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THE IMPACT OF TRADE LIBERALIZATION ON AGRICULTURAL BIOLOGICAL DIVERSITY

A synthesis of assessment frameworks

Note by the Executive Secretary

I. INTRODUCTION

1. The present note was prepared pursuant to decision VI/5, on agricultural biological diversity, of the Conference of the Parties to the Convention on Biological Diversity. In paragraph 17 of this decision, the Conference of the Parties requested “the Executive Secretary to further study the impact of trade liberalization on agricultural biodiversity, in collaboration with the United Nations Environment Programme, the Food and Agriculture Organization of the United Nations, the World Trade Organization and other relevant organizations”. The request of the Conference of the Parties in decision VI/5 came further to a note prepared by the Executive Secretary, entitled “Assessing the impact of trade liberalization on the conservation and sustainable use of agricultural biodiversity” (UNEP/CBD/COP/6/INF/2), which was prepared in response to decision IV/6, on agricultural biodiversity.

2. The earlier note gave a broad analysis of the impacts trade liberalization may have on agricultural biological diversity, and drew some general conclusions. It gave a brief description of the extent of trade restrictions and distortions in the agricultural sector and of the trade liberalization agenda in the Agreement on Agriculture of the World Trade Organization (WTO), with its disciplines on market access restrictions, on export subsidies and on trade-distorting domestic support. This description served as a basis to extrapolate probable impacts of liberalization on changes in relative prices, and to further explore how changes in relative prices alter the allocation of resources within agricultural production. The impacts of altered allocations within agricultural production – in particular the alternations in land use and the level of production intensity – on biological diversity were then examined as a next step. This

* UNEP/CBD/COP/7/1 and Corr.1.

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sequence allowed deducing the – largely indirect – impacts of trade liberalization on agricultural biodiversity.

3. The earlier study had already strongly underlined that it is very difficult if not impossible to draw clear-cut conclusions on a global level in regard to the impact of trade liberalization on agrobiodiversity. ^{1/} In general, the analysis given in the earlier study identified both beneficial and detrimental effects, with overall, global outcomes that would qualify as ambiguous from a theoretical perspective. Empirical assessments would be necessary to identify the direction of the overall effect. However, data gaps and methodological problems were said to impair the quality and reliability of empirical assessments, especially on a highly aggregated, global level.

4. The study concluded that, in order to draw more specific conclusions and, most importantly, to enable the identification of adequate policy responses to maximize potential synergies and mitigate any negative trade impacts, more disaggregated assessments on the impacts of specific measures of trade liberalization need to be carried out at national or regional levels. Several frameworks are under development or already in use to undertake such environmental assessments. The purpose of the present note is to provide an overview on the different assessment frameworks at hand, and to have a closer look at the methodological problems referred to in the earlier study. ^{2/} In particular, the note analyses how and to what extent these frameworks take specifically the impacts on agrobiodiversity into consideration, and also identifies key challenges and opportunities for further research and integration of biodiversity and agricultural biodiversity impacts into these different frameworks.

5. Several assessment frameworks have been developed by international organizations and by regional economic organizations. Moreover, in Canada and the United States, national governments are required to undertake environment impact assessments pursuant to trade liberalization measures. These States are therefore in an advanced stage of developing national frameworks for undertaking such assessments, which are therefore also taken into consideration.

6. The present note will cover the following assessment frameworks:

(a) ***International organizations:***

- (i) The Methodologies for Environmental and Trade Reviews of the Organization for Economic Cooperation and Development (henceforth: OECD framework);
- (ii) Integrated Assessment Methodology of Trade-Related Policies of the Economics and Trade Branch of the United Nations Environment Programme (UNEP framework);

(b) ***Regional economic organizations:***

- (i) The Assessment Framework of the North American Commission for Environmental Cooperation (CEC framework);
- (ii) The Sustainability Impact Assessment Methodology of the European Commission, currently under development by the Institute for Development Policy and Management of the University of Manchester (EC framework);

^{1/} See section IV of document UNEP/CBD/COP/6/INF/2, and in particular paragraphs 89, 93, 99, 105 and 109.

^{2/} It is noteworthy that the term *methodology* is also used to characterize such an overarching framework. However, some confusion may arise, because this term is also used sometimes to refer to the technical, analytical tools to conduct the actual assessment (e.g. general equilibrium models, etc). To avoid such confusion, the term *methodology*, in the present note, will be used exclusively for such analytical tools.

(c) *States:*

- (i) The Canadian National Framework for Conducting Environmental Assessments of Trade Negotiations (henceforth: Canadian framework);
- (ii) The U.S. Guidelines for Environmental Review of Trade Agreements (henceforth: US framework).

7. The organizations and States enumerated in the previous paragraph were invited to collaborate in the preparation of this note by completing a questionnaire provided by the Secretariat, reproduced in the annex of the present note. They were also invited to provide comments on the first version of the note. In addition, the following organizations were also invited to provide comments and input on the first version of the note: the Food and Agriculture Organization of the United Nations (FAO), World Trade Organization (WTO), the International Association for Impact Assessment (IAIA), the International Centre for Trade and Sustainable Development (ICTSD), the Institute for European Environment Policy (IEEP), the International Institute for Sustainable Development (IISD), IUCN – The World Conservation Union, and WWF.

8. It is noteworthy that a recent study undertaken by the Forest Products and Economics Division of the FAO also reviewed environmental/integrated assessments of trade and trade-related policies, with a focus on their application to the forestry sector. ^{3/} This study also identified, and briefly described, the main international initiatives, approaches and methodologies for trade assessments. Furthermore, a few studies that have applied trade assessment frameworks to the forestry sector were also reviewed.

9. The present note adopts the definition of agricultural biodiversity given in the earlier study. This study, by referring to the appendix of decision V/5 of the Conference of the Parties, noted that agricultural biodiversity includes crops and domesticated livestock, their wild relatives as well as wild flora and fauna ecosystems, as well as numerous interacting species such as pollinators, symbionts, pests, parasites, predators and competitors. It also cautioned that, as the distribution of these components as well as possible impacts on them are different and uneven among regions, they may need different and mutually supportive policy approaches. ^{4/}

10. The note proceeds as follows. Section 2 provides background information on the development of the framework and brief descriptions of their main features. Section 3 focuses on analyzing how and to what extent biodiversity is covered in the frameworks. Section 4 describes identified deficits and subsequent need for further research. Section 5 summarizes and concludes.

II. OVERVIEW OF ASSESSMENT FRAMEWORKS

11. This section provides background information on the development of the frameworks and brief descriptions of their main features. It also provides information on relevant documentation and where to find specific studies carried out under the respective framework. In addition, the balanced trade webpages of the WWF also provide collections of assessment studies, by sector (including agriculture) and by country/region (see <http://www.balancedtrade.panda.org/>).

OECD framework

12. The OECD “Methodologies for Environmental and Trade Reviews” trace their origin to the second of the “Procedural Guidelines on integrating trade and environment policies.” of 1993. ^{5/} The

^{3/} FAO (2003): *Environment assessments of trade in the context of sustainable forestry management*. Forest Products and Economics Division, Rome.

^{4/} See UNEP/CBD/COP/6/INF/2, paragraphs 6 – 9.

^{5/} See OCDE/GD(93)99, available at www.oecd.org/trade or www.oecd.org/environment .

guidelines stated that “Governments should examine or review trade and environmental policies and agreements with potentially significant effects on the other policy area early in their development to assess the implication for other policy area and to identify alternative policy options for addressing concerns. Governments should follow-up as appropriate: to implement policy options; to re-examine the policies, agreements and any measures in place; and to address any concerns identified in the conclusion of such re-examinations”.

13. Further to a request of OECD Ministers in June 1993, the methodologies were worked out in the Joint Session of Trade and Environment Experts – made up of environment policy and trade policy government officials – and endorsed by Ministers in 1994. ^{6/} They are in two parts:

- (a) Environmental reviews of trade policies and agreements; and
- (b) Trade reviews of environmental policies and agreements.

14. The OECD document for environmental reviews provides a general framework that is intended to apply to both national trade measures and trade agreements concluded among two or more countries. As different types of trade policies and agreements will have different types and levels of environmental impacts, and as it is not evident that all trade policies and agreements should be subject to environmental reviews, guidance is offered on the potential candidates for environmental reviews. In particular, tariffs and related measures, non-tariff measures, trade-related subsidies and TRIPs are identified as main types of national trade measures or instruments. Trade liberalization agreements, commodity agreements, preferential trade agreements and sectoral trade agreements are identified as multilateral candidates.

15. Guidance is also provided on the procedural and design aspects of reviews. It is noted that the extent and complexity of environmental reviews will differ according to the type of trade measure or agreement and the legal or administrative structure of the country or countries concerned. Methodologies for reviewing trade policies and agreements will have to be adapted to national legalities and capabilities. As a general rule, environmental reviews should be conducted as early in the policy-making process as possible so that the results of the review can be integrated into this process and help shape the final form of the trade measure or agreement. It is also underlined that environmental reviews of trade measures and agreements would best provide for transparency and consultation with private sector representatives, such as environmentalists, industry representatives, trade unions, consumer groups and academics.

16. Furthermore, guidance is provided for the monitoring how the results of the reviews are taken into account and implemented and for follow-up to ensure that concerns are being addressed. Means might be devised for reviewing the findings of environmental reviews and considering how to enhance positive environmental effects and address potential negative environmental effects. Provisions for follow-up may be needed to re-examine the environmental implications of trade measures and agreements because circumstances may have changed, new concerns may have emerged, or response measures may no longer be appropriate or need to be re-enforced.

17. In particular, the findings of an environmental review may warrant different policy responses, including: the modification of some aspects of the trade measure or agreement; the inclusion of environmental safeguards in the trade measure or agreement; or the implementation of a complementary environmental mechanism to accompany the trade measure or agreement. In the case of trade agreements, changes or modifications would imply keeping the negotiated balance of commitments in the agreement and would necessitate a cooperative approach. Complementary mechanisms might include development and/or enforcement of environmental regulations, levying taxes or charges to contribute to an environmental fund, or financial or technical assistance for environmental clean-up.

^{6/} See OCDE/GD(94)103, available at www.oecd.org/trade or www.oecd.org/environment

18. The heart of the OECD documents are the Checklists which appear at the back of each part and consist of a series of questions to guide the reviewer in his analysis. These Checklists, in the case of the Environmental reviews of trade policies, are broken down into:

- (a) Preliminary screening;
- (b) Product effects (product identification, environmental effects, and policy responses);
- (c) Technology effects (production technologies, environmental effects, and policy responses);
- (d) Scale effects (scale of economic growth, scale of pollution, scale of transport, scale of resource use, policy responses);
- (e) Structural effects (structure of production, structure of consumption, structure of investment, structure of costs, geographical structure, policy responses);
- (f) Regulatory effects.

19. The checklist on regulatory effects is primarily applicable for trade liberalization agreements. It is noteworthy that the review of regulatory effects would be different from the assessment of the potential effects of the trade measure or agreement on the physical environment. It would involve legal or policy analysis to determine the legal and policy implications of using different environmental policy approaches, regulations or standards with reference to the trade agreement concerned. Countries may also wish to explore harmonization of their environmental review methodologies to promote greater coherence.

20. The checklist includes general considerations (general goals and environmental principles), trade measures (import restrictions, export restrictions, environmental agreements, exceptions), environmental policy instruments (product standards, environmental subsidies, economic instruments, voluntary programmes), other policies (foreign investment, intellectual property rights, and services) and procedures (notification, sub-national entities, dispute settlement, enforcement, and policy responses).

21. The framework distinguishes three main types of physical environmental effects which can be reviewed, noting that these effects are not mutually exclusive and may overlap: pollution effects, health and safety effects, and resource effects. Furthermore, it notes that trade measures and agreements can also affect the economies and environments of countries other than those conducting the review and lead to environmental effects which are national, transboundary or global in scope, pointing out that there is not a clear distinction between these different types of geographical effects which are often inter-related.

22. With regard to assessment methodologies, the framework notes that a different mix of methodologies will most likely be needed for different types of trade measures and agreements with various types of effects, and that the review approaches adopted should be flexible and practical. Some methodologies might be borrowed or adapted from traditional environmental impact assessment techniques, bearing in mind that they have usually been conducted of specific projects (e.g. a dam, mine or factory), and that environmental reviews of policies are much more complex and involve a much wider geographical area and a broader range of economic and environmental impacts.

23. The framework suggests first establishing baseline environmental conditions using existing data. Models and other forecasting techniques could be subsequently used to predict broad changes in resource use, pollution or environmental quality resulting directly or indirectly from the trade measure or agreement. To deal with data deficiencies and forecasting uncertainties, scenarios could be used to test certain hypotheses or predictions of environmental impacts. Case studies of particular types of

environmental impacts or of particular economic sectors or geographical regions also might be conducted. And finally, in weighing alternative policy options, general policy evaluation techniques might be employed, such as cost-benefit analysis and techniques for handling uncertainty.

24. In a new round of work in 2000-2001, the OECD Joint Working Party on Trade and Environment de-classified two new complements to the 1994 methodologies:

- (a) Assessing the environmental effects of services trade liberalization: a methodology; 7/
- (b) Checklist of issues for ex ante environmental assessments of trade liberalization. 8/

25. The framework for the assessment of service trade liberalization notes that services and services delivery have many characteristics which distinguish them from extractive and manufacturing industries and that such differences mean that new approaches are useful in assessing their environmental impact. Building on the general OECD approach, the framework suggests to follow six steps when undertaking a review of the environmental effects of service trade liberalization:

- (a) Scoping services sectors for environmental effects;
- (b) Building scenarios of services trade liberalization;
- (c) Assessing environmental effects associated with economic changes;
- (d) Assessing regulatory effects arising from rule-making;
- (e) Screening for significance of environmental effects.

26. The framework suggests the following services to be included into the scoping exercise: business services; communication services; construction and related engineering services; distribution services; educational services; environmental services; financial (insurance and banking) services; health-related and social services; tourism and travel-related services; recreational, cultural and sporting services; transport services; and other services.

27. The framework suggests addressing direct (high per source as well as cumulative) and indirect environment effects. It suggests focusing on the following environmental effects: air emissions, water effluents, soil discharge and erosion, and ecosystem disruptions. The checklist to address the environmental changes associated with economic changes follow the general framework in distinguishing scale effects, structural (or composition) effects, technology effects and product effects.

28. With regard to *ex ante* assessments (assessments e.g. on new multilateral trade negotiations), OECD members agreed not to undertake such an assessment as the multilateral level. However, it was agreed to share future experiences on a basis of a checklist of main issues, which shall serve to focus discussions on difficulties encountered and solutions tried. The checklist covers the following aspects: setting the objectives of the assessment, actors (who is carrying out the assessment?), overall mandate (e.g., framework, guidelines), timing, managing feasibility through prioritization, scope of environmental effects, stakeholder consultations, assessment methodologies, assessment output, identifying policy options, follow-up: assessing the assessment.

29. According to the OECD, these frameworks have been widely used by member Governments and research institutes, other intergovernmental organizations and non-governmental organizations. In several

7/ See COM/TD/ENV(2000)123/FINAL.

8/ See COM/TD/ENV(2001)42/FINAL.

cases, they have been the basis for the further development of – refined and extended – frameworks by agencies active in reviews. The OECD secretariat undertook a series of reviews on the environmental effects of transport associated with trade liberalization under the Uruguay Round. ^{9/} In October 1999, a major workshop entitled “Assessing the Environmental Effects of Trade Liberalisation Agreements: Methodologies” brought together practitioners of environmental reviews and assess the evolution of frameworks and methodologies since those adopted by OECD in 1994. ^{10/}

The UNEP framework

30. The development of the UNEP integrated assessment framework began in 1997 with the initiation of the first round of six country studies designed to explore the environmental, social and economic impacts of trade liberalization. The studies were action-oriented and combined theoretical methodologies with concrete application on the ground. The assessments were undertaken by national policy research institutions and provided data on the linkages between trade, environment and development policies and the impacts of these policies. A National Stakeholder Committee was established in each country to guide the projects. The committees included ministries of environment and trade and other relevant government departments (e.g. fisheries and agricultural ministries), academia, the private sector, local communities, non-governmental organizations and relevant United Nations organizations.

31. The studies explored the complex linkages between trade, environment and development and analyzed the environmental, social and economic impacts of policies, with the aim to improving understanding and developing proposals for policy reform. Improved understanding of the linkages would strengthen a developing country’s negotiating powers during trade talks and would help to identify and address any potential conflicts between agreements, e.g. between WTO Agreements and multilateral environmental agreements. Hence, the goals of the projects were to empower Governments and national institutions to maximize the gains of trade liberalization while minimizing environmental and social damage by influencing policy design and implementation.

32. A second round of six country studies took place between 1999 and 2001. This round emphasized the importance of coordination at the national level between government ministries, the private sector, industry and non-governmental organizations. The interactions and linkages between trade, environment and development policies were identified, and more emphasis was placed on designing a “package” of integrated policies to address those interactions. Additional emphasis was also placed on enhancing the capacity of governments and national policy research institutions to undertake integrated assessment.

33. A third round of country studies was launched in 2002, which focuses on the agricultural sector and rice production in seven countries. ^{11/}

34. During the second round of country studies, a Reference Manual was developed simultaneously with the assistance of country experts, which built on experience gained from the previous round of studies. ^{12/} The Reference Manual provides detailed guidance with respect to the purpose, focus, and possible design of an integrated assessment strategy. The guidance includes a discussion on the scoping of an integrated assessment, and provides an outline for the design, which includes timing (*ex ante*, concurrent or *ex post* assessments); information, consultation and participation; indicators; capacity building; integrated approaches and techniques; and integrated policy responses.

^{9/} Studies can be found under <http://www.oecd.org/trade> and then under trade and environment.

^{10/} See OECD (1999): *Methodologies for Environmental Assessments of Trade Liberalization Agreements. Report of the OECD Workshop held on 26-27 October 1999.* COM/TD/ENVIRONMENT(99)92/FINAL.

^{11/} Studies are available under <http://www.unep.ch/etu/etp/index.htm> .

^{12/} See Reference Manual for the Integrated Assessment of Trade-related Policies (2001), available at <http://www.unep.ch/etu/etp/index.htm> .

35. In addition to the outline, the Reference Manual identifies key elements in the design of assessment processes, including government commitment, collaboration, including the participation of all major stakeholders, ‘learn-by-doing’ and building on experience from other institutions. Criteria for choosing the appropriate methodology include data availability, timing, resources available, and level of experience.

36. The Manual also provides an overview of relevant methodologies, including macroeconomic models (input-output models, general equilibrium models); sector-based microeconomic tools such as partial equilibrium models, environment impact assessment, benefit-cost-analysis, risk assessment, multi-criteria analysis, extended domestic cost approach; approaches such as life-cycle analysis, global commodity chains analysis, sustainable livelihoods approach; and approaches used in the valuation of trade-environment linkages. The UNEP framework adopts the OECD approach, summarized above, to distinguish product, technology, scale, structural and regulatory effects. It also gives an overview on sector-specific environmental and social impacts, including a list of appropriate indicators, as well as list of examples on sector-specific analytical questions.

37. The Reference Manual takes into account that there is no single methodological approach to conducting an integrated assessment, as it is important to choose and develop a methodology most appropriate to the circumstances and policy priorities of each particular situation.

38. The Reference Manual highlights that an *integrated assessment* not only provides decision-makers with information on the anticipated consequences of a trade-related policy – or on the actual consequences of a trade measure that has already been introduced – but also, in many cases, provides policy recommendations to address harmful economic, environmental and social impacts and to promote any positive effects. As envisioned in the Reference Manual, *integrated assessment* is a policy development tool with technical and participatory inputs rather than simply a technical methodology with incidental policy implications. The Reference Manual also provides guidance on possible policy responses, including the modification of trade policies and the introduction of “flanking” policies. In addition to the Reference Manual, a handbook on integrated assessment in agriculture is currently under development. ^{13/}

CEC framework

39. Over a period of three years (1996-1999), the North American Commission on Environment Cooperation (CEC) created a framework to analyse the environmental impacts of the North American Free Trade Agreement (NAFTA). After an initial survey of other initiatives to examine the effects of economic activity and trade on the environment and the various hypotheses that had been made about NAFTA’s possible impacts, research was conducted by an interdisciplinary group of experts to explore the trade and investment provisions that NAFTA would put in place and the ways that NAFTA-associated economic change might affect the environment. In the second phase, the CEC took into account the work done by other institutions on trade-environment linkages. This was complemented by a number of case studies. The final phase consisted of a peer review of the work undertaken in the first two phases and the incorporation of the comments received into the methodology. ^{14/}

40. The Framework ^{15/} is the product of many hands. A wide range of technical expertise and stakeholder perspectives were included through the process leading to the framework. The work involved

^{13/} See Handbook on Integrated Assessment of Agriculture, final draft, available at <http://www.unep.ch/etu/etp/index.htm>.

^{14/} Work undertaken within the framework can be retrieved at http://www.cec.org/programs_projects/trade_enviro_n_econ/project/index.cfm?projectID=12&varlan=english&ID=docs.

^{15/} See *Assessing Environmental Effects of the North American Free Trade Agreement (NAFTA). An Analytic Framework (phase II)*, available at http://www.cec.org/files/pdf/ECONOMY/engframe_EN.pdf.

environment and trade officials from the three NAFTA Parties, lawyers, economists, political economists, input and comments from the public, guidance from an Advisory Group, and input from peer reviewers and the CEC Joint Public Advisory Committee. In 2002, the CEC held a major symposium on *Addressing the Linkages between Trade and Environment*. ^{16/} The CEC stresses that the process by which the Framework was developed, based on principles of transparency and public input, is almost as important as the Final Framework itself.

41. At the outset, the Framework selects a set of hypotheses that together should serve to direct the analysis in a focused way. Each of these hypotheses will have to be individually supported, refuted or modified by the evidence. These hypotheses arise from the highly polarized discussion that accompanied the negotiation process of the NAFTA and include the following:

- (a) Does NAFTA trade liberalization lead to a regulatory/migratory “race-to-the bottom”?
- (b) Does NAFTA give rise to competitive pressures for capital and technological modernization or to pollution havens?
- (c) Does NAFTA lead to upward convergence of environmental practice through activities of the private sector or of the government that offset the scale effects?
- (d) Does NAFTA reinforce existing patterns of comparative advantage and specialization to the benefit of efficiency?
- (e) Do liberalized rules under NAFTA serve to increase the use of environmentally preferable products?

42. The framework itself is intended to be applied at the sectoral level and in a linear or sequential manner. The first step is to examine various economic and other consequences of the NAFTA itself, including NAFTA rule changes, NAFTA institutions, trade flow data, transborder investment flows, and other economic conditioning factors. An important assumption of the Framework is that institutions matter for environmental quality; for instance, in the case of the NAFTA, several institutions all exert important influences on environmental quality and environmental policy in North America. ^{17/}

43. Since NAFTA also includes new disciplines covering trade-related investment, the framework recommends that the analysis refer not only to trade flow data, but also the relationship between foreign direct investment and environmental quality. Beyond examining the specific implications of chapter 11 of NAFTA, the framework notes that transborder FDI flows are closely associated with changes in trade patterns, and reference is therefore made to taking into account such variables as comparing pre and post-NAFTA changes in FDI stocks and patterns among the three countries. Investment-related considerations noted in the framework include the regional concentration of FDI, including geographic and sectoral concentration, shifts in the sectoral composition of FDI, the link between FDI and technology transfer and diffusion, changes in environmental standards relating to production and products, and other investment considerations.

44. The framework then asks how to link trade flow data, trade-related investment data and other economic variables with environmental effects. The framework notes that among the factors to consider at the sectoral level are the production, management and technology profile of firms engaged in NAFTA

^{16/} See CEC (2002): *The Environmental Effect of Free Trade: Papers Presented at the North American Symposium on Assessing the Linkages between Trade and Environment*.

^{17/} For instance, the so-called side agreement on the environment that established the Commission, approximately 26 trilateral working parties and groups under NAFTA looking at various technical issues such as pesticides, standards harmonization, hazardous wastes as well as various bilateral initiatives such as the United States-Mexico border initiative.

associated trade and investment activities. In particular, six variables are noted under the production-management-technology cluster:

- (a) Composition of inputs;
- (b) Relative production efficiency;
- (c) Physical technology;
- (d) Management standards;
- (e) Product characteristics and prices; and
- (f) Sectoral and geographic concentration of production.

45. Another consideration relates to the physical infrastructure of the geographic location in which NAFTA-related economic activity is concentrated. Consideration is given to the characteristics and environmental impact of the physical infrastructure that supports and connects site-specific production units, which have been affected by NAFTA. In particular, factors to be considered under infrastructure considerations include: existing infrastructure capacities; the relationship between capacities and the concentration of economic activity; the identification of infra-structure related bottlenecks or choke-points, usually in border crossing regions; the creation of transport related corridors which, in the North American context, usually refer to north-south road-transport corridors; and intermodal shifts in the type of transport.

46. In addition to weighing production and infrastructure factors, the framework identifies two other variables: social organization and government policy. Social organization issues including the existence and role of civil society groups, private property, labor migration patterns, community traditions and formations. In government policy, considerations are generally related to the type and extent of government environmental policies, including market based instruments, the jurisdiction of regulations, government-related green procurement policies, financial incentives and instruments, levels of enforcement and other domestic considerations.

47. The Framework finally considers how all these variables relate to environmental quality in the broadest sense. It distinguishes four components of the ambient environment: air, water, land and biota, and provides indicative lists of indicators for each component.

European Community framework

48. The development of the *Sustainability Impact Assessment (SIA) Methodology* was initiated by the European Commission for the specific purpose of assessing the impacts of the WTO negotiations due to be started at the 1999 WTO conference in Seattle. Subsequently, the European Community has widened its commitments to carry out sustainability impact assessments of all major European Union policy initiatives. This impact assessment process will be applied to all new regulatory initiatives from 2003/04.

49. Its development was commissioned to the Institute for Development Policy and Management of the University of Manchester. This development is carried out in conjunction with the sustainable impact assessment of the WTO Doha round. The study has three phases and is currently in its third phase. The framework described in the phase one report was the start of an extensive process of consultation and dialogue with stakeholders, through the project website, public meetings organized by the European Community, attendance at and organization of conferences, and direct email correspondence with a

network of experts. Results were incorporated into the extended framework described in the final report of the project, ^{18/} and into subsequent refinements.

50. The framework addresses social and economic impacts as well as environmental ones, and the interactions between them. ^{19/} As applied by the EC, it addresses the impacts in all countries and globally, not just the EU. The framework has been applied by other consultants, e.g. by Planistat for the sustainable impact assessments (SIA) of Chile/Mercosur. In addition to the sustainable impact assessment of the WTO Doha Round, the European Commission has commissioned a number of other assessments on trade liberalization. ^{20/}

51. The framework follows the general structure established for environmental impact assessment, tailored to the evaluation of trade policies and agreements. In the process, consultation and stakeholder participation are identified a key stages:

- (a) Identification of likely potential impact of each trade measure under negotiation, and selection of measures to be assessed in detail (screening and scoping);
- (b) Selection of scenarios and country groupings for the assessment;
- (c) Assessment of impacts and evaluation of significance, using sustainability indicators a) as a checklist of issues to be addressed, b) for presentation of summary results and c) for subsequent monitoring;
- (d) Evaluation of alternative mitigation and enhancement measures;
- (e) Presentation of results;
- (f) Monitoring and *ex post* evaluation;

52. The framework identifies nine core sustainability indicators. The assessment of impacts is broadly as follows, using a combination of causal chain analysis and case study experience, supported where appropriate by economic modelling:

- (a) Identify the effects on market incentives and opportunities which result from the proposed change to a trade measure;
- (b) Identify induced changes in the economic behaviour of producers, consumers and intermediaries, and hence effects on the production system;
- (c) Evaluate the dynamic nature of these effects, to identify short and medium term adjustment effects, and longer term outcomes once the production and economic systems have adjusted to the changed trade measure;

^{18/} Kirkpatrick C and Lee N (2002): *Further Development of the Methodology for a Sustainability Impact Assessment of Proposed WTO Negotiations (Final Report)*. IDPM, University of Manchester.

^{19/} The evolution of the framework and its application is described in a number of reports that can be downloaded at <http://idpm.man.ac.uk/sia-trade/>.

^{20/} SIA of the new EU-ACP economic partnership agreements, carried out by PricewaterhouseCoopers (<http://www.sia-acp.org/acp/uk/news.php>); SIA of the negotiations of the trade agreement between the EC and the Gulf Cooperation Countries, carried out by PricewaterhouseCoopers (<http://www.sia-gcc.org/gcc/uk/news.php>); SIA of the trade aspects of an Association Agreement between the European Communities and Chile by Planistat (<http://www.planistat.com/SIA/en/>); SIA of the trade aspects of an Association Agreement between the European Communities and Mercosur by Planistat; SIA of the Euro-Mediterranean Free Trade Agreement between the European Communities and Mediterranean countries (not yet attributed). The first completed study was an SIA of WTO negotiations in the major food crops sector as carried out by the Stockholm Environment Institute (<http://www.sei.se/policy/SIA-Food.html>).

(d) Assess the significance of linkages from the effects on production relationships to sustainability impacts, e.g. Through changes in employment, investment and/or income, effects of changes in the production system on environmental quality, natural resource stocks and/or biodiversity, changes in level and distribution of household income, gender balance of paid and unpaid labour, prices of essential goods and services, livelihood opportunities, poverty levels etc., and interactions between these effects;

(e) Assess the impacts of the change in the trade measure on sustainable development processes, and hence on economic growth rates and corresponding long term dynamic effects on social and environmental factors;

(f) Evaluate interlinkages between the measure being assessed and other components of the trade policy or agreement, and their influence on the impacts identified;

(g) Estimate the cumulative social, environmental and economic effects of all measures within the trade policy or agreement, allowing for scale effects, structural and locational effects, and regulatory and technology effects, nationally and internationally.

53. For some types of trade measure, notably tariff changes, the causal linkages in steps 1 to 3 (and partially 4) may be modelled through computable general equilibrium (CGE) and other economic models. This provides quantified estimates of the magnitudes of equilibrium economic effects, from which the likely magnitude of adjustment impacts may also be inferred. This provides a basis for estimating magnitude and significance of consequent social and environmental effects. For other types of measure, and in steps 4 to 7 for all types of measure, a combination of causal chain analysis and case study experience is used to indicate likely impact significance.

Canadian framework

54. In 2001, the Government of Canada released the “Framework for Conducting Environmental Assessments of Trade Negotiations”. The Framework was prepared by an interdepartmental committee, chaired by the Department of Foreign Affairs and International Trade (DFAIT), with guidance from the non-legislated “1999 Cabinet Directive on Environmental Assessments of Policy, Plan and Program Proposals”. Preparation of the Framework was also informed by extensive consultations with external stakeholders including provinces and territories, business and non-governmental organizations, and the public. ^{21/}

55. The Canadian framework foresees to conduct the environmental assessment in parallel to the trade negotiations. According to the framework, conducting an environment assessment will involve the following steps:

(a) Notice of intent to conduct an environmental assessment (announced when trade negotiation announced). The purpose of this step is to publicize the intention to conduct an environmental assessment, and to invite comments on environmental matters related to the proposed negotiations;

(b) Preparation of an initial environmental assessment (released in advance of negotiation). The fundamental purpose of the initial environmental assessment is to scope out the main environmental issues likely to arise as a result of the proposed negotiations;

(c) Preparation of a draft environmental assessment (released at the start of negotiation). The fundamental purpose of the draft environmental assessment is to inform the negotiators of the identified environmental concerns during the conduct of negotiations; and

^{21/} The Canadian framework is available at <http://www.dfait-maeci.gc.ca/tna-nac/env/env-ca-en.asp>.

(d) Preparation of a final environmental assessment report (released after negotiation concludes). The purpose of the final environmental assessment report is to document the outcome of negotiations in relation to the environmental assessment process.

56. The framework identifies four analytical stages in conducting the assessment, and provides, for each stage, illustrative lines of inquiry:

- (a) Identification of the economic effect of the negotiation;
- (b) Identification of the likely environmental impacts of such changes;
- (c) Assessment of the significance of the identified likely environmental impacts;
- (d) Identification of enhancement/mitigation options to inform the negotiations.

57. Agriculture and Agri-Food Canada (AAFC) was a key participant in the process of developing the framework. It drew extensively on the capacity it is developing internally to quantify the relationship between production agriculture and the environment. This capacity development is now contained in the National Agri-Environmental Health Analysis and Reporting Program (NAHARP). This project, undertaken with extensive interaction with the broader science and academic community as well as Provinces, producer organizations and other interested stakeholders, includes continued development of Agri-Environmental Indicators (AEI) and integrated modelling for quantification of impacts.

58. The main methodological feature of the framework involves employing the analytical tools that are now featured under NAHARP. They include a comprehensive set of agri-environmental indicators as well as an integrated economic-environmental modeling system centered around the Canadian Regional Agricultural Model (CRAM). Where appropriate, this analytical system can be used to develop quantitative estimates of environmental outcomes, or draw on a body of research derived from using this system to develop qualitative assessments where warranted. ^{22/}

59. To date, Initial Environmental Assessments under the Framework have addressed the agricultural negotiations within the World Trade Organization (WTO) and the Free Trade Area of the Americas (FTAA). These have been posted for public comment prior to proceeding to the next stage of the framework. Less comprehensive environmental assessments for some country specific negotiations have also been completed. ^{23/}

United States framework

60. By Executive Order 13141, issued in November 1999, the United States Trade Representative is to conduct environmental reviews of free trade agreements, and in particular of comprehensive multilateral trade rounds; of bilateral or multilateral free trade agreements; and of major new trade liberalization agreements in natural resource sectors. The focus of environmental reviews is generally on impacts in the United States; however, as appropriate and prudent, reviews may also examine global and transboundary impacts. The order directed the Office of the United States Trade Representative (USTR) and the Council on Environmental Quality (CEQ) to oversee implementation of the Order, including the development of procedures.

61. Further to the Executive Order, these agencies developed draft Guidelines through an extensive interagency process with active participation from interested foreign policy, environmental, and economic

^{22/} Documentation for this system exists in several publications as well as on the AAFC web site: see http://www.agr.gc.ca/spb/rad-dra/home_e.php and <http://www.agr.gc.ca/policy/environment/pdfs/aei/summary.pdf>.

^{23/} These studies are available at <http://www.dfait-maeci.gc.ca/tna-nac/env/env-ea-en.asp>.

agencies. Input was also solicited from advisory committees and the public. The final Guidelines for implementation of the Executive Order were published in December 2000. Since 2000, a number of environmental reviews of bi- and multilateral free trade agreements have been carried out. ^{24/}

62. The Guidelines provide a general framework to conduct environmental reviews, structured along the following stages of a review process: initiation of the process, determining the scope of the review, analytical content of the review, public participation, documentation of the review process, administrative considerations. Early outreach and stakeholder consultations are highlighted as an important principle under the initiation chapter.

63. The scoping process involves the identification of significant issues to be analysed in depth in the written environmental review, along with the elimination from detailed study of those issues which are not significant or have been covered by prior reviews. Again, the early involvement of agencies with relevant expertise and the public in the scoping process helps assure that analysis is adequate and that issues are identified in a timely manner. The scoping process for the environmental review has two principal components: (i) identification of issues; and (ii) selection and prioritization of issues for review. The first component focuses on soliciting input and determining the types of environmental impacts that could result from the proposed trade agreement. The second component focuses on selecting and prioritizing the significant issues that should be analysed to determine the environmental consequences of the trade agreement, if any. The result of an effective scoping process is a targeted, analytical work plan. Three types of information shall be considered when determining the scope of the environmental review:

- (a) the scope and objectives of the proposed trade agreement;
- (b) a realistic range of alternative approaches for accomplishing the broad objectives of the trade agreement; and
- (c) types of reasonably foreseeable environmental impacts.

64. During the initial stages of scoping, a range of reasonably foreseeable environmental impacts (both positive and negative) should be considered for inclusion in the ER. Later, as scoping progresses, some of the identified impacts may be eliminated from consideration through a process of prioritization and analysis. An indicative list of such impacts is also given in an annex. The list distinguishes regulatory effects, economic effects (compared to a base or projected baseline), environmental effects (related to the identified economic effects), increased or decreased impacts on environmental media and resources, including transboundary and global impacts, and environmental resources and issues otherwise of concern to the United States.

65. With regard to analytical methodologies, the Guidelines point out that the analysis shall entail an objective, rigorous assessment of the environmental issues under consideration, and shall be based on scientific information and principles, documented experience and objective data. Analysis shall normally be both qualitative and quantitative. The analytical process should take into consideration assumptions and/or uncertainty in the data and methodologies and document limitations due to those assumptions or uncertainties. As a result of broad variation among trade agreements, it is likely that each environment review will incorporate uniquely tailored analytical approaches. Hence, a different mix of analytical methodologies may be needed for different types of trade agreements.

66. The Guidelines endorse the application of modelling techniques, because they may provide a useful approach for estimating such environmental impacts. However, it is also said that modelling and other economic analytical techniques, in and of themselves, are unlikely to provide an exclusive means

^{24/} The United States Guidelines are available at <http://www.ustr.gov/releases/2000/12/guides.html> . Reports are available at <http://www.ustr.gov/environment/environmental.shtml> .

for assessing areas of environmental concern. For example, prevailing tools for assessing the economic effect of comprehensive trade agreements rely on aggregation of resource sectors to estimate broad trends, while estimates of environmental impact generally benefit from a more local or regional analysis. In consequence, several different analytical methods were used in the reviews conducted so far, in addition to formal modelling, including questionnaires, interviews and panels; checklists; matrices; network and system diagrams; trends analysis; overlay mapping and geographic information systems.

67. In addition, the review shall examine the extent to which the proposed trade agreement may have implications for United States environmental regulations, statutes and other obligations and instruments. The reviews should also analyse, as appropriate, any implications that the agreement may have regarding the ability of state, local, and tribal authorities to regulate with respect to environmental matters. Examples of such regulatory implications include impacts on the ability to maintain, strengthen and enforce laws, regulations and policies on pollution control; control of toxic and hazardous wastes and materials; protection of natural resources, wildlife and endangered species; relevant product standards; control and regulation of pesticides; food safety; and the public's ability to obtain information regarding the environment.

68. The identification of ways to address environmental impacts is also highlighted. Key findings and supporting analysis of the environment review shall be made widely available to trade negotiators of the proposed agreement, as well as to trade and environmental policy makers throughout the government. Where significant regulatory and/or economically driven environmental impacts have been identified, there shall be an analysis of options to mitigate negative impacts and create or enhance positive impacts. Options may include changes to negotiating positions as well as environmental policy responses outside the trade agreement, such as seeking possible changes to relevant United States domestic and international environmental policies. Where options that address identified impacts are described in the review document, they may include options for post-agreement actions for agencies to consider, such as actions to assess the accuracy of the analysis.

III. BIODIVERSITY COVERAGE IN THE FRAMEWORKS

OECD framework

69. The OECD framework does not provide specific guidance on how to address the impacts on biological diversity or on agricultural biodiversity. However, the framework provides a number of entry points to address biodiversity issues. For instance, the increased or decreased destruction of wildlife habitats or other ecosystems, the increased or decreased depletion of species, and the change of land use patterns are explicitly referred to as possible resource effects, among the environment effects of trade policies and agreements. Furthermore, a number of issues raised in the checklist offer linkages to biodiversity. Under scale effects, it is pointed out that the scale of transport may have environmental impacts in terms of land use, which may, in turn, have important impacts on biodiversity. Furthermore, under structural effects, the importance of the geographical structure is highlighted, and in particular the impacts of changes of production, consumption and investment patterns in geographical areas or regions. This offers an entry point to analyze the impacts on biodiversity-rich areas.

70. Similar entry points exist in the checklist developed for the assessment of environmental effects of services liberalization. In addition, the framework identifies ecosystem disruptions as one potential negative environmental effect, to be addressed during the scoping stage. As an example, the framework in particular points to wildlife habitat damage and repetitive use in fragile ecosystems as possible negative effects of tourism and travel-related services.

UNEP/ETB framework

71. In the overall framework, biodiversity is identified as a sector-specific potential issue, notably in agriculture, fisheries and services (travel and tourism). Possible sector-specific biodiversity indicators are also enumerated (for agriculture: area converted to local farming, populations of key farm land flora and fauna; for fisheries: population of key bird and mammalian species in fishing areas; for services: proportion of tourist expenditures allocated to biodiversity management, species diversity of sensitive habitats, population of key bird and mammalian species). Sector-specific analytical questions on agriculture and fisheries, provided in the annex, also address biodiversity. Finally, the Handbook on Integrated Assessment in Agriculture, currently under development, will also address the linkages between trade policies, agricultural production systems and biodiversity.

72. In the studies conducted so far, the impacts on biodiversity are assessed to varying degrees depending on the sector and the resource exploited. For example, in the banana sector in Ecuador, findings indicated clear loss of biodiversity due to expansion of its agricultural frontiers. Conversely, in China's cotton sector, trade liberalization is expected to bring about positive effects on the environment because of reduction in the use of cultivated land and the consequent reduction in the application of chemical fertilizers and pesticides. Moreover, agricultural biodiversity is directly addressed in the ongoing third round of country studies, which focus on the agricultural sector and rice production in Cote d'Ivoire, Senegal, Nigeria, China, Colombia, Indonesia and Vietnam.

CEC framework

73. As indicated above, biota is one of the important components of the environment identified in the CEC framework along with air, water and land. The term biota refers to overall biodiversity, including all forms of living organisms, including animals, plants and micro-organisms. The framework provides an indicative list of indicators, including (for general biodiversity): species depletion (including flora and animals); endemic species; number of species at risk (threatened and endangered); loss and fragmentation of habitat (forests, wetlands, other wildlands); rural to urban conversion of land; natural protected areas (area, quality, % by ecoregion type). For forest biodiversity, it is suggested to use, for each major forest type, the amount of forest cover, the rate of deforestation and of afforestation, successful regeneration, standing volume and mean annual increment versus harvesting rates.

74. In addition, a number of land indicators such as the intensity of pesticide use for agriculture, nitrogen from fertilizers and livestock, area of forested land, intensity of forest use, and to a lesser extent waste generation and recycling rates, are also related to biodiversity.

EC framework

75. As indicated above, the methodology identifies nine core sustainability indicators, one of which is biodiversity. A second tier of indicators, 'designated eco-systems' and 'endangered species' is proposed. While agricultural biodiversity as such is not mentioned, it is assumed that agriculture is one of the 'different types of habitats' suggested to be addressed.

76. The methodology does not identify any specific scientific methods to be used in the assessment of this or any other type of impact, other than the general approach outlined above. Within this general approach, the methodology has been used to assess impacts on biodiversity (including agricultural biodiversity) in the studies.

Canadian framework

77. The Canadian framework document itself does not provide specific guidance on which environment impacts could be expected and how to analytically address them. A general reference to

biodiversity impacts is made in the illustrative lines of inquiry for stage two of the assessment process (the identification of the likely environmental impacts), where it is asked whether the trade negotiations be consistent with Canada's existing commitments under multilateral environmental agreements (MEAs), such as the Montreal Protocol on Substances that Deplete the Ozone Layer, the Convention on Biological Diversity, the Kyoto Protocol, etc.

78. Under NAHARP, Canada indicated that there is to-date one working agri-environmental indicator related to biodiversity, dealing with how agricultural land use provides wildlife habitat. To determine the appropriate set of agri-environment indicators required to deal with the issue of biodiversity is one of the questions being dealt with in the ongoing development process. A broader set of indicators is now under consideration. To what extent the system will address biological diversity vs. what might be defined as agricultural biodiversity is yet to be determined. Draft proposals are currently under review internally.

79. In the future, it should also prove feasible to utilize the Canadian Biodiversity Index as a measurement tool in the assessment methodology. The Canadian Federal/Provincial/Territorial Biodiversity Working Group, under the Ministers of Wildlife, Fisheries and Aquaculture, and Forestry, is in the early stages of developing a Canadian Biodiversity Index that will measure the state of biodiversity in Canada in several different ecosystem types, including agricultural areas. The Index will identify relevant indicators for each ecosystem and measure them against a desired future condition to determine success of biodiversity management. It is anticipated that this tool will be ready for use in 2007.

United States framework

80. In the United States Guidelines for Environmental Review of Trade Agreements, biodiversity is reflected in the provided list of types of environmental impacts for consideration. Under economic effects, changes in volume, pattern, and modes of transportation are mentioned and explicit reference is made to increased or decreased potential for spread of invasive species pursuant to such changes. Furthermore, a number of biodiversity-relevant effects are enumerated, under the heading of increased or decreased impacts on environment media and resources: protected or environmentally sensitive terrestrial and marine areas (e.g., national parks, national wildlife refuges, wetlands, marine sanctuaries); endangered species and other species identified as significant under law (e.g., certain marine mammals, migratory birds); and marine aquatic and terrestrial biodiversity, including species, genetic variety and ecosystems and the potential for invasive species to compromise such biodiversity; also ecosystem productivity and integrity, living resources and ecosystem services. In addition, migratory species, including straddling and highly migratory fish stocks and migratory mammals are specifically mentioned under possible transboundary and global impacts. The Guidelines do not suggest specific indicators nor do they provide further methodological guidance on how to analyse these impacts.

IV. IDENTIFIED DEFICITS AND RESEARCH NEEDS

81. Although differences exist, all frameworks presented above offer entry points to address biodiversity impacts in the assessment process, and many offer some additional guidance on what effects to expect in particular sectors and what indicators to use. However, most organizations and States questioned showed considerable dissatisfaction with the state of affairs of integrating biodiversity concerns into trade-related assessments. A number of deficits were identified, and corresponding needs for further research stressed.

82. For instance, the European Community pointed out that existing impact assessment reports have in general not led to a clear analysis of the impact of trade liberalisation on agricultural biodiversity. Recommendations on how to alleviate potential negative impacts are usually only addressing wider, related issues such as deforestation, soil degradation, pesticide use or water quality. According to the EC,

the different cause-effect chains of trade liberalization on agricultural biodiversity have not been adequately analysed, and only limited policy responses have been proposed. ^{25/}

83. Respondents frequently stressed the need to develop comprehensive and more practical **indicator sets** for biodiversity in general and agricultural biodiversity in particular. For instance, the CEC said that, even while progress has been made in developing aggregate quantitative indicators capable of showing changes in air and water pollution, progress in honing non-pollution indicators capable of showing changes in biodiversity, forest cover, habitats and ecosystems remains less developed and certainly less quantitative than pollution-related indicators. ^{26/}

84. The development of such indicator sets appears to remain a challenging task, and not only because of inherent technical difficulties in developing indicators on such a multi-dimensional concept like biodiversity in general and agricultural biodiversity in particular, but also because of the diverse, and sometimes conflicting, requirements put upon indicators within trade-related assessments.

85. On the one hand, there is a need expressed for **aggregated biodiversity indicators** that can be integrated into formal economic models in order to allow for insights into the *overall* impacts of economic changes on biodiversity.

86. On the other hand, in order to provide meaningful advice to policy-makers on where corrective policy action may be needed, it was said that indicators should also be able to point to the **spatial distribution** of specific impacts. As was pointed out by Canada, understanding that at the margin, nationally, production patterns may change due to trade liberalization is of only limited value in terms of trying to determine where on the landscape the change would actually occur and, in a next step, of trying to estimate how biodiversity would be impacted. ^{27/} In this connection, the United States noted that most measures of diversity sacrifice complexity for simplicity, and are consequently more useful at larger rather than smaller scales. In consequence, the usefulness (and precision) of general models of biodiversity decline as the scale of application gets finer.

87. In consequence, indicator sets would seem to be subject to two different objectives: to provide aggregated data for formal modelling, and to provide disaggregated data for the identification of the spatial distribution of biodiversity impacts and of the subsequent needs for policy action. ^{28/}

88. Respondents also stressed **data availability and comparability** as an important issue closely related to the indicator question. In particular, the CEC pointed out that extensive gaps in environmental data often exist within countries, while analysis attempting to examine cross-border issues runs into often pronounced problems regarding the comparability of environmental data. Data comparability was said to

^{25/} It is noteworthy that the FAO study on environmental assessments in the context of sustainable forestry management, referenced in paragraph 8, also found that the impact assessments reviewed have not led to clear results on how trade and trade policies impact on the way forest resources are used.

^{26/} See Commission on Environment Cooperation (2002): *Free Trade and the Environment. The Picture Becomes Clearer*, available at www.cec.org.

^{27/} Canada indicated that attempts are being made to deal with very complex issue of attribution within the NAHARP process, by using the Soil Landscape Polygons (SLC) scale as the basic level of analysis for the system.

^{28/} Work on agri-biodiversity indicators is undertaken by the OECD and, with regard to agricultural genetic resources, by the FAO. Recent OECD meetings focused on soil erosion and soil biodiversity, on land conservation and on agricultural water use and water quality. See also OECD (2001): *OECD Expert Meeting on Agri-Biodiversity Indicators. 5-8 November 2001, Zurich, Switzerland. Summary and Recommendations*. OECD, Paris, and *Environment Impacts in the Agricultural Sector: Using Indicators as a Tool for Policy Purposes*. Paper presented by Kevin Parris (OECD) to the Commission for Environmental Cooperation Meeting: "Assessing the Environmental Effects of Trade" Montreal, Canada 17-18 January 2002; available at http://www.cec.org/files/PDF/ECONOMY/OECDParris_EN.PDF. For FAO's work on indicators of agricultural genetic resources, see Collette, L. (2001): *Indicators of Agricultural Genetic Resources: FAO's contribution to Monitoring Agricultural Biodiversity*. Paper presented to the OECD Expert Meeting on Agri-Biodiversity Indicators, 5-8 November 2001, Zurich, Switzerland.

be especially difficult when addressing biodiversity issues. Again, it was observed that, though there is an increasing amount of biodiversity data available, this data is not easily integrated to economic models to link environment and trade policies.

89. Limitations in the availability of adequate data, however, restrict the use of formal models to disentangle the effects of specific trade policies or agreements from the many other factors that influence observable trends in agricultural trade flows and other key variables. In this connection, the ICTSD pointed out that, given that many environmental problems rather arise from underlying market imperfections and/or policy failures than from trade policy *per se*, such isolation of effects would be very important. In addition, formal models may also have other shortcomings. ^{29/}

90. The assessment frameworks discussed implicitly recognize the potential shortcomings of formal models. Indeed, no methodology seems to endorse specific formal tools or models for conducting the actual assessment. The methodologies either point to a plethora of possible quantitative as well as qualitative tools, or keep silent on the issue. The United States Guidelines explicitly point out that, while the application of modelling techniques may provide a useful approach for estimating environmental impacts, modelling and other economic analytical techniques, in and of themselves, are unlikely to provide an exclusive means for assessing areas of environmental concern. ^{30/}

91. Case studies seems to be an alternative approach in that they allow issues to be examined in their specific context, they are more disaggregated and make use of the detailed country-specific knowledge of the individual consultants who prepare the case studies. In consequence, a number of methodologies endorse the concept of more qualitative case studies. While not specifically focusing on environmental or biodiversity impacts, a similar approach was chosen by the FAO in assessing the implementation experience of the WTO Agreement on Agriculture in developing countries. ^{31/} However, possible limitations to the case-study approach were also pointed out:

(a) First, when the ultimate objective is to draw more general conclusions, it is paramount to choose a **representative sample** of case studies. Arguments drawn from case studies that based on just one or two examples will be of limited value if these examples are not extremely well chosen, which, in turn, may often be difficult. In this connection, the Institute for Development Policy and Management indicated that the quantification of some effects (such as commercialization in developing countries) relies largely on case study experience and that thoroughly evaluated case studies are however not readily available. In consequence, well-substantiated case studies and scientific information that is drawn together in a manner suitable to be called on in individual assessments would be very helpful.

(b) Second, despite common terms of reference in broad terms, the details of each case study are inevitably different. Not all case studies allow answers to all relevant questions.

(c) Third, the conclusions drawn from a case study depend on the analyst and, again, the **data basis** chosen for the analysis.

92. More generally, many respondents indicated that there still seems to be a certain **lack of methodologies** available to specifically measure impacts of trade liberalization on biodiversity in general

^{29/} Other possible shortcomings of formal approaches frequently referred to in the discussion include: outcomes that are heavily determined by the built-in assumptions on economic behavior and market competition (in the case of simulation modelling), too aggregated nature of models to capture the intricacies of trade agreements, validity of assumptions behind statistical models. See for short discussions OECD (1999), *ibid*; WWF International (1998): *Developing a Methodology for the Environmental Assessment of Trade Liberalization Agreements* and FAO (2003): *WTO Agreement on Agriculture: The Implementation Experience - Developing Country Case Studies* (available at <http://www.fao.org/DOCREP/005/Y4632E/y4632e00.htm>) or, for more extensive contributions, CEC (2002), *ibid*.

^{30/} The OECD workshop in 1999 came to a similar conclusion. See OECD (1999), *ibid*.

^{31/} See FAO (2003), *ibid*.

and agricultural biodiversity in particular. ^{32/} The European Community said that, even while it has to be acknowledged that the impacts of trade liberalization on biodiversity will be very different according to the specific country situation (regulatory framework, governance structure, geographical and environmental situation, land use forms, etc...), which would make it very difficult to develop a “one size fits all” methodology, assessment frameworks should include **more detailed provisions** for data use, indicators and assessment methods as regards biodiversity. ^{33/}

93. Several respondents said that **modelling systems** should be further developed in such a way as to fully capture the causal relationships which would form the basis of any analysis carried out in relation to land use change and management. UNEP noted that the further development of **techniques for environmental valuation** would also be useful.

94. Assessments usually start with an analysis of the trade policies and their economic impacts, and only towards the end of the assessment process link up with the agro-biodiversity system. However, understanding the agro-ecological system and its dynamics may also provide a good starting point of a more pro-active approach that would possibly contribute to draw more specific conclusions on impacts of proposed trade policies on agro-biodiversity. For instance, the expected impacts of trade liberalization policies may often depend very much on whether the agricultural system is a low-external-input or a high-external-input one. ^{34/}

95. As a specific proposal for the further development of biodiversity-specific methodologies along such lines, the European Community suggested committing assessment practitioners to focus on the country-specific direct and underlying causes for biodiversity loss, information which would usually be available in the national or regional biodiversity strategies and action plans. A clear analysis of these direct and underlying causes for biodiversity loss (including agricultural) in each country or region assessed should be a key first step in the assessment. For each of the main direct and underlying causes, an indicator should be developed against which the different liberalization scenarios should be analysed.

96. In particular, the European Community suggested to develop, under the framework of the Convention on Biological Diversity, a ‘tool kit’ which would include ‘methodology frameworks’ for:

- (a) Identifying the main direct and underlying causes for biodiversity loss;
- (b) Assessing the cause-effect relationships between those causes and trade liberalization;
- (c) The identification of appropriate indicators for measuring those effects; and
- (d) The methodology to assess impacts against those indicators.

97. In some instances, information problems go beyond data availability or indicator and other methodological issues. In these cases, a serious shortage of **reliable scientific information** was identified as key impediment for evaluations that go beyond the identification of potential impacts. In this

^{32/} UNEP also indicated that methodologies could also be improved by including a focus on linkages to development and poverty, and how the sound management of biodiversity can contribute to development, enhance market access opportunities and alleviate poverty.

^{33/} The Institute for Development Policy and Management referred to their cooperation with the biodiversity section of the International Association for Impact Assessment, and noted that the impact assessment programme of the European Union may include a further detailed assessment of the agriculture sector, within which further methodological refinements would take place.

^{34/} See Kessler, J.J. and M. Van Dorp (2003): *Environmental Impact Assessment of Structural Adjustment Programmes in Developing Countries*. AIDEnvironment, Advice and Research for Development and Environment, The Netherlands.

connection, the Institute for Development Policy and Management pointed to the example of transgenic crops, whose long-term environmental impacts cannot yet be evaluated with any certainty.

98. Finally, it is noteworthy that the FAO study on environment assessments in the context of sustainable forestry management, referenced in paragraph 8 above, also identified a need for more work on impact criteria and indicators, and also stressed (forestry) data availability and comparability as well as a shortage of reliable scientific information as serious impediments in the conduct of assessments of the impacts of trade and trade-related policies on forests, in particular when conclusions are to be drawn on the complex relationship between trade in forest products and forest sustainability. Furthermore, the study underlined the need for capacity-building, because of the weak capacity of many countries to carry out impact assessments of forest products trade and trade policies on sustainable forestry management.

V. SUMMARY AND CONCLUSIONS

99. All frameworks presented above offer at least some entry points to address biodiversity impacts in the assessment process. In addition, many offer additional guidance on what effects to expect in particular sectors when conducting the assessment, in the form of possible repercussions on biodiversity. A number of frameworks also include indicative lists of biodiversity indicators to use for measuring trade impacts in these sectors.

100. However, there is still a considerable lack of detail and specificity. Even while recognizing that assessment frameworks necessarily are of a more general nature, assessment frameworks need to provide more detailed provisions for data use, indicators and assessment methods as regards biodiversity, including specific reference to individual ecosystems—such as agricultural biodiversity—and their particular problems, in order to ensure that impacts are comprehensively and accurately addressed.

101. Biodiversity indicators or sets of indicators need to be further developed that are both able to provide disaggregated information (e.g., on the spatial distribution of impacts) and operational at aggregated levels, making them compatible with usual economic models. It has to be recognized that each assessment necessarily focuses on specific economic sectors, geographic areas and ecosystems, which impedes the use of a highly standardized, uniform set of indicators. Nevertheless, more consensus needs to be built, to the extent possible, on which set of indicators seems to be most appropriate to use under what circumstances. Existing initiatives that strive to reach such consensus need to be continued and encouraged. Assessment frameworks that eventually reflect such consensus would contribute to alleviate the problems of data comparability.

102. Consensus should also be built on how to collect and synthesize relevant data, by developing common protocols for data generation and synthesis.

103. In this connection, it is noteworthy that most frameworks presented (with the notable exception of the UNEP framework) are driven by and largely focus on developed countries. However, as many of the biodiversity impacts of trade liberalization agreements are to be expected in developing countries, empowering these countries to conduct corresponding assessments through capacity building appears to be very important. In the further development of indicators, the limited capacity of most developing countries in generating and processing data for highly sophisticated sets of indicators should also be taken into due consideration. For instance, efforts should strive to find practical and meaningful indicators that are sound from a scientific perspective and use existing data to the extent possible or enable the use of inexpensive data collection methods.

104. More could be done in developing tools that provide adequate analytical access to the multi-dimensional nature of biodiversity in general and agricultural biodiversity in particular. While it has again to be acknowledged that methodologies have to be adaptable to national or local circumstances, frameworks could nevertheless provide more guidance on *how* to address biodiversity-related problems.

This observation does not necessarily refer exclusively to formal modeling tools, although the further development of such tools, including valuation tools, will certainly be useful.

105. First, assessment frameworks could provide more detailed conceptual guidance on the different facets of the trade–agriculture–biodiversity relationship. With regard to agricultural biodiversity, such guidance could contribute to ensure comprehensive and thorough analyses by alerting researchers of the complexities of this relationship. For instance, the following key features could be stressed:

(a) Agriculture itself can be viewed as an ecosystem that hosts a unique and very specific community of species. Biodiversity is not only about wildlife;

(b) In consequence, specific agricultural activities, that is, specific agricultural production systems are not necessarily bad for biodiversity on the ecosystem level. Indeed, some agricultural production systems are actually an important *precondition* for maintaining specific agricultural ecosystems, extensive grassland being a standard example;

(c) Moreover, biodiversity/ecosystem-related aspects directly feed into agricultural production and productivity (pollinator mechanisms being a classic example);

(d) It is not clear that each and every agricultural intensification process (stemming possibly from trade liberalization policies) would necessarily have negative impacts on biodiversity. When starting from low productivity levels, a moderate use of mechanical and agro-chemical input may also yield important productivity gains with only relatively minor negative impacts on biodiversity. And some agro-ecological forms of intensification (intercropping, use of diverse species, integrated pest management) and beneficial mixes of land use can also raise resource efficiency while keeping existing biodiversity intact and even raising its overall level in agricultural landscapes.

106. Moreover, the frameworks could provide further guidance on how to address these intricacies while taking country-specific circumstances into consideration. One suggestion that merits further consideration was to focus the analysis on the direct and underlying causes for biodiversity loss, including loss of agricultural biodiversity, as a key first step in the assessment. Researchers could be directed to use the pertinent information contained in the National or Regional Biodiversity Strategies and Action Plans. A toolkit could be developed to further substantiate this proposal.

Annex

**THE IMPACT OF TRADE LIBERALIZATION ON AGRICULTURAL BIOLOGICAL
DIVERSITY: A SYNTHESIS OF ASSESSMENT METHODOLOGIES**

***Questionnaire for States and intergovernmental organizations that develop or use methodologies for
trade-related impact assessments***

1. Please provide background information on the development of your assessment methodology (for instance: authorship; development process including stakeholder involvement; mandate and scope of the methodology; legislative history, if applicable; etc).
2. Please provide a brief description of the main features of the assessment methodology.
3. Please describe how and to what extent the assessment methodology addresses the impacts on biological diversity, and specifically, on agricultural biodiversity.
4. In your opinion, what are the main (methodological and other) problems in addressing the impacts on biological diversity and specifically, on agricultural biodiversity, in trade-related impact assessments?
5. What do you think is necessary to improve the coverage of biodiversity impacts in your assessment methodology?
6. Please describe the activities, if any, you are undertaking to improve your assessment methodology with regard to its coverage of biodiversity impacts.
7. Please provide a list of specific assessment studies that were undertaken by using your assessment methodology, including short summaries of the main findings.
8. Please provide references to key documentation (manuals, guidelines, etc) (including web addresses; if only hardcopies are available, please send a copy to the address above).
9. Please provide any other comment you deem to be of use for the further work of the SCBD on this issue.
