources and technology transfer, and will take fully into account that economic and social development and poverty eradication are the first and overriding priorities of developing countries.

Under the Kyoto Protocol (which was established in 1997), only developed country parties are obliged to make binding commitments to reduce their greenhouse gas emissions. The Kyoto Protocol mandates a first commitment period (of 2008-2012) for emission reduction for Annex I countries in Article 3.7. The Protocol contains specified amounts of reduction for each party before 2012 and collectively to levels of at least 5.2 per cent below the 1990 levels.

It also says that commitments for subsequent periods for Annex I parties shall be established by amending Annex B of the Kyoto Protocol (which contains specific reduction commitments of each developed-country party) (Article 3.9). Thus the Kyoto Protocol's first commitment period will end in 2012 and a second commitment period should start in 2013. Kyoto mandates further commitment periods after that. Therefore there is an in-built mechanism in the Protocol for the continuation of commitments of Annex I countries, which is beyond 2012 and which does not end, unless it is explicitly ended. The developing countries do not have to undertake legally binding emission reduction commitments under the Kyoto Protocol.

From the above brief account, it is clear that the UNFCCC and the Kyoto Protocol recognize the responsibility of developed countries for causing the crisis and their higher capacity level to resolve the crisis, and thus they have accepted the two main commitments of binding emission reduction targets and of assisting the developing countries with finance and technology. The developing countries are also obliged to collect data and undertake mitigation and adaptation measures. However, it was agreed they are not required to undertake binding reduction commitments, and the extent to which they undertake these measures depends on the extent to which developed countries keep their finance and technology commitment.

It is important to recognize that developed and developing countries are treated differently in the UNFCCC and in Kyoto Protocol, in terms of levels of responsibility, with developed countries having binding commitments, while developing countries have non-binding responsibilities which are also conditional on their obtaining adequate assistance. However the implementation of the developed countries' commitments towards developing countries has so far been dismal, with hardly any

progress on technology transfer, and very little funding. Their performance to date on emission reduction has also been disappointing.[1]

Within the UNFCCC itself, there are provisions guarding against trade protectionism. For example, Article 3.5 of the UNFCCC states that "Measures to combat climate change, including unilateral ones, should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade." This Article reflects the concerns of developing countries that trade measures not agreed to would be planned to be used against their exports on climate grounds. This Article now commits developed countries not to make use of such measures. It is an important reference point in the current discussion on trade and climate change.

At the UNFCCC's conference in Bali in December 2007, the Parties of the Convention agreed to launch a process "to enable the full, effective and sustained implementation of the Convention through long-term cooperative action." The elements of the Bali Action Plan include enhanced actions on adaptation, mitigation, technology, finance and a "shared vision." A working group on long term cooperative action is mandated to reach a decision in December 2009.

III. TRADE, ENVIRONMENT AND CLIMATE ISSUES IN THE WTO CONTEXT

A. INTRODUCTION

This section deals with the trade and climate linkage in the context of the framework of the WTO and the discussions on various issues on trade and environment that have taken place at the WTO, especially its Committee on Trade and Environment. There are several rules in the WTO that have an implication on the relation between trade and climate change, as well as measures relating to climate change that may be constrained by the rules of the WTO. The rules include those relating to tariffs, the non-discrimination principle, standards, subsidies, and intellectual property.

The topics covered in this section are the issue and debate on processes and production methods (PPMs); environmental exceptions in WTO rules; liberalization of environmental goods and services; and intellectual property.

B. THE PPM ISSUE AND THE DEBATE IN THE WTO

Just prior to the establishment of the WTO and in the few years after its establishment, there was a major debate inside and outside the WTO on the possible role of trade-related environment measures and in particular about the possible use of the concept of "processes and production methods (PPMs)." The PPM concept had been introduced by some Parties and by some non-governmental organisations (NGOs) as a means of distinguishing between products by the manner in which the

[1] As at 2005, 19 of the 40 Annex I parties to the UNFCCC had greenhouse gas (GHG) emissions above their 1990 levels. From 1990 to 2006, total GHG emissions from developed countries listed in Annex I declined by 4.7% but this decrease was largely due to the collapse in industrial activities of economies in transition. Excluding these countries, the emissions from developed countries rose by 9.9% between 1990 and 2006. (South Centre, 2009b)

products are made and the environmental effects (for example, the volume of pollution) arising from the production.

The WTO's non-discrimination principle states that a member shall not discriminate between "like products" from different trading partners, providing them equally with most favoured nation status (General Agreement on Tariffs and Trade (GATT) Article I); and between its own and like foreign products, thus giving them national treatment (GATT Article III). According to the national treatment principle, imported products "shall not be subject, directly or indirectly, to internal taxes or other internal charges of any kind in excess of those applied, directly or indirectly, to like domestic products" (GATT Article III:2). Thus the amount or rate of any taxes or charges on imports cannot be more than what is charged on "like" local products.

This raises the issue of what is a "like product" and the related issue of PPMs. A central point in the debate is whether the way in which a product is produced (i.e. non-product related processes and production methods) can be used as the basis of different treatment, for example to be subjected to an environment-related trade measure. Many developing countries are of the view that if two products are "like" because their physical characteristics are similar, they should be treated in a similar way, and that differences in the production processes or methods and the manner in which the production takes place (including the environmental aspects) would not make these products "unlike." Thus, it would be against the GATT rules to take a trade measure (such as an extra import duty) on a foreign-made product on the grounds that the production method is less environmentally sound.

The WTO secretariat, in a note on WTO rules and the environment in its website, seems to take the view that different methods used in production do not *per se* make two products "unlike." According to this explanatory note[2]: "An important question in relation to environmental measures is whether products may be treated differently because of the way in which they have been produced even if the production method used does not leave a trace in the final product, i.e. even if the physical characteristics of the final product remain identical (referred to as non-product related processes and production methods). When comparing two products, different processes or production methods (PPMs) used in the manufacture of such products do not *per se* render these products "unlike"."

The same WTO website note also remarks that the determination of the likeness of two types of a product (it provides an example of wood products from a sustainably grown forest and from a forest whose production method is unknown) may be particularly "challenging". It cites the conclusion of the Appellate Body (in the European Communities (EC) - Asbestos case) that the analysis of likeness between two products should be carried out on a case-by-case basis.

According to the WTO Secretariat, in WTO case law, four criteria have been used in determining whether products are "like":

(i) the physical properties of the products;

[2] World Trade Organization, "WTO rules and environment policies", 18 April 2008. Available from http://www.wto.org/english/tratop_e/envir_e/envt_rules_gatt_e.htm.

(ii) the extent to which the products are capable of serving the same or similar end - uses;
(iii) the extent to which consumers perceive and treat the products as alternative means of performing particular functions in order to satisfy a particular want or demand; and
(iv) the international classification of the products for tariff purposes.

In 1994, several NGOs published studies and engaged in dialogue with governments in the Organisation for Economic Co-operation and Development (OECD), proposing to amend GATT rules to enable WTO Members to use trade-related environmental measures (TREMs). A World Wildlife Fund (WWF) study cited cases where environmental protection measures could affect competitiveness of national business enterprises and thus would need TREMs to enable import restrictions based on PPMs, citing as an example the European Union's difficulties in imposing a carbon tax because of concerns over competitiveness of European industry being affected. It advocated bilateral or multilaterally designed incentive-based TREMs to promote internalizing the environmental costs of traded goods and setting a "fair price" for a traded product so that an exporting country does not have to degrade its environment to trade profitably. It advocated qualification of the GATT's most-favoured nation and national treatment principles, wherever they conflict with sustainable development objectives, to enable discrimination in trade and traded products (of domestic and foreign origin) on environmental grounds (Raghavan, 1994a).

The Third World Network (TWN), in response to the moves of some environmental groups and some developed country governments, published a paper arguing that the proposals to legitimize TREMs would add another burden of adjustment to the already-burdened South, and "could change the non-discrimination principles of the multilateral trading system and change the basic rules of the game and the conditions of competition under the guise of protecting the environment…In practice it will add additional burdens on the South (TWN, 1994). The paper pointed out that the three related concepts of PPMs, eco-dumping and internalization of costs, in the WTO context, would imply that if a country has lower environmental standards in an industry, the cost of the product is not internalized and the prices are too low and that country is practicing eco-dumping. Thus the importing country has the right to impose trade penalties such as countervailing duties. The paper described several examples of how these concepts would be difficult or impossible to be implemented and how they would unfairly be biased against the developing countries. "There is the danger, if not the likelihood, that through particular and narrow definitions of the trade-environment link, the powerful nations will try to shift the economic burden of ecological adjustment to the weaker parties in order to preserve and expand their own unsustainable consumption patterns," argued the paper. It suggested that the initiatives to introduce TREMs and legitimize PPMs in the WTO be abandoned. It proposed instead that any trade measures linked to the environment should be addressed by negotiations for an international treaty and any treaty containing obligations on developing countries must have provisions for technology transfer and financial resources as an integrated contractual obligation (TWN, 1994).

The PPM debate was taken up within the WTO in the Committee on Trade and Environment (CTE) in the run-up to the WTO's first Ministerial Conference in Singapore in December 1996. The PPM issue was especially prominent in the

discussion under the item environment measures with trade effects, especially eco-labeling (Shahin, 1997, pp. 18-28). The discussion focused on the possible inclusion of PPMs in the rules of the Agreement on Technical Barriers to Trade (TBT), which contains disciplines on technical regulations and standards which may not be more restrictive than necessary to fulfill a legitimate objective. The regulations and standards should also respect the non-discrimination principle and be based on international standards.

In the 1996 discussion, Canada proposed that the coverage and applicability of the TBT Agreement be clearly extended to cover measures based on non-product related PPMs and that the agreement should cover eco-labelling based on life-cycle analysis and on non-product related PPMs, with a gradual approach to introduce this. In contrast, several developing countries, including Egypt, India and the Association of South East Asian Nations (ASEAN) argued that the TBT Agreement does not cover non-related PPMs. They were of the view that agreeing to such a coverage would allow PPMs to enter the WTO through the back door. On the issue of the trade effects of eco-labelling, many developing countries expressed fears about the growing trend of producers or traders resorting to eco-labeling and that eco-labels could have trade effects if combined with disguised protectionism. According to a leading developing-country negotiator, the outcome of the CTE's negotiations, as reflected in the CTE's report to the Singapore Ministerial, showed that the balance had tilted towards the views of the developing countries, which feared the inclusion of PPMs in the WTO and the precedent it could provide for other topics such as the social clause in the WTO (Shahin, 1997, pp. 26-27).

Because of the stand of the developing countries in the early years of the WTO, the attempts by some groups and countries to legitimize non-product related PPMs in the WTO rules did not succeed, and the PPM issue lay dormant for some years. However, with the increasing interest in introducing trade measures linked to climate change issues, the PPM issue has sprung back to prominent life in recent years.

C. ENVIRONMENTAL EXCEPTION AND UNILATERALISM

A general exception to the normal GATT rules is in Article XX, that subject to the requirement that 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, nothing in the GATT agreement shall be construed to prevent the adoption or enforcement by any party of various listed measures. Two clauses cite measures linked to the environment: Clause (b) cites measures "necessary to protect human, animal or plant life or health" and Clause (g) cites measures "relating to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption."

If undertaken in a manner that meets certain conditions in the Article and in line with what is interpreted by the Appellate Body, the exception in Article XX allows members to violate basic GATT rules such as the non-discrimination principles and

the prohibition of quantitative restrictions.[3] As it is an exception clause, Article XX comes into play only once a measure is found to be inconsistent with GATT rules.

The Article XX exception provisions for the environment have become an important part of the currently intense discussions on whether trade measures (and in particular border adjustment measures) linked to climate objectives are compatible with WTO rules. The argument by several researchers and groups is that even if the measures are found incompatible with Articles I or III of GATT on non-discrimination, or Article XI on prohibition of quantitative restrictions, they could be compatible with Article XX: (b) or (g).

In this regard, an important case is the US-Shrimp dispute, in which the Appellate Body found that the Unites States was justified in discriminating between products on the basis of PPMs, on the basis of the environment exception in Article XX. The case was not in the context of GATT Articles I or III on non-discrimination, but Article XI which prohibits bans and other quantitative restrictions placed on imports. The case involved the action of the US to impose an import ban on shrimp harvested by methods (involving fishing nets and trawl vessels) that may incidentally result in the killing of sea turtles. Exporters were required to show that they use turtle exclusion devices or TEDs[4] or similar equipment, in order to avoid the ban. The Appellate Body found that the US prohibition on shrimps originating from countries that were not certified as using the TED was inconsistent with Article XI. However it also viewed the United States' measure as directly connected to the policy of conservation of sea turtles. The measure was thus considered to be provisionally justified under Article XX(g).[5]

The Article XX exception does not provide an automatic permission for WTO Members to undertake unilateral environment-related trade measures. It allows such measures only within the context of its preamble, and the framing of the two environment-related provisions.

The "chapeau" of Article XX states: "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."

Thus the trade measure in its design and application must not be a means of arbitrary and unjustifiable discrimination or a disguised restriction on international trade. According to Kommerskollegium (2009), Article XX cannot be invoked to justify a measure to offset competitive disadvantages for domestic industry as Article XX does not cater for economic arguments. "Current discussions, however, emphasise the competitiveness loss if carbon measures are applied only in countries like the EU and the US, though combining it with environmental reasons such as carbon leakage would result in increasing greenhouse gas emissions globally. In order to justify a

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[3] See further in this section of this paper for factors a dispute panel or Appellate Body are likely to consider in judging if a trade measure is consistent with Article XX.

[4] A TED (turtle excluder device) is a trapdoor installed inside a trawling net which allows shrimp to pass to the back of the net while directing sea turtles and other unintentionally caught large objects out of the net. (*WTO website note on WTO rules and environment policies*).

[5] *WTO website note on WTO rules and environment policies.*

measure under Article XX, the environmental argument needs to be made" (Kommerskollegium, 2009, p. 13).

Article XX(g) states: "relating to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption." In the context of climate change, the proponent of a trade measure has to show that the planet's atmosphere is an "exhaustible natural resource", that the import restrictions relate to the conservation of the planet's atmosphere and the restrictions are made effective in conjunction with restrictions on domestic production and consumption.

Article XX(b) refers to the exception for measures that are "necessary to protect human, animal or plant life or health." According to Kommerskollegium (2009), the challenge here is to show that the measure is "necessary." This is seen as more difficult to meet than the requirement of "relating to" in Article XX(g), and thus countries may be more likely to resort to Article XX(g). Decisions by the Appellate Body, including the Brazil-EU retreaded tyres case, have developed guidelines to determine "necessity." These guidelines include: (1) how trade restrictive is the challenged measure?; (2) what is the value of the objective that the measure is designed to protect?; and (3) what contribution does the measure make to the stated objective? (Kommerskollegium, 2009, p. 14).

According to Kommerskollegium (2009, pp. 15-16), the WTO's Appellate Body has developed criteria in the previous environmental disputes and is likely to refer to at least three elements in future disputes: (1) Does climate legistation take account of local conditions in foreign countries or does it essentially require that foreign countries have to adopt their own policies? (2) Before imposing the unilateral carbon legislation, did the imposing country engage in "serious, across-the-board negotiations with the objective of concluding bilateral or multilateral agreements" to address climate change?; and (3) Does the implementation and administration of climate legislation respect "basic fairness and due process"?

Kommerskollegium (2009, p. 16) concludes that to justify a measure under Article XX, the environmental argument would be decisive and the WTO is sensitive to uncovering measures that are allegedly for environmental reasons but in fact serve other interests such as protection of domestic producers.

According to Stilwell (2009a), Article XX has been interpreted by the Appellate Body to permit measures relating to the conservation of exhaustible natural resources that are not arbitrary and that take into account the conditions of exporting countries. In applying any such provisions, it seems likely, based on previous practice, that a WTO adjudicatory body could take into consideration a range of factors including:

- Whether the implementing country had made serious, good faith, across-the-board efforts to reach a negotiated solution with exporting countries in order to resolve issues relating to international competitiveness and/or related environmental issues before imposing unilateral measures (including, potentially, their good faith participation in relevant multilateral negotiations).

- The extent to which the measures reflect and take into account the different conditions which may occur in the territories of those other countries, and the comparability of efforts to work with those countries.
- The transparency and predictability of the process, the availability of review of decisions, the provision of formal, reasoned decisions in writing and other factors associated with due process.
- The relevant provisions of related international agreements – for example, the Climate Convention and Kyoto Protocol's provisions calling on developed countries to take a lead in addressing climate change, provide supportive measures such as technology transfer and financial assistance, and explicitly call for efforts to minimize adverse effects on international trade and the economic prospects of developing countries.

In the WTO's Committee on Trade and Environment in 1996, the issues of environmental exception were discussed under the item of the relation between multilateral environment agreements (MEAs) and the WTO. This discussion is significant in throwing light on the current and future discussions on this issue. There were several positions, as described by Shahin (1997). Firstly, the US argued that any trade measures (trade sanctions and restrictions, defying WTO rules if necessary) are justified and permissible to protect the environment that lie outside the country's jurisdiction. The EU wanted to amend the WTO rules to ensure there was no conflict between the trading regime and the MEAs. Both the US and EU wanted recourse to trade measures whose use in future should not be prejudiced. On the other hand developing countries wanted to ensure that recourse to trade measures should be part of an integral policy package and conditional on trade being the root cause of environmental degradation, while consistency of the measures with WTO rules should be fully respected. These differences resulted in a delicate balance between the developing countries' position that cooperation provisions of financial and technological transfers and capacity building are indispensable elements of a policy package within the MEAs, and the "possible" use of trade measures. Eventually the CTE in its report agreed that trade measures (provided they are based on the agreed-upon provisions -- "may" be needed in certain cases in the future (Shahin, 1997, p. 6).

On the issue of the scope of trade measures on environmental grounds, the US had in the early days of the WTO stood for unilateralism. In November 1994, at an environment sub-committee of the preparatory committee for the WTO, the US had argued that unilateral trade measures may be necessary for pursuing environmental policies. Several delegations criticized the US stand, stating that any unilateral trade restrictions would be contrary to the WTO's rights and obligations, and would also not contribute to environment protection but harm it (Raghavan, 1994b). In the CTE in 1996, the US pushed for language for continuing to use trade measures in the MEAs. Several other countries supported accommodating legitimate environmental concerns in the WTO but were against the use of the environment as a pretext for disguised protectionism or against allowing the use of extra-jurisdictional application of environmental laws. They wanted criteria that the trade measures be necessary and effective and non-discriminatory, but the US was opposed to this such criteria. Many developing countries felt that GATT Articles III and XX, together with the TBT and Sanitary and Phytosanitary (SPS) Agreements, were sufficient to accommodate

legitimate environmental measures and that unilateral action that went beyond what was permissible under GATT Article XX should be condemned. While the developing countries proposed language that GATT Article XX does not permit a member to impose unilateral trade restrictions that are inconsistent with WTO obligations, this was also opposed by the US and the final text in the CTE report was weak, only restating the commitment to Principle 12 of the Rio Declaration.

This background to the early discussion in the WTO on the environment exception clause in GATT and the role and dangers of unilateral action (using trade measures for environmental purposes) is significant as they have influenced the understanding of the issues in the WTO in its initial years and up to the present. These early discussions also throw light on the present and future discussions on these issues in the context of climate change.

D. ENVIRONMENTAL GOODS AND SERVICES

Another controversial issue is the 2001 Doha Ministerial mandate (under Article 31 (iii)) for negotiations on "the reduction or, as appropriate, elimination of tariff and non tariff barriers to environmental goods and services."

The discussion on this issue has taken place in the WTO's Committee on Trade and Environment (in Special Session, in reference to it being a Doha negotiating issue). The most significant proposal which directly relates to climate change was submitted by the US and EU in November 2007, on the eve of the UNFCCC's climate talks in Bali.[6] The joint proposal sought to liberalise trade in many "climate friendly" goods and services. It stated that "by making it cheaper and easier to trade in these goods and services the EU proposal would help spread green technologies globally, especially to industrialising developing countries." The proposal was also sent as "an important part of the EU and US' contribution to the Bali Trade Minister's summit on climate change."

The EU and the US proposal is a two tier process as part of a final Doha agreement.

- First, agreement to liberalise trade in at least 43 goods with clear environmental benefits drawn from a World Bank list including solar panels and wind mill turbines.
- Second, a far-reaching Environmental Goods and Services Agreement (EGSA) to be negotiated by WTO Members, which would foresee further binding commitments to eliminate tariffs and non-tariff barriers in trade in green technologies. In services, highly ambitious and comprehensive commitments would be undertaken in services that address environmental and climate change challenges such as waste management. Developing countries would be asked to make contributions proportionate to their level of development.

The US-EU proposal has been criticized by developing countries, especially India and Brazil, in the WTO, for being an expanded version of earlier proposals that are more

[6] European Commission, "EU and US propose new WTO green trade agreement for Doha Round", Statement on 30 Nov 2007.

about the market-access ambitions of the two major countries and less about assisting developing countries to tackle climate change. They pointed out that there are double standards in the choice of climate-friendly products on the list, as the list reflects products of export interest to developed countries, whereas developing countries' products, such as bio-fuels, which are of major interest to Brazil, are absent.

According to South Centre[7] (2007), the mercantilist interest underlying the proposal is clear in that:

- The basis for the US-EU proposal are their existing market access-oriented proposals that have already been rejected by developing countries;

- It completely lacks any reflection of developing country proposals on how to ensure a development-oriented outcome; and

- It does not make suggestions about how to solve the technical difficulties that have discredited the list-based approach to identifying environmental goods at the WTO. For example, these products could serve both environmental and non-environmental purposes.[8]

On environmental services, the list in the proposal covers a wide range, including sensitive sectors, since many of them are public utilities. The sectors include sewerage collection (CPC 9402), sanitation and similar services (CPC 9403), refuse disposal services (CPC 9402), and others.

On "environmental goods", the US-EU argument that the tariff elimination would benefit developing countries as the products will sell at the cheapest prices runs into the same type of criticism regarding proposals for import liberalization in food products. While some organisations such as the World Bank and the International Monetary Fund (IMF) have argued that reducing tariffs to low levels or zero in agriculture products would make food more cheaply available to consumers, many developing countries in the WTO agriculture negotiations of the Doha Work Programme (especially the Group of 33) have taken the strong position that they be allowed to designate "special products" which would be subjected to zero or significantly lower tariff reductions on the ground of food security, farmers' livelihoods and rural development.

In the same line, developing countries can have more policy space if they do not lower the tariffs of "environmental goods" to low levels or zero as part of binding WTO commitments. They then have options to develop their own industries and products while maintaining tariffs that are appropriate to this objective. Or else, they have the option to liberalise the applied tariffs on certain environment-related products and later increase the tariffs of those products which are selected for local production; however, they can do this only if they do not presently bind the tariffs of

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[7] South Centre, "Repackaging old positions: the "bold new" US_EU proposal on trade liberalisation of climate-friendly goods and services", Informal Note, Geneva, 5 Dec. 2007.

[8] These products are often referred to as products having "dual use" or "multiple end use" and how to treat them is known as the dual use or multiple end use challenge.

these products at zero or very low levels. Eventually developing countries would like to be able to produce their own climate-friendly products instead of importing them. The acceleration of liberalization of the tariffs would reduce these policy options. As the South Centre (2007) put it, the market opening by developing countries to developed countries' environmental goods and services through tariff and non-tariff barrier elimination could indeed lead to a situation of technology-dependency – in which developed countries become the sole providers of such goods and services. A more appropriate approach would require the promotion of larger policy measures designed to support developing countries' ability to adopt, adapt, and innovate on such goods and services (such as flexibilities in innovation and intellectual property regimes, non-commercial technology and skills transfers, support to research and education, support to infrastructural development) as well as develop their own environmental goods and services in order to support economic development and diversification efforts. Such an approach would also need to be accompanied by adequate financing facilities, to ensure that trade liberalization, modernization or innovation effectively materialize. The US-EU proposal does not even acknowledge the need for such other policy measures (South Centre, 2007).

Another concern of many developing countries is that some developed countries have been subsidising and plan to continue or expand their subsidies for the research and development of environmentally sound (and especially climate-related) technologies. This subsidisation puts developing countries at a disadvantage, especially since they lack the financial resources to match the developed countries' subsidies. Given this unfair imbalance in subsidies, the developing countries and their firms would be in an even worse competitive situation if they have to lower their tariffs on environmental products.

At the Trade Ministers' meeting on the sidelines of the UNFCCC climate conference in Bali in December 2007, there were reportedly sharp differences between the Brazilian Foreign Minister Celso Amorim and the US Trade Representative Susan Schwab on the issue of liberalization of environmental goods and services. These differences came out in the open at a post-Conference press conference, with Schwab saying that the elimination of tariffs on products like hydrogen fuel cells would increase trade and the use of clean technologies, and Amorim criticising the US for its list of environmental products for tariff elimination. Amorim complained that the list was incomplete and won't do much for climate change, that it was not proven what the effects of the good on climate change are, and that it was unfortunate that ethanol was excluded from the list even though Brazil had used it for 30 years. He said it was "very strange" that this product with a proven record was not on the list, if the real objective is climate change.[9]

E. IPRs And Environment Related Issues In the WTO

The intellectual property issue in the WTO has a significant bearing on the discussion on the development and transfer of climate-friendly technologies and products.

[9] Martin Khor, "Trade Ministers propose more intensive trade-climate engagement",*TWN Bali News Updates and Climate Briefings*, 2008.

The IPR-environment relation was recognized as an important item in the agenda of the WTO's Committee on Trade and Environment. In its early days, developing countries, particularly India, highlighted the effects that IPRs and the (Trade-related Aspects of Intellectual Property Rights) TRIPS Agreement have on environmental objectives.

At the WTO's Committee on Trade and Environment in March 1996, India presented a paper that usefully laid out a framework for discussing the TRIPS Agreement and technologies that are either harmful to or beneficial for the environment.

For environmentally beneficial technologies, to encourage their global use, India proposed three points:

(i) To allow free production and use of such technologies as are essential to safeguard or improve the environment, members may have to exclude these technologies from patentability. Such an exclusion is not incompatible with TRIPS and may have to be incorporated through a suitable amendment.

(ii) For currently patented technologies, members may revoke patents already granted, if this is done in consonance with the Paris Convention and is subject to judicial review;

(iii) To encourage the use of environmentally beneficial technology, members should be allowed to reduce the term of patent protection from the present minimum of 20 years to, say, 10 years, "so as to allow free access to environmentally-beneficial technologies within a shorter period."

The TRIPS Agreement has several references and provisions that deal with technology transfer. Article 7, which contains the objectives of the agreement, states: "The protection and enforcement of intellectual property rights should contribute to the promotion of technological innovation and to the transfer and dissemination of technology…" Article 8.2, on principles, states: "Appropriate measures, provided that they are consistent with the provisions of this Agreement, may be needed to prevent the abuse of intellectual property rights by right holders or the resort to practices which unreasonably restrain trade or adversely affect the international transfer of technology."

Article 66.2 states that developed country Members shall provide incentives to enterprises and institutions in their territories to promote and encourage technology transfer to least-developed country Members in order to enable them to create a sound and viable technological base. There is also a process that is on-going for the review of Article 66.2.

Despite these provisions, little or nothing has been done by developed countries to either provide concessions to developing countries or provide incentives to (or impose obligations on) their enterprises and institutions to disseminate or transfer technology to developing countries.

In a paper in 2000 to the WTO's General Council and to the TRIPS Council, the Indian delegation stated: "There has been little effort to implement this provision (Article 66.2), raising doubts about the effectiveness of the Agreement to facilitate technology transfers" (India, 2000a). India also recalled an earlier proposal it had made to the Committee on Trade and Environment, "that owners of environmentally sound technology and products shall sell such technologies and products at fair and most favourable terms and conditions upon demand to any interested party which has an obligation to adopt these under national law of another country or under international law." Developing countries access technologies usually through licences and technology transfer agreements. The paper points out that technology seekers in developing countries face serious difficulties in their commercial dealings with technology holders in developed countries. These difficulties include: (i) those arising from imperfections of the market for technology; (ii) those arising from lack of experience and skill of enterprises and institutions in developing countries in concluding legal arrangements for technology acquisition; (iii) government practices (legislative and administrative) in developed and developing countries which influence the implementation of national policies and procedures designed to encourage the flow of technology to, and its acquisition by, developing countries.

For the TRIPS provisions on technology transfer to be implemented, these difficulties have to be addressed. To overcome some of the difficulties, developing countries would need to build suitable safeguards in their domestic IPRs laws. Also, commercially viable mechanisms need to be established to address the problems and needs of enterprises or institutions in developing countries that want to acquire technology but find its cost prohibitive due to economies of scale and other reasons. Moreover, the high cost of technology makes it difficult for smaller and poorer developing countries to acquire technology on commercial terms. They can only acquire the needed technology through government-to-government negotiations and with financial aid provided either by developed countries' governments and other institutions, or by inter-governmental organisations. Another problem is the denial of dual-use technologies, even on a commercial basis, to developing countries; under this guise, a variety of technologies and products required for their growth process is being denied to developing countries (India, 2000a, pp. 2-3).

In order that the TRIPS objectives, principles and provisions on technology transfer are made effective, a review of how to operationalise the relevant provisions of the TRIPS Agreement should be carried out. The obligations on developed countries to provide incentives to or oblige the enterprises or other institutions in their countries to transfer technology to developing countries could be made stronger, with regular reviews of the implementation. Relaxation of the standards of protection for environmentally sound technology should also be done, including through amendments to the agreement. Progress towards the goal of technology transfer is essential in order for there not to be a further loss of confidence in the TRIPS Agreement's purported objective of technology dissemination and transfer.

The discussion in the WTO is part of a wider international debate, including at the United Nations Conference on Environment and Development in Rio in 1992 and

after.[10] Proponents of a strict IPRs regime have argued that it would encourage innovation and contribute to technology transfer. Opponents point out that granting exclusive rights to IPRs holders would enable them to monopolise the technology, hinder research by other parties and prevent the use by and spread to other parties. In international policy fora, developed countries have been taking the pro-IPRs position whilst developing countries have generally raised concerns about the negative effects of a strict IPRs regime on technology transfer.

In relation to environmentally-sound technologies (ESTs), there is a strong case that IPRs hinder the ability of developing countries to attain EST as well as new technologies in general. To begin with, the great majority of patents worldwide are held by companies based in North America, Western Europe or Japan. In 1977-2000, ten developed countries accounted for 94 per cent of the patents granted in the United States. The ten countries also accounted for 84 per cent of global R and D expenditure and 91 per cent of the global cross-border royalties and technology licence fees (or a total of US$80 billion) in 1997[11]. In climate-related technologies, the developed countries also have an overwhelming share of patents worldwide. In 2005, the EU countries held 36.7 per cent of patents linked to renewable energy, with the US holding 20.2 per cent and Japan 19.8 per cent, while China held 2.9 per cent and Korea 2.3 per cent. (Shashikant, 2009b). Serious concerns have also been expressed over the monopoly by a few companies over patents on climate-related genes in plants. According to ETC (2008), at least five US and European major companies have filed 532 patent applications (in 55 patent families) on "climate ready" genes at patent offices worldwide, including in developing countries.

There are several ways in which a strong IPRs regime can hinder access of developing countries to technology, and transfer to developing countries of technology (including EST).

Firstly, a strict IPRs regime can discourage research and innovation by locals in a developing country. Where most patents in the country are held by foreign inventors or corporations, local R and D can be stifled since the monopoly rights conferred by patents could restrict the research by local researchers.

Secondly, a strict IPRs regime makes it difficult for local firms or individual researchers to develop or make use of patented technology, as this could be prohibited or expensive.

Thirdly, should a local firm wish to "legally" make use of patented technology, it would usually have to pay significant amounts in royalty or licence fees. TRIPS increases the leverage of technology suppliers to charge a higher price for their technology. Many firms in developing countries may not be able to afford the cost. Even if they could, the additional high cost could make their products unviable.

Fourthly, even if a local firm is willing to pay the commercial rate for the use of patented technology, the patent holder can withhold permission to the firm or impose

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[10] Martin Khor, *Intellectual Property, Biodiversity and Sustainable Development: Resolving the Difficult Issues* (London, United Kingdom; New York, United States of America; Penang, Malaysia, Zed Books Ltd.; Third World Network, 2006).

[11] Cited in Shashikant 2009b.

onerous conditions, thus making it impossible or extremely difficult for the technology to be used by the firm.

A well-documented case of IPRs being a barrier to transfer of climate technology is the difficulties of firms in India and Korea to obtain the rights to producing substitutes for chlorofluorocarbons (CFCs), chemicals used in industrial processes as a coolant, which damage the atmosphere's ozone layer. This hinders their ability to meet commitments under the Montreal Protocol which tackles ozone-layer loss by phasing out the use of CFCs and other ozone-damaging substances by certain target dates.

A study of the effect of IPRs on technology transfer in the case of India in the context of the Montreal Protocol has been conducted by Watal (1998). She points out that technology-transfer provisions in the Montreal Protocol are particularly relevant for developing countries which are producers of ozone-depleting substances (ODS), such as India, Brazil, China, South Korea and Mexico. In India, Korea and China, such production is dominated by local-owned firms, for which the access to ozone-friendly technology on affordable terms has become a central issue of concern.

The study concludes that: "Efforts at acquiring substitute technology have not been successful as the technologies are covered by IPRs and are inaccessible either on account of the high price quoted by the technology suppliers and/or due to the conditions laid down by the suppliers. This would require domestically owned firms to give up their majority equity holding through joint ventures or to agree to export restrictions in order to gain access to the alternative technology."

Another study that also reviewed transfer of technologies for substitutes for ozone-damaging chemicals under the Montreal Protocol has provided details for some cases in which technology transfer to developing countries' firms was hindered by either high prices or other unacceptable conditions imposed by companies holding patents on the chemical substitutes onto companies in developing countries that wanted a licence to manufacture the substitutes[12]. Examples include:

(a) The case of HFC-134a, a chemical used to replace harmful CFC in refrigeration. When Indian companies requested a licence from a US company owning the patent for HFC-134a, in order to manufacture the chemical, they were asked to pay a very high sum (US$25 million) which was far above the normal level, or to allow the US company to own a majority equity stake in a joint venture and with export restrictions on the chemical produced in India; both options were unacceptable to the Indian producers.

(b) Korean firms also faced difficulties when they wanted to replace CFCs with acceptable substitutes HFC-134a and HCFC-141b, which had been patented by foreign companies in Korea. "South Korean firms are of the opinion that the concession fees demanded by technology owners represent a lack of intention to transfer the alternative technology." (Anderson et al., 2007, pp. 262-265)

[12] Reference to these cases are in Martin Khor (2008a), "Note on access to technology, IPR and climate change".

(c) The case of HFC-227ea: This chemical (known also as FM-200) is a substitute for halon-1301 for fire protection applications. The US owner of FM-200 patent requires that licenced fire protection systems satisfy certain design and inspection requirements and only three enterprises (in US, United Kingdom, Australia) have satisfied the approvals. The patent owner offered joint ventures with majority share holding but do not want to licence the technology to wholly locally owned firms, and thus Indian firms are unable to avail themselves to this product (Anderson, 2007, p. 265).

(d) Many of the technology agreements between Korean firms and their partners in Japan and the US contain restrictions such as they are not allowed to consign to a third party, to export, and that the improved technologies should be shared. (Anderson, 2007)

Some recent studies that analysed specific sectors of climate related technologies have also pointed out the potential for IPR protection for becoming a barrier to technology transfer. The IP holder can prevent access to the protected technology and know-how and thus prevent other firms from imitating the technology or innovating on the basis of new technologies (Ockwell et al., 2007, p. 40).[13]

In a study on light emitting diode (LED) lighting technology and the barriers faced by India on obtaining such technology, Ockwell et al. (2007) concludes that IPR is a barrier because LED is a highly protected technology and each of the various processes in manufacturing the LED chips is patented and requires huge investment. The study concludes that at present the cost of chip manufacturing and resolving IP issues is substantially high compared to importing the chips. The study also indicates significant IPR issues faced by Indian manufacturers in biomass technology and in manufacturing hybrid vehicles since there are many patents associated with the equipment and technologies.

A study by Barton (2007) on three sectors (solar photovoltaic, biofuels and wind technology) found that despite patents being prevalent in these sectors, competition between the various types of energy kept prices and costs relatively low. However his study did not rule out IPRs being a possible barrier, and he warns of "serious plausible patent issues likely to arise from the new technologies" and the risk of broad patents which may complicate the development of new, more efficient or less expensive technologies, as well as anti-competitive practices if the small number of suppliers cooperate to violate competition-law principles.

Proponents of a strong IP regime have argued that patents boost technology transfer because the patent applicants have to disclose information on their claimed invention when submitting their application. However in reality, there are many problems with this, such as that the patent agents usually avoid including information that enable competitors to exploit the invention on patent expiry; the applicant also often omits information that allow reproduction of all embodiments; and technicians in

[13] This and the following survey of recent literature on climate technology and IPRs is based on Shashikant 2009b (pp. 29-31).

developing countries are often without the experience needed to work the disclosed patent specifications. Moreover, during the term of the patent, the patented invention cannot be exploited by others (unless permission is obtained from the patent holder) even if the information is available (Shashikant, 2009b, p. 33).

The argument that patent protection is essential for innovation to take place is also a topic of debate. The link between patents and innovation depends on many conditions, including the existence of significant markets, sufficient capital, qualified personnel and a solid scientific base open to collaboration with industry. Even when such conditions are met, IP may not promote innovation. A review of 23 empirical studies found weak or no evidence that strengthening patent protection increased innovation, although it increased the number of patent applications (Shashikant, 2009b, p. 34). There is also an increasing counter-argument that too strong an IP system curbs innovation because it hinders scientists and other firms from using the patented technology as the basis for innovation and technological advance.

In Part V, proposals are given on dealing with the IPR and technology issues relating to climate change.

IV. CLIMATE AND TRADE ISSUES: EVOLVING CONCEPTS AND PROPOSALS IN DEVELOPED COUNTRIES AND RESPONSES FROM DEVELOPING COUNTRIES

Many developed countries are pressing for "competitiveness" issues to be addressed in the UNFCCC, and it can also be anticipated that some developed countries may revive the old debate in WTO about competitiveness and unilateral trade measures. Some of them have also discussed or are preparing unilateral trade measures. In particular, the United States Congress is contemplating various domestic climate bills, which contain a section on border tax adjustment that is to accompany a domestic cap-and-trade system to curb emissions.

The argument of the "competitiveness" advocates is that if their industries or companies have to incur additional cost to address climate concerns (for example, through having to meet national carbon standards or pay carbon permits to exceed a standard), they would unfairly be at a cost-competitive disadvantage vis-à-vis companies in another country that does not have to comply with similar standards.

Moreover, the country having such climate measures may see some of its companies and industries shift to other countries that do not have such measures, and continue to adopt polluting practices; thus there is no net decrease in GHG emission. This process is often termed as "carbon leakage"[14].

To maintain what they consider a level playing field, the developed countries are planning or seeking to establish a policy and eventual legislative framework to enable

[14] "Carbon leakage" is a term often used in discussions, in describing how when industries move from a country that has emission caps (usually taken to be a developed country) to a country that does not have caps (usually taken to be a developing country), there may be no significant change in overall greenhouse gas emissions, as the products will still be produced and exported to the developed country. However the developed country's emissions will go down as the associated emissions will now occur outside its borders in a developing country.

their undertaking trade-related measures on the products of the countries that either do not have climate measures similar to their (such as a cap and trade system) or that do not comply with the standards set for their nationally-based firms and industries.

Since developing countries do not have to undertake binding GHG reduction commitments at the UNFCCC, and since most of them have not introduced cap-and-trade measures, they are seen as the potential targets of these trade measures. In effect the trade measures may become instruments to have the developing countries comply with climate-related disciplines such as GHG emission reductions.

These unilateral actions can thus be expected to meet with strong opposition from developing countries in general. Due to the countries' lack of technological capacity and finance, their industries do not have the means to match the emission standards of developed countries or the performance of the latter's firms. The developed countries have also not met their UNFCCC commitment to provide the finance and technology required by developing countries. Moreover, placing a tax (in the form of purchase of emission certificates) on developing countries' imported products is against the spirit, principles and provisions of the UNFCCC and Kyoto Protocol. These include the central principle of common but differentiated responsibilities, which recognizes that developing countries do not have to undertake binding emission-reduction commitments and that developed countries have commitments on transfer of financial resources and technology to developing countries. The plans for the use of trade measures is also having a dampening impact on the current global climate negotiations, with developing countries expressing serious concerns that the Convention and its principles can be so easily circumvented by the use of such unilateral measures.

As discussed in Part III.C, unilateral trade measures for environment aims in general and for climate change have long been opposed in the WTO by developing countries, which consider that such unilateral actions are in violation of the WTO rules.

Stilwell (2009a) provides the following useful list of trade-related measures that governments may be tempted to impose, under pressure from domestic industries or organized labour, as part of their climate strategies:

- *Punitive tariffs or quantitative* measures could be imposed to ban or limit market access for products that are seen as harming the climate or failing to internalize the costs of climate-related environmental measures.
- *Anti-dumping duties* could be applied to the exports of foreign producers drawing on the argument that their goods that are produced in a manner that does not internalize the full (carbon-related) costs of their production, are exported at below their normal value and cause material injury to competing domestic industries. This seems to be the basis of "environmental dumping" arguments.
- *Countervailing measures or "Anti-subsidy duties"* could also be applied drawing on the argument that the failure by a government to impose suitable regulations, carbon taxes or carbon cap-and-trade systems constitutes a financial contribution that confers a benefit on

industries or regions which causes an "injury", "serious prejudice" or a "nullification of benefits" expected from the GATT.

- *Border adjustment measure* linked to a domestic regulation or system that applies equally to foreign and domestic products. Such a border adjustment measure could include the application of domestic carbon taxes to imported products or require the purchase of domestic carbon credits or other forms of emission allowances as a condition of entry into the market.
- *Standards and domestic regulations* could be used to increase barriers to trade in products from developing countries that do not meet energy- or carbon-efficiency standards imposed nationally, or agreed through regional or international processes (including a sector-based agreement).

One or the other of the above measures have been mentioned as possible actions that could or should be taken, by some political leaders of developed countries, or by negotiators, parliamentarians, trade unions, NGOs and scholars. The measure that was originally proposed in the mid-1990s was the imposition of antidumping duties (on the ground that the imports do not internalize the full production cost and that this constitutes environmental dumping) and this had been rejected by developing countries, as it involves the use of processes and production methods (PPM) which in their view is not acceptable in the WTO's concept of "like products." Some politicians are however still proposing the imposition of additional duties on imports whose inputed carbon content exceeds certain levels.

At present, the most discussed option is the "border adjustment measure", with the variant that an importer of goods that exceed a carbon dioxide maximum level will have to pay for emission permits, similar to the permits that domestic companies have to buy for exceeding the emission maximum level. According to its proponents, this option is more likely to meet the legal test of standing a fair chance of being found to be "WTO compatible." However, whether it is WTO compatible is the subject of great dispute.

In Europe, political leaders have made bold statements, threatening the use of sanctions on imports, on climate grounds. In October 2007, the French President Nicolas Sarkozy said in a speech in France that the EU must examine the possibility of "taxing products imported from countries that do not comply with the Kyoto protocol. We have imposed environmental standards on our producers. It is not normal that their competitors should be completely exempted…Environmental dumping is not fair. It is a European issue that we must raise" (Sarkozy, 2007).

In March 2008, the EU Commission President Jose Manuel Barroso said the EU could take protective measures sector by sector to safeguard European production of cement and steel. "We do not want to put our energy-intensive industries in a situation of disadvantage in competition terms, that is why we will have measures that we are ready to take if there is not a global climate agreement," he told The Times newspaper (13 March 2008). "We want a binding decision now that we will take measures to protect these industries in 2012 in case there is not agreement. It would be completely foolish for the EU to export the pollution and the jobs because globally the effects on climate change will be just the same, only we lose the jobs and our industry."

The European Commission, in its climate and energy package released in December 2008, states that "energy-intensive industries which are determined to be exposed to significant risk of carbon leakage could receive a higher amount of free allocation or an effective carbon equalization scheme could be introduced with a view of putting EU and non-EU producers on a comparable footing." This package includes a scenario in which importers are required to purchase emission allowances[15].

According to Kommerskollegium (2009, p. 6), the EU is currently considering the inclusion of a requirement that importers of carbon-intensive products buy carbon allocations in a future amendment of the European emission trading system (ETS). The initial reason for this was the concern that the US had rejected the Kyoto Protocol which raised concerns that domestic industries would lose competitiveness, a concern that increased when the ETS expanded in scope and coverage. Some European countries argue that carbon taxes be imposed on products of countries that do not have comparable domestic programmes for climate mitigation. The EC Regulation 2003/87/EC currently in force does not contain such a trade measure. As an alternative, industries may be provided free emission allocations to address competitiveness and carbon leakage concerns, depending on the degree to which they are vulnerable. However, the EU is considering a border carbon adjustment for the most vulnerable sectors, if a suitable international climate agreement is not reached. According to EU officials, a decision on these measures will not be taken before the Copenhagen conference as this may threaten the negotiations.[16]

In the United States, several climate-related bills were introduced in the Congress in the recent years, and a common feature is the inclusion of a border adjustment mechanism, in which importers will have to purchase "international reserve allowances" to cover the cost of emissions in the imported products. In June 2009, the House of Representatives passed the Waxman-Markey bill. However, the US Senate has not yet passed its own version of the bill.

Below is an account of the elements of various Congress bills, focusing on the border adjustment aspects:

- One of the best known of the earlier bills is the Warner-Libermann bill. In October 2007, Senators John Warner and Joseph Libermann, introduced America's Climate Security Act 2007. Its main feature is the capping of the amount of emissions and allowing emitters to buy and sell emission credits. The bill contains provisions that require importers of energy-intensive products from countries that lack emission-reduction measures to purchase emission allowances. The importers would buy permits to meet the costs of the GHGs emitted during the production of the imported products. The bill was discussed on the floor of the Senate but failed to get the necessary support in 2008.

[15] This part of the EC package is reported in Meyer-Ohlendorf and Gerstetter (2009, p. 27).

[16] This insight into the European Union thinking on border adjustment measures is provided by officials of the Swedish National Board of Trade and published in Kommerskollegium (2009).

- A later bill was introduced by Democrat Congressmen Edward Markey, known as iCAP (The Investing in Climate Action and Protection Act) of 2008. There is a trade component in Subtitle G (on pages 86-100) of the draft bill. According to the Executive Summary, one of the principles of the bill is to "include policies that will encourage major emitting developing countries, like China and India, to take comparable action to reduce global warming pollution to protect the competitiveness of US industry." It further explains that under the iCAP Act, developing countries that take comparable action to reduce global warming pollution will have access to funding from the International Clean Technology Fund and will be allowed to sell 'offset credits' into the U.S. market. Developing countries that carry out programmes to reduce emissions from deforestation will be eligible for assistance from an International Forest Protection Fund. If a country fails to take comparable action by 2020, "importers of energy-intensive primary goods (e.g. iron and steel, aluminium, cement, bulk glass and paper) from that country will have to purchase special reserve allowances to account for pollution generated in the production of such goods. Until 2020, U.S. manufacturers of competing primary goods will be given free allowances to prevent loss of jobs or 'leakage' of emissions due to international competition."

- The Democrat Congressman, Lloyd Dogget, who is a member of the House Ways and Means Committee, introduced another draft bill, the Climate MATTERS (Market, Auction, Trust & Trade Emissions Reduction System) Act of 2008. There is a trade component in Subtitle B on International Reserve Allocation on pages 15-50. A "Detailed Summary" of the draft Act indicates that the bill would create a "level playing field for American workers". It explains that beginning in 2015, importers of certain carbon-intensive goods from countries without comparable emissions limits will be required to purchase International Reserve Allowances to cover the emissions resulting from the production of those goods. Goods subject to this allowance requirement include primary goods such as iron, steel, cement and paper and other manufactured items for consumption. Countries with *de minimis* greenhouse gas emissions and the least developed countries are excluded from the international reserve allowance requirements and funds from the purchase of International Reserve Allowances would go to mitigate the effect of climate change in disadvantaged communities in foreign countries.

- The Democrat Congressman John Dingell, former Chair of the House Committee on Energy and Commerce, also introduced a discussion draft bill. Part G is on International Reserve Allowance Program (pages 216-261) and the executive summary says with regards to "international linkages" that: "To avoid jobs and emissions moving overseas as a result of mandatory U.S. climate change program, the discussion draft relies on various combinations of allocations to industry and border adjustments for carbon-intensive products."

- In June 2009, the US House of Representatives passed the American Clean Energy and Security Act of 2009 (also known as the Waxman-Markey bill, named after the two Congressmen who proposed the bill, Henry Waxman and Edward Markey).[17] The bill introduces a cap-and-trade system for the United States, in which producers will have to purchase emission allowances for exceeding certain emission limits. The bill also obliges the US President to place a charge on importers of certain products that come from many developing countries by 2020. Under the bill, the import measures will be automatically applied, unless the President declares that the measures are against the national economic interests, and Congress approves this declaration.

  The importers will have to buy "allowances" for the emissions of the products they bring into the country. In effect, this is like putting an extra tax or duty on the developing countries' goods, and the rate may depend on how much carbon dioxide is emitted during the making of these products. The bill's advocates say this is needed so that US domestic firms, which will also have to pay for emissions allowances, can maintain their competitiveness vis-à-vis imports.

  The law will limit the total level of emissions for the country. Importers of goods from countries that have not undertaken emission reduction commitments as stringent as the US in an international agreement (or that do not meet two other criteria) will have to purchase "international reserve allowances".

Since other developed countries are obliged to cap their emissions at a level still to be negotiated, the US-proposed import measure will apply only or mainly to developing countries. Least developed countries are exempted, as are also those developing countries accounting for a small share of the total emissions. This means that middle-income developing countries and those with large populations will be affected. Importers of their heavily-traded energy-intensive products will have to buy emissions allowances, a measure that will raise the prices of the imports, which could affect their sales in the US.

The products to be subjected to this new import charge are expected to include chemicals, iron and steel, cement, glass, lime, some pulp and paper products, and non-ferrous metals such as aluminium and copper.

The two biggest developing countries – India and China – have already attacked this part of the Waxman-Markey Bill as constituting disguised protectionism and flouting the rules of the World Trade Organization (WTO). The Indian Environment Minister Mr. Jairam Ramesh described carbon tariffs as "pernicious." He said that climate change should not be negotiated at the WTO. Mr. Yao Jian, a spokesperson of China's Ministry of Commerce, on 3 July criticised developed countries for proposing to impose carbon tariffs, stating: "China has consistently advocated that the international community faces climate change together, but some developed countries have advocated using carbon tariffs against imports," he said. "This violates basic WTO rules. It only pretends to

[17] See Yu (2009a and 2009b) and Khor (2009a and 2009b) in South Bulletin 10 Sept. 2009, for details and analyses of the Waxman-Markey bill.

protect the environment, but really it protects trade…To put out carbon tariff policies during the economic crisis and ahead of the annual climate change conference this year is not timely. It doesn't strengthen faith in the international community's cooperation against the crisis."

The Waxman-Markey bill was passed by a small majority of the US House of Representatives in the last week of June 2009. In October 2009, a separate bill was also introduced in the US Senate, which also contains a provision on border adjustment measures. Following the adoption of a Senate bill, a joint Congress bill will then be sent to the U.S. President Obama for his approval.

The use of trade measures with the effect of blocking developing countries' goods on climate grounds is beginning to generate great controversy and may result in a severe blow to the WTO and the multilateral trading system, as well as sour the atmosphere in the negotiations taking place under the UNFCCC.

Many developing countries will read the bill as an attempt by the US to evade its commitment to assist developing countries, and instead shift the burden of adjustment onto these developing countries.

Under the UN Climate Convention, only developed countries have to undertake legally binding commitments to cut emissions, in recognition that they are responsible for much of the emissions in the past.

Under the Convention, the developed countries also committed to pay for the costs incurred by developing countries when they take actions on climate change. The convention also says that the extent to which the developing countries act against climate change depends on the extent to which developed countries provide them with finance and technology transfer.

According to senior staffers in the US Congress, any domestic climate bill in the United States will have to include a border adjustment component to deal with the competitiveness issue, in order to deal with the concerns of American trade unions and businesses.[18] They are aware that the border adjustment component is controversial and will arouse opposition from developing countries, but indicated that any climate bill would not succeed unless this component is included in the bill.

Senior officials of the Bush administration were also well aware of the controversial nature of the border adjustment aspect of US climate bills, and indicated their opposition to it. The then US Trade Representative, Susan Schwab, in March 2008 said she had serious concerns over proposals in legislation that may be perceived as unilateral trade restrictions, and that trade ministers that met in Bali in December 2007 agreed that "trade

[18] This was told to the author by several staffers of various Congressmen during visits by the author to the US Congress in November 2008 and February 2009.

restrictions run the risk of tit-for-tat retaliation and even an all-out war where no one wins and everyone loses."[19]

There is a large debate on whether the border adjustment measures, such as those contained in the various US Congress bills, are compatible with WTO rules. The two most cited rules are GATT Article III on non-discrimination and GATT Article XX on exceptions. The conclusion seems to be that the border adjustment measures are likely to encounter problems of compatibility with Article III, while there is a better although by no means certain chance of compatibility with Article XX, provided the many conditions linked to that article are satisfied.

This has led some legal scholars and NGOs to advocate that any border adjustment measure to be introduced should be designed in a way that tries to be in compliance with both Articles III and XX; and that in a future possible dispute case at the WTO, if it were to fail the test of compatibility with Article III, then it may still pass the test with Article XX.[20]

As discussed in Section III.B, the most relevant WTO provision is that relating to national treatment in Article III:2, which states that imported products shall not be subject to internal taxes or other charges in excess of those applied to like domestic products. A border adjustment measure first has to pass the test that the tax or charge imposed on the imported product is at the same amount or rate as that being charged to domestic products. Presumably such a measure can be designed with this in mind (for example, that the imported good is subjected to the same emission permits above the same caps as the domestic good), and even here there are several methodological problems. Then the measure has to pass the test of "like" and "unlike" product. A country will be required to give the same treatment to domestic and imported goods if these are found to be "like" products. As discussed in Section III.B, there is a broadly held view (especially by delegations of developing countries) that if two products are "like" in physical characteristics, it is not permissible to put a tax or charge on the imported product on the basis of how it is produced (i.e. on the ground of processes and production methods). In this view, the imposition of a payment for an emission permit on an imported good that is deemed to have caused emissions beyond a level, while no permit is charged for a domestic good that is deemed to have caused emissions below the level, would not be permitted by Article III.

If the process of production and production methods cannot be taken into account in imposing a tax or permit, then the possibility is to impose the tax or charge in identical amounts on the import and the domestic product that contains identical carbon content. As pointed out by Meyer-Ohlendorf (2009), this is "arguably an insurmountable task,

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[19] "USTR Schwab warns of trade war potential of CO2 laws", *Dow Jones Newswires*, 5 March 2008.

[20] For example, Joost Pauwelyn (2007) argues that the kind of competitiveness provisions or "border adjustments" envisaged by the Congress draft bills on climate change stand a good chance of proving to be compatible with Article III, but if they fail this test, resort can also be had to Article XX.

because it is very difficult to calculate the exact carbon context/price paid by domestic producers (and importers)".

The border adjustment measure (BAM) of the type envisaged in US Congress bills is also likely to be deemed as being against the most favoured nation (MFN) principle (GATT Article I), in which a WTO Member has to provide equal treatment to all other WTO Members. The BAMs in the Congress bills are designed to target imports from countries that are either not signatories to international binding emission-reduction commitments, or have climate policies or industries that are deemed to be not up to the desired standards, or countries that are major emitters. The use of this differentiation between the products of different countries according to their climate policies or their environmental standard is against the MFN principle. Thus, in this line of thinking, it would not be permissible to impose a payment charge on the product of a country on the ground that this country is not signatory to an international treaty or does not have an adequate national policy on emission controls, while no such charge is imposed on products of other countries deemed to have met the standards.

If there is failure to pass the national treatment and MFN tests, the advocates of border adjustment measure can still resort to the Article XX:b and XX:g environment exceptions.

There is significant uncertainty over whether a trade measure can be considered consistent with Article XX, and this will be treated on a case by case basis.

According to Stilwell (2009a), Article XX has been interpreted by the Appellate Body to permit measures relating to the conservation of exhaustible natural resources that are not arbitrary and that take into account the conditions of exporting countries. In applying any such provisions, it seems likely, based on previous practice, that a WTO adjudicatory body could take into consideration a range of factors including:

- Whether the implementing country had made serious, good faith, across-the-board efforts to reach a negotiated solution with exporting countries in order to resolve issues relating to international competitiveness and/or related environmental issues before imposing unilateral measures (including, potentially, their good faith participation in relevant multilateral negotiations).
- The extent to which the measures reflect and take into account the different conditions which may occur in the territories of those other countries, and the comparability of efforts to work with those countries.
- The transparency and predictability of the process, the availability of review of decisions, the provision of formal, reasoned decisions in writing and other factors associated with due process.
- The relevant provisions of related international agreements – for example, the Climate Convention and Kyoto Protocol's provisions calling on developed countries to take a lead in addressing climate change, provide supportive measures such as technology transfer and financial assistance,

> and explicitly call for efforts to minimize adverse effects on international trade and the economic prospects of developing countries.

However, even if the border adjustment measures are designed or implemented in a manner that is found compliant with Article XX, there are likely to remain concerns among developing countries about the fairness of developed countries being able to resort to the environment exception. As many products may fall under their purview, the climate-related BAMs could give rise to systemic concerns about the environment exceptions themselves. For example, developing countries and development advocates could well argue that it is unfair to developing countries that environmental protection has been accorded priority status to be allowed a general exception, whereas development concerns are not accorded the same status. "Sustainable development", which is a key objective of the WTO, contains an environmental aspect as well as an economic and social developmental aspect. Developing countries are at a disadvantage when only the environment is accorded a general exception status, since they are at a lower economic and technological level and thus unable to match the developed counties in pollution control. Therefore having environment but not development as part of the general exceptions is unfair, as it enables the uneven playing field to be tilted even more against the developing countries. If there is an exception clause granted to environmental concerns, there should also be a general development exception clause in the GATT[21].

They are also likely to argue that the measures are unfair and violate the UNFCCC's principle of common but differentiated responsibilities, and the principle of historical responsibility, whereby it is recognised that the developed countries are mainly responsible for the accumulation of greenhouse gases in the atmosphere, are legally bound to reduce their emissions and to assist developing countries to take mitigation and adaptation measures. By subjecting developing countries' imports to the same tax treatment as their domestic products, when the developing countries' financial resources and technological level are so much below those of the developed countries, would be seen not as levelling the playing field but on the contrary as tilting the already unlevel playing field to an even much more uneven level against the developing countries.

In the current round of discussions within the UNFCCC, there have been attempts to introduce trade related issues into the discussions, perhaps with the intention of adopting a decision, resolution or even an amendment to rules. At the Bali meeting (December 2007), Japan among others tried to have the topic of "level playing field for international competitiveness" accepted as a topic for discussion or negotiation in the post-Bali talks towards a Copenhagen decision. This was rejected by the developing countries. During the UNFCCC talks on the Bali Action Plan in various sessions in 2008 in Bangkok, Bonn and Accra, Japan insisted on a "Sectoral Approach" being discussed and adopted. Many developing-country delegations voiced the suspicion and concern that the Japanese version of a "sectoral approach" is an attempt to bring in the same "competitiveness" issue through another door. By having all countries adopt certain minimum standards of efficiency or performance (energy efficiency, carbon-intensity) at the level of a sector or

[21] This is an argument made by Chakravarthi Raghavan, Editor Emeritus of the South North Development Monitor, in conversation with the author.

product (for example, steel, aluminium, paper and chemicals), the foundation may be set to introduce penalties (such as an additional import duty, a border adjustment measure such as payment for emission permits) or standards (which if not adhered to can have a product prohibited from entry), although the proponent may start by saying that the aim is to provide an incentive (i.e. to effect technology transfer at sectoral level). (See TWN 2008 paper on sectoral approach).

At the WTO, there has so far not been any formal attempt in recent years by any Member to raise the competitiveness issue and to amend WTO rules to clarify that border adjustment measures or even special import duties can be adopted by members so that there is certainty about how such unilateral trade measures are linked to climate change. However, the topic of border adjustment and other measures is widely discussed at various seminars. The WTO Director-General Pascal Lamy appears to be aware of the dangers of having the members of WTO negotiate the role of trade measures as a means to deal with the climate crisis. His position is that the climate issue has to be resolved at the UNFCCC and not at the WTO.[22]

On the political level, the issue of competitiveness figures largely in the developed countries, which are likely to unilaterally introduce border adjustment measures and perhaps even special import duties, as part of their national climate policies, which include the cap and trade system. While the trade measures may make their climate policies more politically acceptable domestically, they will also poison the political atmosphere of the crucial negotiations in the UNFCCC, which is the home of the multilateral climate regime. These measures will also be received with great hostility by the developing countries at the WTO.

Recent separate statements from officials in India involved in the climate and trade regimes provide a preview of the strong reactions to the threat of such trade measures linked to climate change. India's special envoy on climate change, Shyam Saran, in March 2009 strongly criticized developed countries for imposing "conditions" and "adding dimensions" such as a carbon tariff and the trade competitiveness issue as part of their actions on climate change (PTI, 2009). "Action on climate change cannot be based on conditions. Once we start going in that direction, then it means we start going for protectionism under the green label and it is harmful to India's interest seeking sustainable development," he said. "So in that context we see issues coming up, sometimes in the form of carbon tariff or greater tariff change or opening up of market which the developed countries want to impose on us on the pretext of tackling climate change." Sharing the concern of corporate officials in India that the imposition of carbon tariffs would go against the interests of business and industry in India, he said, "This is what we have been resisting. Collaborations become irrelevant when competitive tendencies prevail."

India's Ambassador to the WTO, Ujal Singh Bhatia, commenting on unilateral measures being considered by developed countries, such as "offsetting" tariffs on imports based on

[22] Lamy made this point at the Trade Ministers' meeting in Bali in December 2007, and again at the WTO's Public Forum in 2008.

carbon content, stated: "The debate on PPM will be revived. The agreements in GATT/WTO or the jurisprudence arising from them do not provide an adequate basis for such measures. In the absence of clear disciplines in this regard, autonomous measures can only invite acrimony and discord. They can also provide a good cover to protectionism. The dispute settlement in the WTO does not have a robust basis to adjudicate on such measures. As a result of such actions, the credibility of the WTO can come under severe stress" (Bhatia, 2008).

At the UNFCCC negotiations towards a climate deal, the developing countries have taken a strong position against climate-linked trade measures (South Centre, 2009a, p. 4). At a session in Bonn in August 2009, India proposed explicit language to be included in the Copenhagen outcome, as follows:

"Developed country Parties shall not resort to any form of unilateral measures including countervailing border measures, against goods and services imported from developing countries on grounds of protection and stabilisation of climate. Such unilateral measures would violate the principles and provisions of the Convention, including, in particular, those related to the principle of common but differentiated responsibilities (Article 3, Paragraph 1); trade and climate change (Article 3 paragraph 5); and the relationship between mitigation actions of developing countries and provision of financial resources and technology by developed country Parties (Article 4, Paragraphs 3 and 7)."

At the same session, the Group of 77 and China also called on developed countries not to adopt unilateral trade-restrictive measures against developing countries. The group said that if they adopt these trade measures, the developed countries would be passing on their mitigation burden onto developing countries, and this would contravene the principles and provisions of the Climate Change Convention. It added that the measures would in particular be contravening the Convention's principles of equity, common but differentiated responsibility and respective capabilities, and the principle enshrined in Article 3.5 that the 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. Article 3.5 also states that "Measures 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".

While the trade measures being planned by the developed countries may be prompted by domestic political concerns, they are likely to have a severely damaging effect on the relations between developed and developing countries, and on the state of negotiations as well as political atmosphere in both the UNFCCC and the WTO and other fora. It is thus more useful if the developed countries seek other mechanisms rather than the trade measures envisaged to meet their domestic concerns.

V. CONCEPTS AND PROPOSALS ON TECHNOLOGY, IPRS AND CLIMATE CHANGE

A. TECHNOLOGY TRANSFER AND IPRS

A major component of the climate-trade linkage is the issue of intellectual property rights and technology. This is not because IPRs fall under the rubric of trade per se, but because the rules of the multilateral trading system embodied in the WTO contain the TRIPS Agreement, which deals primarily with intellectual property issues. Thus, IPRs are part of the trade rules, although intellectual property does not constitute trade, and a significant number of people do not consider that it was appropriate to locate a treaty on IPRs (i.e. TRIPS) within the WTO which is supposed to be a trade organisation.

As pointed out in Section III.E, the discussion on IPRs, TRIPS and the environment has been an integral part of the work of the Committee on Trade and Environment at the WTO. At the UNFCCC, technology development and transfer, together with finance, are key components, constituting the most visible development-oriented elements in the Convention. The developing countries also considered a satisfactory outcome on technology as an essential element of a global deal in the UNFCCC meeting in Copenhagen in December 2009.

The Convention recognises technology transfer not only as an issue but as a major commitment by developed countries to developing countries. This is articulated in several provisions, including Article 4.3 (Developed countries shall provide financial resources including for technology transfer needed by developing countries to meet their agreed full incremental costs of implementing measures), Article 4.5 (Developed countries shall take all practicable steps to facilitate and finance transfer of and access to environmentally sound technologies and know how particularly to developing countries; and shall support the development and enhancement of endogenous capacities and technologies of developing countries) and Article 4.7 (The extent to which developing countries will implement their commitments will depend on effective implementation by developed countries of their commitments on financial resources and technology transfer). The Bali Decision (COP Decision 1/CP.13, December 2007) on long term cooperation also contains separate sections on enhanced actions on technology transfer and financial resources. These should be provided to developing countries in a "measurable, reportable and verifiable" manner, according to a separate section on mitigation actions.

Despite the central role of technology transfer, in fact there has been very little if any practical transfer of climate-friendly technology under the UNFCCC. The operationalising of the principles, the establishment of mechanisms, and the actual transfer of technologies have yet to be put into effect.

Technology transfer is not merely the import or purchase of machines at commercial rates. A central aspect of technology transfer is the building of local capacity so that local people, farmers, firms and governments can design and make technologies which can be diffused in the domestic economy. In the first stage of technological development, developing countries can go through three stages: (a) initiation stage, where technology as capital goods are imported; (b) internalisation stage, where local

firms learn through imitation under a flexible IPR regime; (c) generation stage, where local firms and institutions innovate through their own R and D (UNCTAD, 2007). In stage 1, the country is dependent on capital imports, some of which (that are patented) may be extra high in cost because of the higher prices enabled by monopoly margins. In stage 2, costs may be lowered by the "generic versions" locally produced. In stage 3, the local firms are able to design and make their own original products. Technology transfer may involve the purchase and acquisition of equipment; the know how to use, maintain and repair it; the ability to make it through "imitation" or reverse engineering; to adapt it to local conditions; and eventually to design and manufacture original products. The process of technology transfer involves progressively climbing through all these aspects.

Several conditions have to be present for technology transfer and development to take place. The absence of such conditions can form barriers to technology transfer. Among the barriers that are normally listed are poor infrastructure, inadequate laws and regulations, shortage of skilled personnel, lack of finance, ignorance of technology issues, high cost of certain technology agreements, problems created by equipment suppliers, and intellectual property rights.

Whether IPRs constitute a barrier or an important barrier depends on several factors, such as whether the particular technology is patented, whether there are viable and cost-effective substitutes or alternatives, the degree of competition, the prices at which it is sold, and the degree of reasonableness of terms for licensing.

In terms of proprietary rights, technologies and related products can be usefully placed under three categories: those that are not patented and are thus in the public domain; those that are patented; and future technologies (which are likely to come under patents).

B. EXPANDING THE SPACE FOR TECHNOLOGIES IN THE PUBLIC DOMAIN

For technologies that are not patented and are thus in the public domain, patents are not a barrier to technology transfer (although other types of IPRs such as trade secrets may be). Nevertheless, international cooperation (for example for obtaining financial resources and training human resources) is also required to facilitate their transfer.

Importantly, the space for technology in public domain should be expanded. Governments in developed countries play an important role in funding R and D programmes. The programmes are implemented by government institutions or in partnership with the private sector. About 40 per cent of annual national R and D spending within some OECD countries was publicly funded (UNCTAD, 1998). In addition governments sponsor a range of R and D that underpin private sector investments in developing environmentally sound technologies (ESTs) (IPCC, 2000, Chap. 3, p. 95).

A paper for the UNFCCC surveyed government R and D funding of ESTs in the US, Canada, UK and Korea. It found that in most countries, governments allocated their rights (patents, copyrights, trademarks, etc.) to the recipient research institutions to a

significant degree. As a result, the diffusion of climate-friendly technology would "typically be along a pathway of licensing or royalty payments rather than use without restriction in the public domain" (Sathaye et al., 2005). The IPCC study (2000) calls on OECD countries to influence the flow of such technology directly through their influence on the private sector or public institutes that receive funding from government for their R and D to be more active in transferring technologies to developing countries. It cites Agenda 21 (chap. 34, para. 34.18a) that "governments and international organisations should promote the formulation of policies and programmes for the effective transfer of environmentally sound technologies that are publicly owned or in the public domain." Products that emerge from publicly funded R and D should be placed in the public domain, those that are partially funded should be in the public domain to the extent to which it is publicly funded.

As part of international cooperation, there can be R and D programmes jointly planned and coordinated by governments (developed and developing). If certain products are wholly publicly funded, they could be placed in the public domain, or else made available through affordable licences. This can make the technologies much more affordable.

C. THE TREATMENT OF TECHNOLOGIES THAT ARE PATENTED

For technologies that are patented, there is a potential for IPRs to be a barrier to technology transfer. To overcome this, there can be an international understanding that patents should not be an obstacle for developing countries to have access to the technologies at affordable prices.

In this regard, an important measure should be to make it easier for governments in developing countries to exercise their rights to provide compulsory licences. According to the TRIPS Agreement, if there is a patent on a product, a process or a technology, a firm or agency in a country in which the patent is operating can request for a voluntary licence from the patent holder, in order for the firm to make or import generic versions of the patented product or technology. The patent holder will normally charge a price (royalty or licence fee) for granting the licence. If the patent holder refuses to give a licence, or if the conditions it asks of the applicant (such as the royalty rate or restrictions on marketing) are unreasonable, the firm or agency can apply to the government to grant it a "compulsory licence". Alternatively, a government that wants to have access to generic versions of a product or technology can itself take the initiative to issue a compulsory licence.

The firm or agency granted a compulsory licence would normally have to pay a royalty or remuneration to the patent holder. In the case of pharmaceutical medicines, the royalty rate offered in recent compulsory licences by Asian developing countries (Malaysia, Indonesia and Thailand) ranges from 0.5 to 4 per cent of the price of the generic drug.

Under the TRIPS Agreement, there is considerable flexibility provided to WTO Members states on the grounds for issuing compulsory licences. These grounds are not restricted, as confirmed by the WTO Ministerial Declaration on TRIPS and Public Health (Doha,

2001). For example, and contrary to a quite widespread notion, it is not necessary for a government to declare its country is in a state of health emergency in order for it to issue a compulsory licence for a pharmaceutical drug. Certainly the fact that a country requires a product or technology in order to meet its objectives or responsibilities to mitigate climate change or to adapt to climate change is a valid ground for compulsory licensing.

Compulsory licensing is not a unique or exceptional policy. In developed countries like the US and the UK, there have been many compulsory licences granted by the government to facilitate cheaper products and technology in the industrial sector. In many developing countries, compulsory licences have been issued for the import or local production of generic medicines. A particular type of compulsory licence, "government use", has been made use of by an increasing number of developing countries in the area of pharmaceutical medicines. This category is appropriate when the product to be imported or produced in a generic version is to be for public, non-commercial use, for example for medicines distributed by the government in clinics and hospitals. In such cases, prior negotiation with the patent holder is not necessary although remuneration or royalty to the patent holder is required.

Compulsory licensing is thus an option that developing countries can consider using for those patented climate-friendly technologies for which they have need, which are expensive, and when negotiations with the patent holder are unable to result in a sufficiently affordable price either for the original product or for a licence for an intended generic product.

The Brazilian Foreign Minister Mr. Celso Amorim in his speech at the plenary session of the UNFCCC Bali climate conference in December 2007 stated that inspiration should be drawn from the case of TRIPS and access to medicines (which resulted in a WTO Ministerial Declaration on TRIPS and Public Health), and that a move should be considered to have a similar Declaration on TRIPS and climate friendly technologies. Strictly speaking, it is not necessary for such a statement to be made by Ministers before a country exercises rights that are already provided for in the TRIPS Agreement to issue compulsory licences for climate-related technologies. However some developing countries may not be familiar enough with these rights, or they may fear that the exercise of such rights may lead to an outcry from the companies holding the patents or to penalties from the developed countries. Therefore developing countries may find it useful that an international declaration is made, so that they would have greater confidence to issue compulsory licences. However there is no guarantee that the political declaration will fully protect a country that exercises its rights: Thailand was placed on the United States' IP Watch List (which implicitly carries a threat of future trade sanctions) following issuing of compulsory licences on some medicines by the country.

An important feature of the TRIPS and Public Health Declaration is that it created new rights for countries to waive a provision in the TRIPS Agreement that limits the supply of a generic product (under compulsory licence) to "predominantly" for the domestic market. This restricts the volume of exports of a firm producing generics, and it also affects the adequacy of supply of generic products that a country with no or limited

manufacturing capacity can import. A Declaration on TRIPS and Climate Change could establish a similar waiver to the restrictive TRIPS provision for climate-related technologies. This will enable an increase of supply of "generic" technologies and products to countries that lack productive capacity to produce their own products.

To further facilitate compulsory licensing of climate technology, developing countries can be encouraged to introduce legislation that makes it easier to obtain compulsory licences for certain purposes or category of products. For example, the Clean Air Act of the United States provides for compulsory licences to be given when the patented innovation is necessary to comply with the emission requirements, when no reasonable alternative is available, and where non-use of the patented invention would lead to a "lessening of competition or a tendency to create a monopoly." Under the Act, a district court, with the Attorney General's assistance, can determine whether a compulsory licence should be granted and set reasonable terms.

Another set of proposals that are more fundamental has to do with exemptions or partial exemptions for climate friendly technologies from patentability. Proposals along this line have already been made at the WTO for many years.

An exemption from patentability for environmentally sound technology was proposed by India at the WTO's Committee on Trade and Environment in 1996 (as described in Section IIIE above).

More recently, the Indian delegation at a climate change meeting as part of the G8-plus-5 Summit in Gleneagles, proposed as an option the redefinition of the extent of patent protection for climate friendly technologies, so that the protection "could exclude the use of such technologies in developing countries."[23]

The above provides two options in exclusion of patents, the first is a blanket exclusion of patentability for environmentally sound technologies and the second being an exclusion applied only to developing countries. In the second option, patent holders that funded their own research and development could recoup their innovation costs through a monopoly (for the specified period in the TRIPS Agreement) of their products in the developed countries, while in the developing countries, competition with such technologies is allowed through an exemption from patentability. An appropriate amendment of the TRIPS Agreement would be required in either case, to the effect that WTO Members (or WTO developing country Members) can exempt such technologies from patentability.

Such a proposal should not be considered unrealistic. Before the adoption of the TRIPS Agreement, many countries exempted food and pharmaceutical medicines from patentability. Although the TRIPS Agreement does not allow patent exclusion on a sectoral basis, it recognises circumstances in which IPRs can be suspended. For example, Article 73 states that in situations of war or other emergency in international relations,

[23] India, Government, *Dealing with the Threat of Climate Change*, India Country Paper, The Gleneagles Summit.

nothing in TRIPS will be construed as preventing a Member from taking any action which it considers necessary for the protection of its essential security interests. There is a strong case for equating the climate crisis with a global emergency situation. Since climate change is an extremely serious crisis threatening human survival, and there are only a few years left for strong action to be effective in preventing catastrophic effects on human life and the environment, the situation is similar to a global emergency with war-like conditions. In such conditions, individual commercial interests such as patents can be suspended so that there can be concerted global and national actions in the most effective way, to face the common threat. Developing countries require technologies at the cheapest possible prices. If they obtain the needed technology at one third the price, they can increase the rate of change to put into effect mitigation and adaptation measures many times more rapidly and effectively.

Another option for facilitating the lowering of barriers posed by IPRs is to require that voluntary licences be automatically granted on request, and on reasonable terms. There could be international regulation of the availability and terms of voluntary licences, as part of a UNFCCC decision on technology transfer.[24] For developing countries there can be a provision either that royalty is exempted, or that the royalty is limited to a specified maximum. This could remedy the kind of problems (such as refusal to grant a licence, or the imposition of unreasonable costs and other conditions for obtaining the licence) which companies in developing countries faced when trying to get a licence from patent holders to produce substitutes to ozone-harmful chemicals.

In situations where patents are granted, a potentially important measure at international level is the setting up of a patent pool or a technology pool relating to climate-change technologies, as a global approach to enhance access and affordability.[25] This is especially useful when there are many different patents attached to a single product or technology, which makes it difficult especially for companies from developing countries to contact the patent owners to obtain voluntary licences. In a global technology or patent pool, patent owners of climate friendly technologies can be obliged to place their patents in a pool, and developing countries' firms can access the technologies through payment of a low compensation on fair and standard terms. This makes it administratively and financially easier for access to take place in a globally regulated framework, while the operationalising of the flexibilities in the TRIPS Agreement is systematised.

Another measure requiring international cooperation is the establishment of a global system for sharing know-how and trade secrets linked to climate-friendly technologies. The withholding of "trade secrets", or the knowledge on how to make the technology, can be a major barrier to technology transfer, even for technologies that are not patented, as it can prevent the development of technology in developing countries. Thus, there is a case for an international cooperation mechanism to make trade secrets and know-how that are linked to climate-related technologies more accessible to developing countries.

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[24] This is proposed in Third World Network (2008a, para. 16).

[25] See Third World Network (2008a, para. 16) for its proposal on technology pooling.

In conclusion, any WTO Member state is already allowed by the TRIPS Agreement to make use of "flexibilities" and take measures such as compulsory licences and parallel importation to obtain technologies or products (that are patented) at more affordable prices. But the processes of negotiating with the patent holder and of issuing compulsory licences, etc. can be quite cumbersome to countries not familiar with the procedures. It is better that developing countries be allowed to exempt such technologies from patenting, while enabling the innovating firms to recover their research costs through patenting in developed countries. Intellectual property should not be treated as something sacred that has to be upheld at all costs. That would send a signal that climate change is not a serious threat, as commercial profits from monopoly would be seen as being on a higher scale of values and priorities than are the human lives that are at stake due to global warming. Technology transfer to developing countries to enable them to combat climate change should be the far higher priority. The UNFCCC process should therefore adopt the principle that developing countries can exempt climate-friendly technologies from patents. This should be supplemented with global measures to enable the sharing of trade secrets. As second-best alternatives, other measures can be considered, such as automatic granting of voluntary licences and regulation of such licences, and patent pools.

D. TECHNOLOGIES OF THE FUTURE

For technologies to be developed for future use, the nature of the funding of research and development will exert influence on the proprietary nature of the products and technologies.

In line with the goal of having as many technologies in the public domain as possible, a technology fund to be set up under the UNFCCC could allocate a significant part of its resources to research and development for new technologies. The fund can establish priority areas for research, based on the decision of UNFCCC Members, and research grants can be provided to successful applicants in line with the priority areas. Since the funding is made available by the fund, the patents for the inventions are to be owned by the fund, and this principle should be one of the conditions for the grants. It can be part of the understanding in this scheme that the fund would make the inventions available to firms in developing countries with licences at no cost or nominal cost, also on the condition that the users cannot apply to patent the technologies.

The up-front funding of innovation by a UN Technology Fund, linked to making the ensuing technologies available at the most affordable prices to developing countries since the latter will obtain the technologies without paying for patent royalties and since there will be free competition in the production, would be more cost effective than the Fund having to purchase the technologies (with patents attached to them) at full cost and distributing them to developing countries.

This scheme would not of course prevent privately funded innovation activities from taking place, and the two could co-exist. However, the larger the resources available for

global publicly funded R and D activities, the larger will be the share of future technologies that will be in the public domain.

E. PROPOSALS OF DEVELOPING COUNTRIES IN THE UNFCCC

In the UNFCCC negotiations since the Bali conference of December 2007, many developing countries and their groupings have presented proposals on technology development and transfer.

The most important of these is the proposal by the G77 and China submitted in September 2008. Its main feature is the establishment of a new technology mechanism under the UNFCCC to accelerate the development and transfer of technology and to support the effective implementation of the UNFCCC's provisions relating to technology and finance. At a UNFCCC meeting in Accra, the G77 and China's coordinator in the working group that deals with the Bali Action Plan explained that the proposal sets out the rationale, criteria and institutional arrangements for a new technology mechanism, which include a new subsidiary body to the Convention (the Executive Body on Technology) as well as a Multilateral Climate Technology Fund, which, along with other funds would operate as part of an enhanced financial mechanism under the Conference of Parties.[26]

The proposal also describes a Technology Action Plan as well as the eligible activities that would be covered by the mechanism.

The proposal notes that access to financing for technology is currently limited and should be enhanced. Barriers to transfer also inhibit the adoption of technologies in developing countries. Consequently, access must be urgently provided to these technologies while balancing rewards for innovators with the common good of humankind, including through jointly developed technology and intellectual property rights (IPR) sharing.

The proposal says that delivery of technology to developing countries also requires an effort by developed countries to enhance enabling environments, to facilitate access to technology, and to provide finance that leverages private sector financial resources. Current institutional arrangements are not sufficient to deliver technology.

The **objective** of the technology mechanism is to address all aspects of cooperation on technology research, development, diffusion and transfer in accordance with relevant articles of the Convention. The **guiding criteria** include that the technology mechanism would operate under the Conference of Parties, aim to ensure that the technologies required by developing countries are accessible, affordable, appropriate and adaptable and seek to ensure the adequacy and predictability of funds for technology transfer, as well as the removal of barriers to technology development and transfer.

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[26] For a report on this session and on the G77 and China proposal, see Stilwell (2008). The proposal is in G77 and China (2008).

The technology mechanism will comprise three components: a new subsidiary body of the Convention, a new Multilateral Climate Technology Fund to finance technology development and transfer, and a Technology Action Plan.

In the new subsidiary body, there will be an Executive Body, supported by a Strategic Planning Committee, with **Technical Panels** providing inputs on topics such as capacity building; policies and measures; intellectual property cooperation; cooperation on a sectoral, cross-sectoral or cross-cutting basis; assessment, monitoring and compliance, and other topics. To ensure that financial and technological contributions made to the mechanism are "measurable, reportable, verifiable" as required by the Bali Action Plan, the subsidiary body would also include a **Verification Group** designed to review the actions of Parties.

The **Multilateral Climate Technology Fund** is to finance enhanced action on technology development and transfer. This fund will operate under the Conference of Parties as part of the enhanced multilateral financial mechanism for the UNFCCC, which was described by the G77 and China in a separate proposal. The fund shall be financed through assessed contributions from developed countries. These contributions shall be additional to other financial transfers to developing countries and shall meet the costs incurred by them.

A third key aspect of the G77 and China's technology proposal is the creation of a **Technology Action Plan.** It will support concrete actions by defining policies, actions and funding requirements for all relevant classes of technologies and in all phases of the technology cycle (with details on three phases: research, technology development, and technology transfer and diffusion).

The Plan will also define specific policies, actions and funding requirements for all relevant technologies, classified as follows:

(1) In relation to *public domain technologies*, it will establish a system for international cooperation to ensure that the needs of developing countries are met through the lowest-cost technology options, and to transfer know-how about how to use and maintain technologies and adapt them to local conditions, thereby contributing to the development of endogenous technologies.

(2) In relation to *patented technologies*, the Technology Action Plan will ensure that privately owned technologies are available on an affordable basis including through measures to resolve barriers posed by intellectual property rights, and through compulsory licensing of patented technologies. Technologies with shared ownership (government and private) will be made available on an affordable basis by facilitating transfer of the government proportion on a reduced or no-cost basis. Technologies that are government owned will be made available on an affordable basis by facilitating transfer on a reduced or no-cost basis.

(3) In relation to *future technologies* the Plan will support the establishment of national and regional technology excellence centers and will reinforce north-south, south-south and triangular cooperation, including in the area of joint research and development.

The proposal also identifies the **eligible activities and costs** that would be covered by the technology mechanism. It notes that the mechanism will cover technologies in all relevant sectors and endeavor to remove technology barriers.

The proposal offers an indicative list of activities and costs that would be eligible for support. This list includes: (1) Promotion, facilitation and implementation of activities along the entire technology cycle; (2) Support for research, development, manufacture, commercialization, deployment and diffusion of technologies for adaptation and mitigation; (3) Adaptation technologies; (4) Technologies to address the adverse impact of response measures; (5) Capacity-building to manage and generate technological change and create enabling conditions in developing countries; (6) Commercialization of new and emerging technologies; (7) procurement of low greenhouse gas emission technologies and (8) Creation of manufacturing facilities for environmentally sound technologies.

On the last item (manufacturing facilities), the proposal says this will include the costs of compulsory licensing and cost associated with patents, designs, and royalties; conversion of existing manufacturing facilities or of establishing new facilities; research and development activities, including joint research, development, design, and demonstration; technology adaptation; retraining and dissemination of know-how; operation (of facilities/technologies); and monitoring and verification.

Besides this G77 and China proposal, many developing countries have also spoken up individually at the UNFCCC on the technology issue. Specifically on the issue of IPRs, several countries including Cuba, India, Tanzania, Indonesia and China have stressed the need to address the IPR issue within the context of technology transfer.

At the UNFCCC meeting in Bonn in July 2008, Brazil called for the establishment of a "coherent and comprehensive" instrument for technology development and transfer i.e. a "Technology Protocol" under the UNFCCC. It stressed the importance of acting beyond the "business as usual scenario" and the need for a "beyond the box" approach.[27] In relation to patented technologies, Brazil proposed a public multilateral fund for purchasing licences with a view to facilitate transfer. In this context it also stressed the need to consider using compulsory licensing as well as emerge with a Declaration similar to the Doha Declaration on TRIPS Agreement and Public Health.

India was of the view that the full potential of technology will require mechanisms across all stages of the technology cycle which is not just a question of transfer alone, but also of

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[27] Meenakshi Raman, "Developing countries call for new technology transfer mechanism", *TWN Bonn News Updates and Climate Briefings*, 2008.

generating new technologies as well as research, development and deployment.[28] It stated that in the area of new technologies, the transfer of technology and know-how should be aided by a suitable IPR regime. Technologies owned by the private sector in developed countries could be compensated by their governments for their transfer and deployment in developing countries. On accelerating technology development, India proposed joint development with IPR sharing, adding that global financing arrangements require global public procurement of IPRs to ensure the affordability of the products and services.

In relation to wider deployment of technology South Africa said that there should be preferential terms provided to developing countries with the least developed countries (LDCs) obtaining the technologies free.

Pakistan stated that the IPR regime facilitates technology development by rewarding the inventor, but at the same time it provides monopoly pricing power which acts as a barrier to its diffusion.[29] Consequently, measures are vitally needed to remove these barriers to technology transfer. It proposed: (1) An international system or agreement on compulsory licensing for climate-friendly technologies along the lines of what was undertaken in the health sector; (2) Joint technological or patent pools, transferring technologies to developing countries at low cost; (3) Reduction of the period for patents on climate-friendly technologies; (4) Provision of incentives (tax exemption, subsidies, etc.) for technology owners so that they can put in place a system of differential pricing, in which developing countries are charged lower prices.

At the UNFCCC talks in Poznan[30] in December 2008, South Korea said that there was a need for fundamental change in policies on IPRs and R and D. "The present regime does not integrate climate change as a goal. IPR is purely to protect the private interest of companies. How can IPR work for climate change? IPR currently is working for the profit of the private sector," South Korea said. It further added that government intervention was necessary for change in public policies in this regard.

China stressed the need for change and for a new ideal institution that removes barriers and other negative market forces so as to enable technology transfer, adding that there was a need to find a way to share IPRs in technology development and research. It reiterated its proposal for a Multilateral Technology Acquisition Fund to support regional and national R and D in developing countries.

In sessions of the UNFCCC in Bonn in June 2009, the G77 and China submitted a proposal specifically on IPRs, which have been included in the compilation of the texts proposed by various Members. The G77 and China proposals are that:

> Specific measures shall be established to remove barriers to development and transfer of technologies from the developed Parties that have commitments under the Convention to transfer

[28] Ibid.
[29] Ibid.
[30] For reports on statements in Poznan, see TWN (2009b).

environmentally sound technologies to developing country Parties arising from intellectual property rights (IPR) protection, including:

(a) All necessary steps shall be immediately taken in all relevant fora to mandatorily exclude from patenting climate-friendly technologies held by Annex II countries which can be used to adapt to or mitigate climate change;[31]

(b) Creation of a "Global Technology Pool for Climate Change" that promotes and ensures access to technologies that can be used to adapt to or mitigate climate change and associated know-how and trade secrets to developing countries including on non-exclusive royalty-free terms in order to provide better information service and reduce transaction costs.[32]

The Philippines submitted the following proposal:

1. All necessary steps shall be immediately taken in all relevant fora to mandatorily exclude from patenting environmentally sound technologies which can be used to adapt to or mitigate climate change.
2. Biological resources including microorganisms, plant and animal species and varieties, and parts thereof that are used for adaptation and mitigation of climate change shall not be patented.
3. Specific measures shall be taken and mechanisms developed to remove existing barriers to development and transfer of technologies from developed to developing country Parties arising from intellectual property rights (IPR) protection, including:
   (i) to use to the full flexibilities contained in the Trade Related Aspects of Intellectual Property Rights (TRIPS) including Compulsory licensing to access intellectual property protected technologies;
   (ii) take steps to ensure sharing of publicly funded technologies and related know-how, including by making the technologies available in the public domain at an affordable price and on terms and conditions that promotes access for developing countries;
   (iii) creation of a "Global Technology Pool for Climate Change" that promotes and ensures access to intellectual property protected technologies and associated know-how to developing countries including on non-exclusive royalty-free terms;
   (iv) adoption of a Declaration on IPRs and Environmentally Sound Technologies in relevant fora to, inter alia, reaffirm the flexibilities in the TRIPS Agreement and enhance the enabling environment for implementing these flexibilities.[33]
4. All necessary measures and actions shall be immediately taken to facilitate technology pools that include associated trade secrets and know-how on environmentally sound technologies and enable them to be accessed, including on royalty-free terms for developing countries.[34]

Bolivia also submitted a similar proposal as follows:

Specific measures shall be taken and mechanisms developed to remove barriers to development and transfer of technologies from developed to developing country Parties arising from intellectual property rights (IPR) protection, in particular:

(a) Parties agree that nothing in any international agreement on intellectual property shall be interpreted or implemented in a manner that limits or prevents any Party from taking any

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[31] As reflected in UNFCCC document "Notes on sources for FCCC/AWGLCA/2009/INF.1 (Parts I and II)", page 184.
[32] Ibid., page 184.
[33] Ibid, page 185.
[34] Ibid, page 185.

measures to address adaptation or mitigation of climate change, in particular the development and transfer of, and access to technologies;

(b) Immediately to take all steps necessary in all fora to mandatorily exclude from patenting in developing countries environmentally sound technologies to adapt to or mitigate climate change, including those developed through funding by governments or international agencies;

(c) Immediately to take all steps necessary in all fora to revoke in developing countries all existing patents on essential/urgent environmentally sound technologies to adapt to or mitigate climate change;

(d) Immediately to take all necessary measures to facilitate technology pools that includes trade secrets and associated know-how on environmentally sound technologies and enable them to be accessed on royalty-free terms, for developing countries;

(e) Immediately to create and provide new and additional financing that is adequate, predictable and sustainable for joint technology excellence centres in developing countries, to enable entities in these countries to do research and development especially on adaptation as well as mitigation technologies;

(f) Immediately to ensure that any technology transfer to developing countries is appropriate for the developing countries concerned in order to enable its effective utilization.[35]

While the developing countries have advocated new technology mechanisms in the UNFCCC framework and called for "thinking outside the box" on IPRs, the developed countries inside the UNFCCC by contrast have generally continued to maintain that respect for a strong IPR regime is necessary for innovation and for the transfer of technology to developing countries. The proposals above have not been acceptable to the US or EU, which deny that IPRs constitute a barrier to technology transfer. For the developed countries, which own most of the patents on climate-related technologies, maintaining the normal situation regarding IPRs is a matter of having advantage in economic competitiveness. Business associations in developed countries have demanded that their governments do not make concessions on IPRs in the climate negotiations. The US House of Representatives has adopted three bills that contain provisions that condition US participation in any global climate deal and any provision of funding for climate-related purposes on robust compliance with and enforcement of existing international legal requirements for the protection of IPRs (Shashikant, 2009a). This could be one reason why the US delegation has been asking that IPR issues be taken off the table in the UNFCCC climate talks.[36]

The emergence of IPRs in the technology discussion at the UNFCCC is to be expected, given that IPRs have been a barrier to access to technology, including in climate-related fields such as substitutes to ozone-depleting chemicals. Of course IPRs are not the only barrier, and in many cases they do not constitute a barrier (as when the technologies or products are not patented) and in other cases, there is sufficient competition from substitutes that keep prices of patented technologies lower than what could otherwise be if there is a monopolistic market situation. In technologies of the future, where the tendency is for a higher incidence of patents, the problem of barriers could be more prevalent. Thus the issue of the expansion of public-domain technologies is of significant importance.

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[35] Ibid, pages 185-186.

[36] The US position was presented at the climate talks in Bonn in August 2009 and reported in TWN 2009a.

It is unlikely that such a complex issue as IPRs can be resolved by the time of the Copenhagen Conference. It could however be placed as one of the issues that are to be dealt with more thoroughly in the post-Copenhagen agenda, within an enhanced body on technology within the Convention.

VI. CONCLUSION

Two major aspects of the climate and trade linkage were examined in this paper: the planned use of unilateral trade measures, particularly border adjustment measures, on the ground of addressing climate change; and the issue of intellectual property rights and technology transfer.

On unilateral trade measures, it is clear that the developed countries, starting with the United States, are preparing the ground for using such measures as part of their national climate action programme. Whether the legislation and the planned measures are compatible with the WTO rules is already a subject of significant discussion, and this discussion will get more intense in future, and may include the clarity and the extent of appropriateness of the rules. The compatibility of these measures with the principles and provisions of the UNFCCC is also an important issue, which has arisen already, even before the emergence of this issue as a subject of formal debate in the WTO. The developing countries are already taking note of the trends relating to the proposed use of border adjustment measures, and have already acted in the UNFCCC discussions on the Bali Action Plan to propose text asserting that developed countries should not use such measures, which are against many UNFCCC provisions. This issue can be expected to feature more and more prominently in the UNFCCC as well as in the WTO. Indeed, it threatens to undermine the negotiations towards outcomes in both fora.

On intellectual property, it is the developing countries that have taken the offensive, to argue that if the technology transfer objective of the climate regime is to be implemented effectively, then a review of the international IPR framework needs to be undertaken.

In their perspective, IPRs can be a serious barrier to technology transfer, and since climate change will require a fundamental reform of the production patterns in developing countries, which will be costly, every effort has to be made to minimize the cost of technology transfer. The developed countries, on the other hand, stress that full respect for the existing global IPR regime is a condition for innovation and for technology transfer.

There are important implications for human development in the issues in the climate-trade linkage.

Firstly, there is a need for a global framework to deal with climate change, in order to reduce emissions and to assist developing countries to adapt to the effects of climate change, since these effects can devastate the ecological foundations of development.

Secondly, there is equal need for the measures taken internationally and in developed countries to counter climate change to be equitable and take into account the policy space required by developing countries for their development, and ideally this requires a switch in production patterns towards sustainable development. It is now widely recognized that the developing countries require significant transfers of finance and technology if they are to accomplish this switch successfully, and that the developed countries have made commitments to adequately provide the finance and technology. This is a key issue in the UNFCCC discussions at the moment. Giving priority to the human development needs of people in developing countries is essential, in that they require both continued economic expansion and a switch to a development pathway with low greenhouse gas emissions.

Thirdly, the international policy framework has to be supportive of the developing countries as they strive towards these dual goals. The unilateral trade measures being planned by some developed countries are not supportive, but have the potential to cause many obstacles both to the developing countries and to the international negotiating environment. In human development terms, such measures have the potential to disrupt the trade and production prospects of developing countries, with serious implications for jobs and livelihoods and incomes, and this in turn makes it even more difficult for them either to expand their economies or to achieve a low emission pathway.

On the other hand, technology transfer is essential for meeting the human and sustainable development objectives of providing people and enterprises in developing countries with the means to create employment based on principles and practices that are both environmentally sound and economically efficient. These are the principles that have to simultaneously exist in development policies of the future, if the world is to survive, and if the people in developing countries are to be given the opportunity to enjoy the fruits of development. In this context, the framework of IPRs, which balances the private rights of innovators with the public interest, has to be reconsidered under the framework of human and sustainable development.

There are many questions that this paper raises rather than resolves, and it is hoped that the paper will contribute to the ongoing debate.

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Chemin du Champ d'Anier 17
PO Box 228, 1211 Geneva 19
Switzerland

Telephone : (41 22) 791 8050
Fax : (41 22) 798 8531
Email : south@southcentre.org

Website :
http://www.southcentre.org

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