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AD HOC WORKING GROUP ON FURTHER COMMITMENTS FOR ANNEX I PARTIES UNDER THE KYOTO PROTOCOL
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Item 5 (c) of the provisional agenda
Other issues arising from the implementation of the work programme of the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol
Consideration of information on potential environmental, economic and social consequences, including spillover effects, of tools, policies, measures and methodologies available to Annex I Parties

Information note to facilitate deliberations on potential environmental, economic and social consequences, including spillover effects, of implementing tools, policies, measures and methodologies available to Annex I Parties, taking into account the submissions and views contained in documents FCCC/KP/AWG/2008/MISC.5, FCCC/KP/AWG/2009/MISC.4 and other relevant documents

Note by the secretariat

Summary

This note provides information that may facilitate discussions by Parties on the potential consequences of tools, policies, measures and methodologies available to Annex I Parties in their efforts to mitigate climate change. It contains a description of a possible approach to group actions (e.g. policies, tools and measures) that may lead to either positive or negative consequences. This is followed by a detailed description of the various tools, policies and measures as well as their associated consequences.

The note also contains information on possible ways, including those proposed by Parties and relevant organizations, to take action on negative potential consequences. The note also mentions possible role players outside the UNFCCC process that could undertake activities to deal with potential consequences.

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I. Introduction

A. Mandate

1. The Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol (AWG-KP) requested the secretariat to prepare an information note to facilitate deliberations at a workshop on the consideration of information on potential environmental, economic and social consequences, including spillover effects, of tools, policies, measures and methodologies available to Annex I Parties (hereinafter referred to as potential consequences).[1] The note should take into account submissions from Parties and organizations, and other relevant documents and reports from relevant organizations.

B. Background

2. Article 4, paragraphs 8 and 10, of the Convention and Article 2, paragraph 3, and Article 3, paragraph 14, of the Kyoto Protocol provide a legal basis for the discussion on ways to minimize adverse social, environmental and economic impacts on developing country Parties, particularly those identified in Article 4, paragraphs 8 and 9, of the Convention.

3. The AWG-KP, at its second session, agreed on a work programme that included "Analysis of the mitigation potential, effectiveness, efficiency, costs and benefits of current and future policies, measures and technologies at the disposal of Annex I Parties, appropriate in different national circumstances, taking into account their environmental, economic and social consequences...".[2]

4. Following discussions at its resumed sixth session, the AWG-KP agreed on the need to deepen the understanding of the issues involved, and requested the secretariat to convene an in-session workshop at its seventh session with the objective of exchanging views on issues such as:

(a) The work under the Conference of the Parties (COP), and the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol, related to potential consequences;

(b) Information on the evidence of impacts and consequences of mitigation tools, policies, measures and methodologies available to Annex I Parties;

(c) Possible approaches to grouping the actions that lead to potential consequences;

(d) Negative consequences that affect developing countries and other countries with national circumstances that render them vulnerable;

(e) Positive potential consequences;

(f) Actions that should be taken to assess the causes and effects of potential consequences;

(g) The potential role of relevant actors outside the UNFCCC process that could address potential consequences.

C. Approach

5. A number of sources were used in writing this note. These include: submissions from Parties on issues related to potential consequences,[3] relevant information from reports of workshops and expert

[1] FCCC/KP/AWG/2008/8, paragraph 38.
[2] FCCC/KP/AWG/2006/4, paragraph 17 (a) (i).
[3] FCCC/SBI/2008/MISC.2 and Add. 1–3; FCCC/KP/AWG/2008/MISC.1 and Add.1–5 and Add.1/Corr.1; FCCC/KP/AWG/2008/MISC.5.

meetings, as well as other relevant documents on response measures,[4] and reports from relevant organizations such as the Intergovernmental Panel on Climate Change (IPCC).

6. The structure that has been adopted for the information note follows, as far as possible, the objectives of the workshop mentioned in paragraph 4 above. The note begins with a summary of the ongoing work under the UNFCCC process related to the potential consequences. This is followed by a section on a possible approach to grouping the types of tools, policies and measures available to Annex I Parties, and then the consideration of their positive and negative consequences. The note then describes some challenges and opportunities to facilitate action on potential consequences as described by Parties.

7. In order to limit the scope of the analysis in this note, and without prejudice to the decisions that the Parties might take in their further deliberations on this issue, the note:

(a) Considers only those tools, policies and measures that might be taken by Annex I Parties for the purpose of effectively addressing climate change;

(b) Considers both positive and negative consequences, while understanding that minimizing negative consequences is of primary importance. It does not consider the positive consequences of avoided climate change, although these may be substantial. Tools, policies and measures to address climate change could reduce the impacts of climate change and could reduce the costs of adaptation, with substantial benefits for all countries;

(c) Focuses primarily, but not exclusively, on those consequences that affect non-Annex I Parties.

8. Most of the potential consequences outlined depend on a large number of factors, and do not arise solely from the application of tools, measures and policies for the mitigation of climate change. Depending on these other factors, some of the potential consequences described in this note may be moderated by other developments, for instance in the world economy. There is therefore a need to craft policies carefully and ensure that the positive potential consequences of policies, tools and measures are increased and the negative consequences are minimized.

9. This note does not deal in depth with the potential consequences for other countries of the methodologies adopted by Annex I Parties to mitigate climate change. The discussions to date in the AWG-KP and in earlier work do not easily lend themselves to a clear understanding of how to interpret the mandate to consider such methodologies, and more discussion may be needed in this regard. It is important that methodologies for assessing the impacts of Annex I Parties' tools, policies and measures be in place to advance the work of the AWG-KP on these issues; the note discusses some of the associated challenges.

II. Ongoing work of UNFCCC bodies related to potential consequences

10. The impacts of the implementation of response measures, which is related to the work of the AWG-KP on potential consequences, are discussed under the Subsidiary Body for Implementation (SBI), the Subsidiary Body for Scientific and Technological Advice and the Ad Hoc Working Group on Long-term Cooperative Action under the Convention (AWG-LCA).

[4] FCCC/SBI/2006/13, FCCC/SBI/2006/18, FCCC/SBI/2006/27 and FCCC/SBI/2007/23.

11. At its twenty-eighth session, the SBI agreed on the following actions relating to the impact of the implementation of response measures in order to further the implementation of decision 1/CP.10:

(a) Enhancing practical approaches to address economic diversification in the context of sustainable development, including through exchanging information and experiences on best practices and lessons learned;

(b) Enhancing capacity for the development and use of modelling in the context of assessing the impact of the implementation of response measures, including through identifying organizations with relevant expertise and the scope of current activities in this regard;

(c) Encouraging Parties to provide, to the extent possible, information on their experiences and concerns arising from the impact of the implementation of response measures, including through national communications and other relevant documents;

(d) Promoting risk management approaches and other appropriate responses to the impact of the implementation of response measures, building upon the practical experience of international, regional and national organizations and the private sector, including through disseminating information on best practices and lessons learned.[5]

12. By its decision 31/CMP.1, the COP mandated a workshop on reporting methodologies. The report on this workshop is contained in document FCCC/SBI/2006/27.

13. The Bali Action Plan (decision 1/CP.13) calls for enhanced national/international action on mitigation of climate change, including the consideration of economic and social consequences of response measures. An in-session workshop on the economic and social consequences of response measures will be held during the fifth session of the AWG-LCA.

III. Possible approach to grouping tools, policies and measures available to Annex I Parties

14. In the following paragraphs an approach is developed that covers different types of potential actions that might be taken by Annex I Parties, and examples are offered for each type. A framework is developed which describes the various types of outcomes that might result from such actions.

15. This approach builds on the discussions that took place at the sixth session of the AWG-KP, on: actions leading to changes in technologies; switching from international to local sourcing; the adoption of standards; and tariffs, taxes and subsidies or other trade-distorting policies. The approach divides the actions, taking into account who is taking the measures in question (states, multilateral regimes), and via what mechanisms (trade policy, climate policy, domestic energy policy). It suggests three categories of policies and measures:

(a) Policies and measures that are purely domestic in scope (taxes, levies, subsidies, policy reform, public investment, cap-and-trade regimes, technology mandates);

(b) Trade-related measures (increased or lowered tariffs, standards and labelling requirements, border carbon adjustment);

(c) International responses (internationally agreed taxes and levies, internationally agreed cap-and-trade regimes, international technology cooperation).

16. These types of policies are considered in some detail in this section. For each, the most likely examples of policy initiatives are suggested, along with potential positive and negative consequences, and where possible some indication of where those consequences might fall. The resulting framework of actions and consequences is summarized in the table below.

[5] FCCC/SBI/2008/8, paragraph 38.

17. The consequences described here assume that only one policy or measure is being implemented. However, it will often be the case that several policies and measures are enacted in tandem, with results that may amplify or counter each other. Trade measures aimed at addressing competitiveness and leakage, which might lessen the potential for consequences associated with industrial relocation, for example, may accompany carbon taxes.

Indicative actions and associated potential consequences

Type	Likely actions	Possible key potential negative consequences for other countries	Possible key potential positive consequences for other countries
Purely domestic	Carbon taxes or levies	• Loss of market share for foreign exporters of conventional fuels	• Increased market share for 'green energy' technology exporters
	Subsidies	• Subsidies to domestic producers of environmentally sound technology: negative for foreign competitors	• Subsidy removal for carbon intensive goods: positive for foreign exporters of environmentally sound technology/goods
	Energy policy reform, green public investment	• For suppliers of conventional energy products	• Advantages for environmentally sound technology suppliers
	Cap-and-trade	• International relocation of industry – positive and negative	
	Goods/technology mandates	• Impacts for exporters of substitutes, • Global price increases for mandated goods, if supply is inelastic	• Advantages for exporters of similar goods
	Public research and development		• Positive technology spillovers, if results made publicly available
Trade-related	Tariffs	• Protection for domestic producers of environmentally sound goods: loss of market share for foreign competitors	• Preferential treatment for all environmentally sound goods: positive for existing exporters
	Standards and labelling requirements	• Loss of market share for producing countries • Dumping of obsolete goods in countries with lower standards	• Potential positive impacts of environmentally sound production in producing countries
	Border carbon adjustment	• Loss of market share for foreign exporters	
International	Carbon taxes or levies	• On aviation – loss of tourism revenues for airline destinations • On maritime transport – reduced trade flows	• International relocation of industry – positive and negative
	Cap-and-trade	• International relocation of industry – positive and negative	
	International offsets (clean development mechanism and joint implementation)		• Increased investment, other sustainable development benefits, in the host State
	Technology cooperation		• Positive technology spillovers, if results made publicly available
	Subsidy reform	• Consumer subsidies: negative social impacts	• Producer subsidies: positive impacts on low-cost fossil fuel exporters

18. It is assumed that, even in the event of negative consequences, no mitigating policy efforts are devoted to softening the impacts. In fact such efforts could be expected in many cases. But the present discussion, focusing as it does on consequences of policies and measures, does not consider the possibility of any ameliorative actions. The aim of this note is to aid the Parties as they discuss which actions of that sort might be warranted, and in what circumstances.

19. Finally, it should be noted that the consequences described in this note are a mix of those that are potentially significant and those that may not merit much attention. A key task in moving forward will be to focus the discussion on those impacts that matter, both in terms of the magnitude of impacts, and in terms of the vulnerability of those potentially impacted.

1. Purely domestic policies and measures

20. These are national-level responses to climate change that seek to address climate change through some change or innovation in domestic regimes, whether through industrial policy, regulatory reform, fiscal policy or other means.

21. **Carbon taxes or levies** have been implemented in several countries, and have been proposed in many others. They are generally based on the carbon content of the covered items, and tend to be focused on energy products such as fuels. Imported fuels are also subject to the schemes, as the tax is typically levied at the point of domestic sale. The key overseas consequences of such taxes would fall upon foreign exporters of relatively carbon-intensive energy products such as oil and coal, who could see their market share drop as the relative prices of their goods increased. Conversely, foreign exporters of environmentally sound energy technologies would see increased market share.

22. **Subsidies**: Two types of policies and measures might be envisaged. The first is subsidies granted to the production or consumption of low-carbon technologies or goods, such as biofuels or solar photovoltaic power. Production subsidies would typically be available only to domestic producers, and thus would have the consequence of decreasing market share for foreign producers of those goods or their substitutes. Consumption subsidies (rebates to buyers of residential solar systems, for example), on the other hand, do not discriminate between foreign and domestic producers, and would potentially have positive consequences for foreign exporters.

23. A second type of policy is the removal of existing subsidies to greenhouse gas (GHG) intensive technologies or goods. Again it is useful to distinguish between producer and consumer subsidies. In the context of fossil fuels, for example, some developed countries predominantly employ producer subsidies; a reduction in those subsidies would probably be beneficial for developing country exporters of the affected goods who would see their market shares increase, although country-level demand overall would probably fall. This depends on the assumption that decreased producer subsidies would increase fossil fuel prices in the country – a result that may or may not actually obtain, depending on the assumptions used. Consumption subsidies for fossil fuels, on the other hand, are predominantly used in developing countries,[6] and their removal would increase prices for domestic consumers, decreasing demand for imports. In its submission,[7] New Zealand noted that total fossil fuel subsidies in Organisation for Economic Co-operation and Development (OECD) economies exceed USD 60 billion annually, whereas total subsidies in non-OECD countries exceed USD 90 billion. The reduction of demand for imports would be lessened by the fact that the largest consumer subsidy programmes are established in countries with predominantly domestic production.

24. **Energy policy reform, 'green' public investment:** Subsidies, discussed above, are one way that Annex I Parties might attempt to spread environmentally sound technologies more widely, in an effort to meet their obligations under the Kyoto Protocol. A number of other possible policies and measures might deliver similar results, such as energy policy reform (feed-in tariffs, renewable sourcing mandates and green certificates, etc.), and dedicated green public investment (public funding for environmentally sound energy infrastructure such as smart grids). Both types of actions could stimulate demand for environmentally sound technologies. Provided that such actions did not discriminate against foreign suppliers of technology, the impacts would be positive for foreign environmentally sound technology producers, and to the detriment of producers of conventional energy products. If the market was large enough, or there was enough public support, there might be positive technology spillover benefits to all countries. Governments in both developed and developing countries have been major funders of large-scale transportation infrastructure such as roads, rail and airports. Dependence on oil-based transportation infrastructure is a result both of policy decisions and of settlement structure and could be addressed through policy reform, with positive consequences for alternative transportation providers and producers of alternative fuels.

[6] International Energy Agency (IEA). 2008a. *World Energy Outlook 2008*. Paris: IEA. p. 62.
[7] FCCC/SBI/2008/MISC.2.

25. **Cap-and-trade schemes**: Implemented only at the domestic/regional levels, and assuming they involve stringent reductions of GHG emissions, these may induce some industrial relocation, or some redirection of greenfield investment, to less regulated host countries.[8] This would involve negative consequences for the implementing country, which loses employment and investment. It would involve indeterminate consequences for the countries that would host the relocated industries. On the positive side, such relocation brings employment and investment for the host States. On the negative side it might also result in the 'dumping' of obsolete, energy-intensive and/or highly polluting technologies in the host countries, locking them into modes of production that would not serve them well in the long run.

26. As background to the discussion on industrial relocation, it is worth noting that company relocation and diversion of greenfield investment do not happen easily, and that environmental regulations are only one of many factors that must weigh in such decisions. Such factors include labour costs, proximity to needed natural resources, available infrastructure (energy, communications, transportation), proximity to markets, property rights (and rule of law in general), political risk and macroeconomic stability, and so on. Studies to date have found only limited industrial relocation or diversion of investment in response to environmental regulations – typically only in sectors in which energy costs are a particularly significant cost element.[9]

27. **Goods/technology mandates:** Governments may mandate the use of a particular technology or good in an effort to combat climate change. The biofuel use mandates applied in several OECD countries are a good example. These policies and measures may have positive impacts for foreign exporters of the technology or goods in question, provided their exporters are allowed to benefit from the scheme. Conversely, they will have negative impacts on those foreign exporters that produce substitutes for the good or technology in question. Depending on the magnitude of demand created by the mandate in question, indirect impacts may be important. To take the biofuel example once again, if biofuel mandates create enough demand for feedstocks, there may be indirect social consequences (rising global food prices) or environmental impacts (increased deforestation for feedstock cultivation).

28. **Public research and development**: Governments may undertake or support **research and development** (R&D) in technologies that will address climate change. Where the results of that R&D are made freely available to the rest of the world, there would be positive consequences (e.g. increased energy security and air quality from new environmentally sound energy technologies). Where the results are made available on commercial terms there would still be benefits for other countries from the innovations that result, although not as great. However, if such commercial terms or other barriers make licensing of innovations to other countries difficult, there may in fact be negative consequences if the innovating country can use the new technology to gain competitive advantage.

2. Trade-related measures

29. Many of the impacts described above are felt through the mechanism of trade; demand for imported goods is stimulated or decreased in the implementing country, with impacts felt by foreign exporters. The class of policies and measures considered in this section also has trade-related consequences, the difference being that these are applied directly to imports. These measures are considered separately from those above because they are legally quite distinct, and because they entail different international institutions and potential solutions from those that are purely domestic in character.

30. **Tariffs**: Tariffs can be lowered to grant special preference to climate-friendly goods, or they can be maintained at high levels to discourage trade in GHG-intensive goods and services. In practice the latter option is not often considered, and any tariff increases would have to respect the bound tariff rates

[8] For a survey of the literature to date, in the context of the European Union emissions trading scheme, see: IEA. 2008b. *Issues behind Competitiveness and Carbon Leakage: Focus on Heavy Industry*. IEA information paper. Paris: IEA. This finds minimal impacts in the sectors examined.

[9] See: Cosbey A and Tarasofsky R. 2007. *Climate Change, Competitiveness and Trade*. A Chatham House Report. London: Chatham House.

to which countries have committed in the context of the World Trade Organization (WTO). Tariff preferences, however, have been widely discussed; there is a mandate under the WTO Doha Round of trade talks to reduce or eliminate tariffs on an agreed list of environmental goods and services, some of which would probably be preferable from a climate change perspective.[10] Such preferential treatment would benefit exporters of the goods in question, but liberalization would also make it difficult for potential producing states to nurture infant industries, or protect desired domestic industries, in the affected sectors. This protection is another possible use of tariffs in the service of climate change objectives: tariffs as protective barriers to shelter domestic producers of climate-friendly goods.

31. **Standards and labelling requirements**: These are typically domestic schemes, but they apply directly to imported goods as well, and thus are covered explicitly under WTO law.[11] Standards and labelling can apply either to the performance and characteristics of the good itself (e.g. efficiency standards), or to the method of production (e.g. sustainability standards for biofuels). There is some scope for the first type of standards and labelling to reduce market share, even for efficient exporters, if they are set inappropriately; but WTO law aims to prevent such outcomes. The second type exists in a grey area of WTO law, with no precedent cases under the agreement covering standards. Potential impacts of such standards include loss of market share for foreign exporters that do not or cannot comply. They may also engender positive environmental impacts in complying producer countries, depending on the specifications they contain.

32. Another trade-related impact may result from the raising of product standards in one country, which may cause out-of-standard goods and technologies to be exported to (dumped in) other countries that do not yet adhere to such standards.

33. In some Annex I Parties, private enterprises have introduced labelling that show air miles embodied in various products such as imported food – the so-called food miles. These types of standards often do not take into account all relevant variables. Specifically, there is evidence that shows that in some cases the manner of production is more important, from a climate change perspective, than how far the goods in question travelled.[12] Such standards may be seen as attempts to exclude certain imported products, with a view to protecting domestic suppliers. In its submission, New Zealand proposed that future designing of international measures to address climate change should be based on rigorous and sound scientific evidence. It noted that there is not, as yet, any internationally recognized standardized approach to measuring the GHG profile or carbon footprint of goods and services. This is an area that needs considerable research.

34. **Border carbon adjustment**: Countries that take strong measures to address climate change often also consider parallel measures to address what they see as competitiveness and carbon leakage problems. Among these measures are two types of border measures that have been widely proposed to impose costs on imports equivalent to that faced by domestic producers. The first, usually considered as a complement to a carbon tax regime, is a tax adjustment, which imposes a levy on imported goods equal to that which would have been imposed had they been produced domestically. The second, considered as a complement to a cap-and-trade regime, is a requirement to buy offsets at the border equal to that which the producer would have been forced to purchase had the good been produced domestically. The impact of such schemes would be functionally equivalent to an increased tariff: decreased market share for covered foreign producers. While border carbon adjustment in and of itself would involve negative consequences for foreign producers, such schemes would not likely be implemented in isolation, but would function as parallel initiatives to climate change action in the implementing state. If they were

[10] Doha Ministerial Declaration, paragraph 31 (iii). Available at <http://www.wto.org/english/thewto_e/minist_e/min01_e/mindecl_e.htm>.

[11] The applicable law is the Agreement on Technical Barriers to Trade.

[12] See, for example: Saunders C, Barber A and Taylor G. 2006. *Food Miles – Comparative Energy/Emissions Performance of New Zealand's Agriculture Industry*. Lincoln University Research Report No. 285; and Williams A. 2007. *Comparative Study of Cut Roses for the British Market Produced in Kenya and the Netherlands*. Précis Report for World Flowers.

implemented fairly, such schemes would leave trade and investment patterns unchanged, being aimed at just offsetting the competitiveness impacts of domestic policies such as carbon taxes or cap-and-trade.

3. International responses

35. The policies and measures described in this section would be undertaken or coordinated at the international level, the result of international or multilateral agreement. They are grouped together because the impacts of such policies and measures are often different in nature from those implemented domestically. It may be easier to address or avoid their negative consequences, given their multilateral character.

36. **Carbon taxes or levies**: If the nature of the agreement on such measures is that they will be differentially applied to different countries, perhaps in respect of the principle of common but differentiated responsibilities, then the impacts will be much the same as if they were applied at the domestic level, which is discussed in paragraphs 20–28 above. The positive and negative potential consequences of industry relocation would hold true as well.

37. If the regime for applying such taxes or levies were global, then the impacts would depend on the nature and scope of the scheme. Several such schemes have been proposed. A climate change levy on aviation would have negative impacts on exporters of goods that rely on air transport, such as cut flowers and premium perishable produce. It would also have a negative impact on the export of tourism services, as air travellers would face increased costs of holidays. This might be a particular concern for developing countries with high tourism dependency. A climate change levy on maritime shipping would increase the costs of a large percentage of international trade. Depending on the level of the charge, this could have significant impacts on the viability of exports as an engine of development in developing countries, particularly with respect to bulky or heavy goods, where transport makes up a large percentage of total costs.

38. **International offset mechanisms**: The clean development mechanism (CDM) under the Kyoto Protocol allows Annex I Parties to achieve mitigation objectives by methods that foster sustainable development in developing countries. The joint implementation facility allows for mitigation objectives to be achieved among Annex I Parties. In both cases, one of the essential consequences would be the support for sustainable development, including increased investment and employment in the host country. There may also be co-benefits such as improved air quality and improved public health, as the projects implemented in the host country may reduce the need for the burning of polluting fossil fuels.

39. **Technology cooperation:** There are a number of ongoing international efforts aimed at fostering innovation, and at the development and dissemination of technologies that can help address climate change concerns. The discussion above on domestic-level R&D efforts underscored the possibilities that can result from such efforts. If the resulting technological breakthroughs are publicly available, then such efforts will have positive consequences even for the non-participating countries. If they are commercially available, then the benefits may still exist, but in lesser measure. If they are not available to be licensed, there may be negative consequences for the non-participating countries.

40. **Subsidy reform:** There have been calls for an international approach to reducing fossil fuel subsidies.[13] Should such an effort materialize, the consequences would depend on the nature of the subsidies addressed. As noted above, fossil fuel subsidies tend to be grouped as either producer subsidies (primarily granted in developed countries) or consumer subsidies (primarily granted in developing countries). The reduction of producer subsidies would presumably raise the price of fossil fuels in those countries.[14] Depending on the price elasticity of demand, this might entail more revenues for foreign producers. International efforts to reduce consumer subsidies would have negative

[13] United Nations Environment Programme (UNEP). 2008. *Reforming Energy Subsidies: Opportunities to Contribute to the Climate Change Agenda.* Paris: UNEP.

[14] This result is not automatic, particularly since the market for oil is global.

consequences for affected consumers in developing countries if these are not accompanied by social adjustments – consequences that could be significant for the poor.

IV. Negative potential consequences of tools, policies and measures

41. The previous section discussed a number of possible Annex I Parties' tools, policies and measures to mitigate climate change, and noted the types of consequences that might flow from them, including economic, environmental and social impacts. Some of the potential negative consequences are discussed in greater depth below.

42. **Declining demand for exports of fossil fuels conventional technologies**: One of the most discussed negative consequences of mitigation policies that reduce global consumption of fossil fuels is a decline in revenues expected by fossil fuel producing and exporting nations – a number of Parties have acknowledged this in their submissions (Australia, the European Community and Saudi Arabia).[15] The IPCC [16] confirms that fossil fuel producing and exporting nations may expect lower demand, prices and gross domestic product growth due to mitigation policies. Estimates of actual revenue losses vary widely depending on the assumptions used (see discussion on modelling below), but there is general agreement that Annex I Parties' mitigation policies will result in significant loss as compared with baseline projections, although revenues may still grow.

43. In its initial national communication to the UNFCCC, the Islamic Republic of Iran presented modelling results that predict revenue losses from oil sales under a number of different scenarios. Under a scenario which includes the application of Kyoto Protocol flexibility mechanisms, but in which the United States of America is not participating, world crude oil prices are estimated to drop by 3.54 per cent from baseline, entailing a loss of revenue of USD 900 million in 2010.

44. In its initial national communication to the UNFCCC, Saudi Arabia presented modelling results estimating that the impact of the response measures of Parties listed in Annex B to the Kyoto Protocol up to 2030 would result in damages to its economy with a present value of between USD 100 billion and USD 200 billion.

45. South Africa, in its initial national communication to the UNFCCC, predicted a drop in coal exports to Annex I Parties (80 per cent of its current market share), which would have a significant effect in a country that in 2000 was the world's second largest exporter of coal.

46. The same impacts can be expected by those countries that export other conventional energy technologies and products; as incentives change to favour green technologies and products, the market for the exports of these countries will shrink, with negative economic consequences on welfare and employment. Most of the policies described above have the potential to create such impacts by changing the market incentives to favour environmentally sound goods and technologies.

47. **Increased costs of traditional exports**: Several types of tools, policies and measures will increase the costs of traditional exports – a negative economic consequence. Some would do this by increasing the costs of commercial transport as, for example, carbon taxes, and international levies on air and maritime freight. The export of tourism services may also be affected by aviation levies – a particular concern for those developing countries that are highly dependent on tourism revenues. Other actions such as border carbon adjustment would increase the costs of traditional exports; standards and labelling may demand costly changes to the production process. Tariffs, subsidies and public support to benefit domestic producers of environmentally sound technology and goods would have the same impact on foreign suppliers of those technologies and goods. Exports are widely seen as a viable engine of

[15] FCCC/KP/AWG/2008/MISC.1 and Add.2.

[16] Metz B, Davidson OR, Bosch PR, Dave R and Meyer LA (eds.). 2007. *Climate Change 2007: Mitigation of Climate Change. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge and New York: Cambridge University Press.

economic development, and the economic and social consequences of dampening their viability may, for some countries and sectors, be significant.

48. **Food insecurity**: Policies to support some green technologies and goods may have significant indirect impacts. A recent example is the support of Annex I Parties for biofuels as a low-carbon alternative to fossil fuels for transport. If this support reaches a significant scale, the competition between feedstock for biofuels and food and feed crops could result in increased food prices, with negative social consequences, in particular for those whose food budgets are a high percentage of their total income. Rosegrant (2008)[17] recently estimated that biofuels demand is responsible for 21 per cent of global rice price increases, and 22 per cent of wheat price increases. In its submission[18] Tuvalu underlined that lower income non-Annex I Parties may suffer severely from the potential consequences of measures such as the production of biofuels.

49. **Transfer of polluting goods, industries**: Some tools, policies and measures taken in Annex I Parties may facilitate the relocation of highly polluting industries in those non-Annex I Parties that have lower pollution standards. Carbon taxes, cap-and-trade schemes and other forms of disincentives to GHG-intensive production may have this effect. The results for the new host countries, while potentially positive in economic terms as noted above, may be negative in other ways, leading to a worsening of air quality and (if their energy demand is significant) a deterioration of energy security. Even in economic terms, in the long run it may turn out that the most viable exporters are those that employ new efficient technologies. Most equilibrium modelling cited in the Third Assessment Report (AR3) of the IPCC expects economy-wide carbon leakage in the order of 5–20 per cent, which would be less if technologies were effectively diffused. However, critical uncertainties remain since modelling depends strongly on assumptions related to policy decisions and energy market conditions. Research carried out since the publication of the AR3 support its conclusion that "reported effects on international competitiveness are very small and that at the firm and sector level, given well-designed policies, there will not be a significant loss of competitiveness from tax-based policies".[19]

50. Some actions by Annex I Parties may lead to a dumping of obsolete goods in developing countries. A tightening of labelling and standards designed to increase energy efficiency, for example, may result in older (more energy-demanding) stock being marketed in developing countries where the higher standards have not yet been implemented. Again the result could be an increase in local pollution associated with energy production, and a deterioration of energy security.

51. **Distortion of international investment**: In its submission,[20] Japan noted that distortions of investment could arise from the introduction of emission reduction obligations for a limited number of countries.

52. **Environmental damage from new exports:** Annex I Parties' tools, policies and measures may stimulate new flows of exports from developing countries, which could have environmentally damaging consequences. If the production of new environmentally sound technologies entails environmental damage, for example, then schemes to stimulate dissemination of that technology will, in the absence of strong environmental regulatory regimes, have negative consequences. An example that has been mentioned is the stimulation of demand for palm oil as a biofuel which may, if the incentives are powerful enough, lead to a loss of biodiversity in producing countries as primary forests are cleared for plantations. Such impacts may be blunted by agreement on standards and labelling.

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[17] Rosegrant MW. 2008. *Biofuels and Grain Prices: Impacts and Policy Responses*. Testimony before the United States Senate Committee on Homeland Security and Governmental Affairs.

[18] FCCC/SBI/2008/MISC.2/Add.1.

[19] Metz B, Davidson OR, Swart R and Pan J (eds.). 2001. *Climate Change 2001: Mitigation. Contribution of Working Group III to the Third Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge and New York: Cambridge University Press.

[20] FCCC/KP/AWG/2008/MISC.5.

V. Positive potential consequences of tools, policies and measures

53. A number of potential positive consequences of tools, policies and measures may arise – several of the key impacts are discussed in greater depth in this section.

54. **Increased market access for environmentally sound goods and technologies:** Many types of mitigative actions promote the uptake and dissemination of environmentally sound technologies in such areas as energy, buildings and transportation. These actions may stimulate demand for such goods and technologies from foreign suppliers, with the result of increased incomes in the exporting countries. For example, the economies of countries such as Denmark, Germany, India and Spain that produce wind turbines for the global market have benefited by supplying those technologies. Actions that have such consequences include removal of trade-distorting subsidies, policy reform, green public investment, goods and technology mandates, tariff lowering, standards and labelling, and international efforts at reducing fossil fuel producer subsidies. Japan noted in its submission that new industries and jobs could be created as a result of stimulated demand for green technologies. In addition, wider usage of biofuels could create new indigenous industries that enhance the participation of new biofuel producers in the economy, as noted in the contribution of Working Group III to the IPCC AR4.

55. However, these benefits will accrue only where there are no barriers to block the flow of green goods and technology in response to the price signals sent by Annex I Parties' mitigation actions. If, for example, a government launches a campaign of investment in environmentally sound energy, but decrees that only domestic technology suppliers are eligible for contracts, the potential positive consequences will not materialize.

56. **Improved air quality (environmental co-benefits)**: A number of types of tools, policies and measures will lead to reduced pollution in other countries as a result of reduced consumption of polluting fuels. Many CDM projects have such benefits, for example. These sorts of benefits might also result from purely domestic mitigation efforts that reduce transboundary pollution. Reduced air pollution has significant social benefits as well, as it reduces public health problems. Actions that may directly reduce foreign consumption of polluting fuels include international offset regimes, standards and labelling regimes and border carbon adjustment – the latter two potentially acting as a spur to environmentally sound production in exporting countries. Actions that have potential to indirectly reduce pollution abroad (via reduced transboundary effects of domestic pollution) include many of the measures surveyed above – most of them at some level reduce the use of polluting fuels in the implementing country.

57. **Technology spillover**: Those tools, policies and measures that drive technological innovation could have positive international impacts beyond the boundaries of the innovating state, in that they advance technology globally. Assuming some avenues for technology transfer, such as trade and investment, the existence of improved or innovative technologies eventually results in positive consequences for all (particularly for energy-intensive industries). Studies of the diffusion of technologies show that as energy-efficient, cost-effective technology is introduced in one part of the world, both end-use and energy-supply technologies diffuse to other countries. In a few cases, 'technological leapfrogging' may occur as developing countries bypass intermediate technologies and move straight to more advanced ones. This has happened in communications technology with wireless mobile phones and with biofuels. The primary impacts include improved environmental quality, and increased economic well-being brought by greater efficiency of resource use, as well as increased energy security. Technology cooperation and support for R&D will drive such benefits directly, but in fact any policy that limits GHG emissions will create incentives for innovation to some degree. These positive spillover effects have also been identified by Japan in its submission.

58. **Regulatory spillover**: Standards and regulations of certain classes of products may spill over into other countries if producers in those countries voluntarily comply with these standards. This would have positive consequences for the quality of the environment in those countries.

59. **Lowered fossil fuel prices**: Those tools, policies and measures that reduce demand for fossil fuels will thereby reduce the global demand and world prices for those fuels. This acts as a powerful

economic benefit for those countries that are net importers of those goods, entailing social benefits as well in terms of raised living standards. A number of purely domestic actions will have this effect, including: carbon taxes or levies, subsidy reform, energy policy reform, green public investment and cap-and-trade schemes.

60. **Relocation of industry**: Some Annex I Parties' actions will, other things being equal, tend to drive industrial relocation to countries whose jurisdictions regarding carbon constraints are not as onerous. The literature suggests that only a few sectors are vulnerable to such impacts, and only under conditions of ambitious unilateral domestic action.[21] If managed effectively, the result may yield socio-economic benefits for the new host country. The types of policies that may result in such impacts are cap-and-trade regimes, carbon taxes and levies. The contribution of Working Group III to the IPCC AR4, however, notes that these impacts are unlikely, given the array of tools available for Annex I Parties to address competitiveness and leakage concerns, including free allocation, border carbon adjustment, and others.

VI. Challenges and opportunities to facilitate action on potential consequences

61. As the examples in this note illustrate, there are a number of positive and unintended negative potential consequences of mitigation tools, policies and measures. The first lesson to be drawn from this is the need to design policies carefully and consider the full consequences of the mitigation actions of Annex I Parties. Awareness of these consequences can assist Parties in designing mitigation policies in a way that will maximize the positive potential consequences of the policies, tools and measures available to them.

62. At an expert meeting on response measures,[22] participants suggested a possible work programme that could include such issues as:

(a) Improving modelling, and enhancing tools and methodologies;

(b) Developing risk and financial management strategies for the short term;

(c) Developing instruments for long-term interventions, such as economic diversification.

63. In discussions at an expert meeting on economic diversification in the context of minimizing adverse impacts of response measures,[23] participants emphasized need for the consideration of the integration of sustainable development strategies in efforts aimed at economic diversification in developing countries, technical and financial assistance to developing countries, and identifying how existing mechanisms and initiatives under the climate change process can contribute to economic diversification in vulnerable countries. Processes and organizations outside the UNFCCC process, such as the United Nations Conference on Trade and Development (UNCTAD), the World Bank, the International Monetary Fund, regional development banks and the Commission on Sustainable Development, were considered useful potential players in this.

64. Participants at a workshop on reporting methodologies[24] reiterated a number of provisions of decision 31/CMP.1, including the importance of consistency, transparency, comparability, accuracy and completeness when reporting information on response measures.

[21] Cosbey and Tarasofsky, 2007; IEA, 2008b; and Hourcade J-C, Demailly D, Neuhoff K and Sato M. 2007. *Climate Strategies Report: Differentiation and Dynamics of EU ETS Industrial Competitiveness Impacts.*
[22] FCCC/SBI/2006/13.
[23] FCCC/SBI/2006/18.
[24] FCCC/SBI/2006/27.

65. In its submission, Saudi Arabia reiterated the need to base any action to minimize the adverse potential consequences on developing countries on the provisions of Article 2, paragraph 3, and Article 3, paragraph 14, of the Kyoto Protocol. It further suggested the consideration of:

(a) Funding, insurance and technology transfer arrangements to be provided by Annex I Parties to developing country Parties;

(b) Assessment of impacts of response measures;

(c) Enhancement of reporting, monitoring and verification.

66. In its submission, New Zealand underlined the need for an effective multilateral response to ensure that trade measures developed and implemented as part of an international policy response to climate change reflect a wider international consensus.

67. In a submission[25] on behalf of Colombia, Costa Rica and Mexico, Panama indicated a wish for the COP to request the IPCC to develop a special report on potential environmental, economic and social consequences, including spillover effects, of tools, policies, measures and methodologies available to Annex I Parties for mitigating climate change. The report should also include information on how to assess and rank these potential consequences. This report should identify, assess and quantify, when possible, all potential spillover effects at both regional and global levels. It should further provide ideas on alternatives and possible solutions at those levels. This information could serve to shape options to effectively address these issues in the negotiations and to improve decision-making within developed and developing countries.

68. Colombia, Costa Rica, Mexico and Panama also indicated that owing to lack of information on spillover effects in their region, they recognize the need to immediately begin work with various organizations, United Nations agencies and other multilateral organizations and civil society on a regional assessment to better understand the key issues that could affect them. These Parties are concerned about, among other things, spillover effects on non-tariff barriers, dumping, tourism, food safety, forestry and employment; and would like to develop possible solutions to address them effectively. Such a regional assessment should not be considered as a substitute for an IPCC special report, but rather as an additional tool to address spillover effects, since there is a clear gap of knowledge in Central America regarding these matters.

VII. Conclusions

69. As recognized in decision 5/CP.7, "responses to climate change should be coordinated with social and economic development in an integrated manner with a view to avoiding adverse impacts on the latter, taking into full account the legitimate priority needs of developing countries for the achievement of sustained economic growth and the eradication of poverty". This note is aimed at facilitating discussions that could more effectively fulfil these provisions.

70. It may be noted that the issues dealt with are inherently difficult for the climate change regime to address in isolation, as they deal by definition with impacts that go beyond climate change, to economic, social and non-climate environmental consequences. It is likely that an effective effort at assessing the potential consequences and at developing measures to avoid or lessen the most serious impacts, will also involve the efforts of others outside the UNFCCC process.

71. As mentioned by Parties in their discussions on this matter, there is a need to deepen the understanding of the full nature and scale of such impacts. While all the consequences mentioned in this note are possible, some will be more significant than others, and should be addressed with greater urgency. Parties attending the workshop referred to in paragraph 4 above may wish to continue the discussions on how to assess these impacts, as well as how to advance thinking on how different consequences interact with each other and how an integrated assessment could be developed.

[25] FCCC/KP/AWG/2009/MISC.4.

72. Impacts would vary from issue to issue. Regarding standards and labelling, for example, the International Organization for Standardization is currently involved in creating climate-related standards. The WTO process will be relevant to any measures that have trade impacts and are covered under WTO law. The OECD and the International Energy Agency, among others, might be appropriate partners given their previous activity in this area. Generally, on environmental impacts, the United Nations Environment Programme (UNEP) or other relevant multilateral environmental agencies may provide information on potential consequences. On public finance, UNEP might again be a good collaborator, on the strength of its work on a new green deal. Other organizations such as UNCTAD and the regional economic commissions could also undertake work in this area. Civil society and academia could also yield potentially useful collaborators, depending on the issues at hand.

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