Preliminary discussion paper

Assessing the Biodiversity Impacts of Trade: Principles and Practice

International trade and global biodiversity are among the most hotly contested topics in the debate on globalisation. Opinions differ widely on the relationship between the two. At one extreme, increasing international trade takes much of the blame for declining biological diversity, while at the other, global market mechanisms are seen as the principal vehicle though which environmental resources can be properly valued and conserved. Between these extremes, it is widely accepted that, through market failure and externalities, unregulated markets fail to deliver an optimal balance between biodiversity conservation and socio-economic goals, with different views about how such an optimum might be achieved. Impact assessment offers the potential to help reconcile these different views, by providing decision-makers with rational, objective information on the likely magnitude and significance of possible effects.

Experience in the impact assessment of trade policies and agreements has been accumulating since the early 1990s, beginning with assessments of the North American Free Trade Agreement (NAFTA), and subsequently expanding to studies undertaken for both governmental and non-governmental agencies, of a variety of bilateral and multilateral trade agendas. These assessments have made use of established principles and practices of environmental impact assessment, strategic environmental assessment, social impact assessment, economic analysis, and other relevant forms of assessment, including assessment of biodiversity impacts, adapting them and linking them as necessary.

To date, assessment of biodiversity impacts has not been a strong component of trade impact assessments, and there is little existing guidance on this issue. To address this, this preliminary discussion paper is intended as the starting point for a consultative process among IAIA members to develop principles and good practice guidance for assessing the biodiversity impacts of trade policy and agreements. Intended users include governments, international organisations and impact assessment specialists involved in carrying out trade impact assessments, and NGOs, international corporations and other stakeholders undertaking or participating in impact assessments.

Annex 1 sets out a number of discussion questions about the nature of possible guidance and how it might be prepared. It is envisaged that the discussion planned for the IAIA'04 conference will address these questions, and also begin the discussion of possible impact assessment principles and aspects of good practice.

Annex 2 discusses a number of issues related to the second part of this discussion.

Key references are given at the end of Annex 2. The paper makes particular use of the work undertaken by the Secretariat of the Convention on Biological Diversity, although much other work has been drawn on. We express our thanks in particular to

Roel Slootweg, Markus Lehmann and Colin Kirkpatrick for comments and contributions, and to Norman Lee for a first draft of Annex 1.

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16 Jan 04
version 5
Submitted to proceedings

Annex 1. Process for developing principles and good practice guidance

i) *What is the knowledge base upon which the Principles and Good Practice Guidance are to be prepared?* Which trade impact assessments carried out to date have included a biodiversity component? What experts should be invited to contribute, other than those participating in discussions at IAIA'04?

ii) *Who are the intended users and what are their principal needs?* Specialists, non-specialists, both? International organisations, national governments, companies, impact assessment specialists, NGOs, trade associations, members of the general public?

iii) *What is the level of detail in which the 'principles' and 'good practice' are to be presented?* How many pages? How much general information on biodiversity should be provided, eg definitions, international commitments (particularly the CBD) different values of biodiversity?

iv) *What are the most appropriate working definitions of the key terms, which are to be used?* Definitions of, for example, 'trade impact assessment', 'assessment of the biodiversity impacts of trade agreements/policies', 'biodiversity component of trade impact assessments', 'biodiversity impact assessment', 'biodiversity impact assessment of trade'. What other terms need to be defined?

v) *What is the intended scope of the guidance?* Should corporate trade policy, national trade policy and international trade agreements all be covered, or should they be the subject of separate investigations and separate principles and guidance? Should trade-related issues such as investment, competition, government procurement, labour standards etc. be included? If so, which issues, and how should they be covered?

vi) *What are the most important contextual considerations to be covered?* Should consideration be given to variability in the planning and decision-making contexts within which assessments have to prepared and used?

vii) *Should an overall trade impact assessment process be defined, within which assessments of biodiversity impacts are to be undertaken?* What are the main stages of the process, and how do they relate to each other? Should there be variations for different types of assessment? What are the key issues for biodiversity, in the overall assessment process, and at each individual stage? Should guidance be given who should be responsible for assessments, and who should carry them out?

viii) *What is the overall analytical framework within which the assessment guidance is to be presented?* How explicitly should the guidance indicate the types of direct and indirect interaction and feedback that should be studied, between environmental, social and economic impacts, and between biodiversity impacts and other environmental impacts?

ix) *How should the guidance cover indicators?* Should specific indicators be defined, or should guidance be given on defining indicators within individual assessments? What kinds of indicators are to be covered in the guidance, and in what ways? Should the coverage of indicators be confined to biodiversity impacts or not? Should target and process oriented indicators both be covered?

x) *What assessment and data collection methods are to be covered, and in what form?* How much detail on scientific methods should be given? What type of guidance should be given on the selection of methods? Should specific reference sources on scientific methods be quoted? If so, which ones, and how firmly should they be recommended? What guidance should be given on whether assessments should make use of existing biodiversity data or involve the collection of new data?

xi) *How is evidence of good practice to be identified and presented within the guidance?* How will examples of practice be gathered? How will they be evaluated for 'good practice'? What criteria will be used? What evidence will be sought? How will examples and evidence be presented and referenced?

xii) *What process will be followed in the preparation of the guidance?* What process should be adopted to take guidance preparation forward following IAIA'04, e.g. establish a working group of IAIA members to take this forward by email? What timescale is envisaged? What consultation process should be used among IAIA members, e.g. circulation of successive drafts? Should other specialists with technical and/or practic al experience in strategic biodiversity impact assessment be involved in developing the guidance? Should consultation take place outside IAIA before the guidance is finalised? With what types of organisation?

Annex 2. Issues and possible approaches

Trade impact assessment in general, and assessing the biodiversity impacts of trade in particular, present numerous challenges. Even at the project level, where biodiversity impact assessment is fairly well established, the complexity of ecosystems and limited understanding of their behaviour is such that predictions cannot be made with the same degree of precision as may be possible for some other types of impact. This is compounded by the greater degree of uncertainty associated with any strategic level impact assessment. Trade impact assessment presents still further challenges, in the complexity of the economic and social systems that interact with ecological ones, and in the international nature of associated decision-making processes.

The following sections set out some of the key issues that need to be addressed, and possible approaches to dealing with them. General issues in trade impact assessment are discussed in the first part of each section, followed by key issues for consideration of biodiversity within this general framework.

1. The decision-making context
2. The importance of biodiversity
3. Screening
4. Scoping
5. Assessment of alternatives
6. Consultation and participation
7. Use of theoretical predictions and case study experience
8. Impact assessment step 1: underlying processes and indicators
9. Impact assessment step 2: economic effects
10. Impact assessment step 3: social and environmental effects
11. Assessing impacts on biodiversity
12. Mitigation and enhancement
13. Uncertainty, monitoring and policy adaptation

Table 1. Summary of key issues for biodiversity at different stages in the impact assessment process

1. The decision-making context

To be effective, the impact assessment process must be integrated into policy development and decision-making, taking full account of the particular means by which trade policies and agreements are formulated.

- *Multilateral trade agreements*, as forged through the World Trade Organisation, are established by a process of negotiation between member states. There is no overall decision-maker. Each country's trade representatives develop their own negotiating position, with the aim of maximising the net benefit to their own country. Sustainable development is a declared goal, as expressed in the Doha Ministerial Declaration, but the main

common interest is the need for stability in the world trade regime, plus the potential for increased economic efficiency that may arise from trade liberalisation.

- *Regional or bilateral trade agreements* are established by a similar process of negotiation, between a smaller number of trading partners. The main common interest lies in maximising the economic benefit to the region as a whole, in a manner that is sustainable for the region as a whole, in competition with other regions and countries.
- *National trade policy* is generally a combination of a country's involvement in multilateral, regional and bilateral agreements, and the choice of alternative policy decisions within the framework of the agreements that are made. It may also be influenced by, for example, relations with the World Bank and the International Monetary Fund, e.g. through Poverty Reduction Strategy Papers (PRSPs).
- *Corporate trade policy* is under the control of the individual corporation, aiming to maximise its own profitability. The corporation is itself the decision-maker, taking account of, and where practicable influencing, international trade rules and national legislation or policy in the countries in which the corporation operates.

Within these various policy formulation processes, there is no international competent authority responsible for approving a trade policy and its potential impacts. The WTO is responsible for facilitating trade negotiations and for the enforcement of negotiated agreements, but not for environmental, social and other aspects of global governance. These are dealt with through other multilateral agreements including Multi-lateral Environmental Agreements (MEAs), such as the Convention on Biological Diversity (CBD), whose mechanisms have no direct authority over the international trade regime. The key issue of the relationship between the WTO rules and specific trade obligations set out in MEAs is an area of on-going WTO negotiations.

In the absence of an international competent authority, it is important that the purpose of an impact assessment study be explicitly stated. Possible purposes may include:

i. *Public relations* - To identify issues of concern to the affected public at an early stage, such that policy may be amended or action taken to win support. This may for example apply to impact assessments conducted for international corporations, to take account of public concerns in the home country and in countries where the corporation operates.

ii. *Strong representation* - To provide information, which strengthens an organisation's ability to represent the interests of its members or sponsors. This may for example apply to impact assessments conducted by NGOs or trade associations.

iii. *Governance* - To enhance national governance, by engaging the domestic public in the formulation of national negotiating positions and internal policy responses to changing trading conditions.

iv. *Sustainable development* - To enhance a country's contribution to international initiatives for sustainable development, by engaging both the domestic public and the international public in the development of supporting policies for mitigation and enhancement to be incorporated into or associated with a trade agreement.

Typically, these and other purposes will have different consultation needs. If the assessment serves more than one purpose, the objectives of each aspect of consultation should be clearly stated.

For trade impact assessments to be successfully integrated into policy formulation and decision-making, several key factors need to be addressed:

- *Appropriate timing* – impact assessments need to be carried out and subject to consultation before negotiating positions are finalised, so that impact assessment findings/recommendations can contribute meaningfully to policy formulation. Agreements should not be reached before or without a clear understanding of their likely social and environmental implications;
- *High-level commitment* – all relevant policy makers need to be involved in and committed to the impact assessment process;
- *Transparency* – the impact assessment process, assessment reports, and their influence on negotiating positions, agreements or policy needs to be as transparent as is reasonably possible;
- *Stakeholder consultation and participation* – all relevant stakeholders, including trading partners, need to be involved in the impact assessment process.

2. The importance of biodiversity

It is proposed that the guidance include a section on the relevance and value of biodiversity, to assist the impact assessment process in informing decision-makers about the implications of their decisions. The following indicates the type of guidance envisaged.

What is biodiversity? Biodiversity is the variety of life on earth. It is nature's variety of plants, animals, microorganisms, habitats and ecological systems, from the everyday to the highly endangered. The concept was placed firmly on the international agenda by the 1992 Convention on Biological Diversity (CBD), which formally defines biodiversity as:

> *'The variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.'*

Biodiversity conservation is similar to the more traditional nature conservation, but takes a holistic approach, giving greater recognition to the social, cultural and economic values of the variety of life. It also includes genetic diversity.

Why does conserving biodiversity matter? The conservation of biodiversity is a key test of sustainable development. Economic and social development is simply not sustainable if it is achieved whilst diminishing biodiversity. Biodiversity has economic, ecological, aesthetic and ethical value.

Biodiversity matters because

- *it supports life itself* – every species plays a role in the Earth's well-being
- *it provides direct economic benefits* – eg in farming, fisheries, forestry, pharmaceuticals, manufacturing
- *it provides indirect economic benefits* eg flood control, waste water systems, soil stabilisation
- *it has an economic and social value for recreation* eg recreation, enjoyment of the countryside, wildlife tourism
- *it has aesthetic and spiritual value* – it enriches our quality of life, it inspires, entertains and motivates us. It makes the world a better, healthier place to live
- *people value the existence of biodiversity and care whether or not it is conserved* – people place a value on knowing a species or habitat exists and are worried about the loss of plants and animals

Much of the importance of biodiversity relates to human values that are not economic ones, but its economic value is itself large. The economic value is however difficult to calculate, as many of biodiversity's benefits do not impact on markets and so do not have prices. The market economic impacts of biodiversity can nevertheless be significant. For example, economists have put the value of nature's services globally at about US$38 trillion a year, roughly equal to the global economy itself (Constanza et al, 1997). This figure demonstrates biodiversity's high overall value, but economic decisions are based on changes in value, which for biodiversity is even more difficult to measure.

Biodiversity loss - We are losing biodiversity at an alarming rate (equivalent to prehistoric mass extinctions) worldwide, predominantly because of human activity. At a global level, habitat loss and fragmentation is the biggest threat for 85% of all threatened species. Invasive non-native species are the second greatest threat to biodiversity after habitat loss. Pollution, climate change, desertification, human population growth and unsustainable use are also significant threats.

International legislation and policy - The key piece of international legislation is the CBD, which has now been adopted by 187 parties and has three key goals:

- *Conservation of biodiversity:* the CBD advocates the protection of species and ecosystems through in-situ conservation, including nature reserves and policies to save endangered species. However, it acknowledges the need for ex-situ conservation, such as zoos and seed banks in some cases.
- *The sustainable use of the components of biodiversity:* the CBD promotes measures to ensure that future generations will benefit (economically and otherwise) from today's biological resources.
- *The fair and equitable sharing of benefits arising from the use of genetic resources:* the CBD sets ground rules for access to genetic resources

(chromosomes, genes and DNA) by acknowledging that when a microbe, plant, or animal is used for a commercial application (eg biotechnology and the development of new pharmaceuticals) the country of origin should benefit.

Adoption of the international target *"to significantly reduce the rate of biodiversity loss by 2010"* at the 2002 World Summit on Sustainable Development (a target subsequently adopted by the CBD) has raised biodiversity higher on the international agenda. As has the growing recognition of how important biodiversity is to achieving the UN Millennium Development Goals.

Other relevant international obligations and initiatives

- Ramsar Convention on Wetlands of International Importance, 1971 (the **Ramsar Convention**) for the conservation and wise use of all wetlands and their resources (http://www.ramsar.org/
- Convention on International Trade in Endangered Species of Fauna and Flora, 1973 (**CITES**), aims to ensure that international trade in specimens of wild animals and plants does not threaten their survival(http://www.cites.org/)
- Bonn Convention on Migratory Species of Wild Animals, 1979 (**CMS or Bonn Convention**) aims to conserve terrestrial, marine and avian migratory species throughout their range. (http://www.unep-wcmc.org/cms/)
- The Convention Concerning the Protection of the World Cultural and Natural Heritage, 1972 (the **World Heritage Convention**) aims to protect cultural and natural heritage (http://whc.unesco.org/nwhc/pages/home/pages/homepage.htm)
- The Cartagena protocol on Biosafety, 2003 (a supplementary agreement to the CBD), seeks to protect biodiversity from potential risks from modified living organisms resulting from modern biotechnology (http://www.biodiv.org/biosafety/default.aspx)

Key principles for biodiversity

- The principle of "**no net loss**" of biodiversity. Any further decline in biodiversity should be considered negative or undesirable and new human activities should not lead to further decline of biodiversity. For example, if an activity will result in impacts on biodiversity which cannot be avoided or reduced (eg loss of an area of wetland habitat), then measures should be put in place to ensure that overall there will be no net loss of biodiversity value (eg an area of new wetland should be created). The mitigation hierarchy approach (see below) seeks to give effect to the no net loss principle. However, the operation of the principle in practice does raise various issues on which consensus has yet to be reached. For example, should the rigour with which the principle is applied depend on the "value" of the biodiversity element effected, ie should the principle be applied more strictly to "high-value" biodiversity eg protected areas? Should the type/value/area of habitat being restored/created be the same as that being lost ("like-for-like")? Or is it

appropriate to compensate with creation/restoration of a different type/value/area of habitat?

- The **precautionary principle** . There are many unknowns about the processes that influence biodiversity, particularly at ecos ystem level. In areas with high biodiversity value only activities with limited or no impact on biodiversity should be permitted. If impacts cannot be established with sufficient certainly, the activity should be halted as a precaution until enough informa tion is available.

3. Screening

Screening. Most trade agreements or policies cover a number of distinct issues or measures, such as agricultural tariffs, non-agricultural tariffs, subsidies or anti-dumping rules. Unless the impact assessment is to cover all of these measures, a screening exercise will normally be necessary, to identify those measures which will be subject to full assessment. A preliminary impact assessment covering all proposed measures may serve this purpose. The selection of measures for further study should be informed by consultation on the findings of the preliminary assessment.

During screening the key biodiversity issue to consider is whether the trade agreement/policy or any of its distinct measures are likely to have a significant effect on biodiversity. This should include considering whether there are likely to be effects on the conservation of biodiversity, on the sustainable use of biodiversity and/or the fair and equitable sharing of the benefits arising out of utilisation of biodiversity. All relevant components of biodiversity should be considered. For example, protected habitats and species, national biodiversity strategy priorities, unprotected habitats and species of high value, "sensitive" ecosystems supplying important services eg wetlands, and ecosystems of high social/cultural/economic significance. The proposed Principles and Good Practice guidance could include a checklist of important elements of biodiversity to consider during screening, and/or a presumption that all trade impact assessments should include a biodiversity component.

4. Scoping

National/international scope. The geographical scope of the assessment will depend on the purposes of the study. For studies whose purpose is to inform a country's trade negotiators or policy-makers, the main aim may be to assess impacts in the home country. However, these may depend on interactions with international impacts, and so some degree of analysis of impacts in other countries may be necessary. A full analysis of impacts in all trading partners may be needed if the impact assessment aims to inform a corporation's international trade policy, or to contribute to international initiatives or supporting policies related to trade policy.

Environmental/social/economic scope. The overall aim of the study may be to assess environmental impacts (strategic environmental assessment, biodiversity impact assessment etc.), social impacts (social impact assessment, gender impact assessment etc.) or a combination of environmental, social and economic impacts (sustainability impact assessment). For all assessments however, some degree of analysis of economic, social and environmental impacts will be necessary, to allow for interactions between the three spheres.

Governments and corporations generally undertake some form of economic, social and/or financial appraisal in formulating their negotiating positions and trade policies, for which they may need to retain a degree of confidentiality. The impact assessment should make use of any such appraisals, but will need to achieve an appropriate balance between commercial confidentiality and sufficient transparency to enable meaningful consultation/participation. It may therefore need to adopt similar approaches to those used in environmental impact assessment, where commercial confidentiality of design details must be respected. This may entail reporting the relevant results of such appraisals, without necessarily revealing analytical details.

Specific scope. As with other forms of impact assessment, the cost-effective use of time and resources requires the scope of the assessment to be restricted to those impacts that are potentially significant. As well as applying the general principles of scoping used in other forms of assessment, allowance should be made for the international nature of trade impact assessment, particularly when the aim is to assess impacts overseas as well as in the home country. Because of widely differing environmental, social and economic conditions in different countries, the potential scope is extremely wide. This may be narrowed by a series of iterative steps, from preliminary to fuller assessments, using consultation at each step to prioritise key issues and potentially affected geographical areas.

From a biodiversity perspective, the following issues will need to be considered during scoping:

- What elements of biodiversity/its sustainable use need to be considered in the assessment? Why are these elements/methods of use valuable?
- What types of impacts on biodiversity are likely (direct, indirect, cumulative)?
- What study area will the assessment cover? Is this meaningful for the elements of biodiversity/likely impacts on biodiversity eg will an ecosystem-based approach be adopted?
- What biodiversity information is available to inform the assessment? Is additional information needed? What biodiversity stakeholders might have relevant information/knowledge? (see below)
- What methods/approaches should be used to assess biodiversity impacts? (see below)

The proposed Principles and Good Practice guidance could include guidance on each of these issues. For example, generic biodiversity indicators to use in the assessment and/or guiding principles for deriving assessment-specific biodiversity indicators

5. Assessment of alternatives.

Where the assessment is intended to contribute to the development of a country's negotiating position or a corporation's trade policy, it should evaluate the impacts of alternative policies being considered, along with those of the do-nothing option. Reasons for rejection of other reasonable alternatives should be described.

Where the assessment is not related to the policy of any particular country or corporation, but is instead intended to provide information on the likely impacts of agreements under negotiation, it should evaluate a representative range of potential

outcomes to the negotiations. The way in which this is done may vary according to the nature of the trade policy being assessed. For a change in tariffs for example, the impacts of different tariff levels may be inferred from an assessment of just two scenarios: the base situation, and a postulated tariff change. Greater or lesser changes, in either direction, can be expected to have impacts, which differ proportionately. For discrete trade measures, such as a change in the rules through which commitments are made, this approach does not apply, and specific alternatives must be considered.

From a biodiversity perspective key considerations will be whether any of the proposed alternatives are likely to be particularly good/bad for biodiversity, and whether any other reasonable alternatives might be preferable from the biodiversity perspective.

6. Consultation and participation

Consultation and stakeholder participation are important for legitimacy and serve three prime purposes in trade impact assessment:

- to identify issues of concern, such that they are included in the scope of the study and subject to informed debate;
- to make use of specialist expertise in the prediction and evaluation of impacts;
- to foster transparency and expose the quality of the assessment to open public scrutiny.

Consultation should take place in screening, scoping, at key points in the study when the scope is refined or analytical techniques are defined, and on the published impact assessment report. Expert consultees should include those with expertise in countries or regions for which significant impacts are analysed. If the purpose of the study includes the assessment of overseas impacts, consultees should also include representatives of affected communities.

Consultees should include NGOs and other organisations representing environmental conservation, disadvantaged communities, women's groups, labour organisations, small and medium sized enterprises and relevant commercial interests. Full use should be made of reports published by experts and stakeholder representatives. Opportunities should also be created for additional comment, e.g. using existing research/information networks to solicit comments, and making direct contact where necessary.

The aims of the study should be clearly defined, relating them directly to stakeholder expectations, and identifying the intended balance between what is desirable and what is achievable. The mechanism for dealing with comments should be clearly stated, including publication of responses. In addition to formal communications, there should be engagement with consultees in direct discussion of analytical techniques, causal relationships and expected effects, by informal communication or, where practicable, face-to-face.

Transparency through information sharing at all levels of the consultation and participation process should be the norm for all decision-makers, stakeholders and NGOs.

From a biodiversity perspective key issues will be what biodiversity stakeholders should be consulted, and what are the most effective methods for involving these stakeholders. The proposed guidance could include a checklist of key biodiversity stakeholders/relevant networks.

7. Use of theoretical predictions and case study experience

Ex ante impact assessment techniques generally follow two broad approaches: theoretical predictions and inference based on modelling or causal chain analysis; and practical inference from *ex post* case study experience. Both approaches have shortcomings. Theoretical analysis may fail to identify some cause and effect links, or overestimate the significance of others. Modelling requires the use of simplifying assumptions as to the complex interrelationships involved, and the dynamic nature of these relations is also difficult to model satisfactorily. Overcoming these limitations is strongly dependent on case studies in which actual effects have been observed in practice. By themselves however, case studies can be misleading, without analysis, which demonstrates a clear attribution of an observed effect to a presumed cause. Even where attribution is satisfactorily demonstrated, a judgement needs to be made as to the transferability of the findings of the specific case study to a different set of conditions and circumstances.

While case study information can provide a measure of impact magnitudes in certain circumstances, theoretical analyses offer a degree of flexibility in exploring the impacts for different scenarios. The impact assessment should therefore use a combination of the two approaches, using each to minimise the shortcomings of the other.

8. Impact assessment step 1: underlying processes and indicators

Many of the impacts of a change in trade policy occur through a perturbation to existing developmental or environmental processes. These may include for example industrialisation, technological development, the commercialisation of agriculture, urbanisation and deforestation, which may be accelerated or decelerated by the proposed trade policy or agreement. These processes need to be fully understood before the impact of the proposed measure can be evaluated. The assessment of impacts on biodiversity should therefore start with an analysis of the underlying direct and indirect causes for biodiversity loss, internationally and in specific regions or countries subject to assessment.

Where programmes are already in place for monitoring the influence of these underlying processes, the assessment should be framed in such a way as to assess the impacts on the indicators that are used. This should not preclude the identification of other impacts, for which additional indicators may need to be devised, as discussed below under monitoring.

9. Impact assessment step 2: economic effects

Assessing the influence of a proposed change in the trade regime will generally begin by identifying the effects on market incentives and opportunities which result from a negotiated change to a trade agreement, or from a proposed change in trade policy. These effects will induce a change in economic behaviour, which will in turn affect the production system, with consequential positive and negative social and environmental effects. The assessment of economic effects will typically proceed as follows:

- identify the effects on market incentives and opportunities which result from the proposed change;
- identify induced changes in the economic behaviour of producers, consumers and intermediaries, and hence effects on the production system;
- 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;
- assess the impacts of the change in the trade measure on underlying developmental and environmental processes, and hence on economic growth rates, resource utilisation, and corresponding long term dynamic effects.

For some types of trade measure, such as tariff changes, economic modelling techniques are well established. In particular, Computable General Equilibrium (CGE) models are widely used for evaluating the economic effects of changes in trade policy. Such techniques give quantified estimates of the economic impacts that are likely to occur once the production and trading systems have settled into a new equilibrium. However, their applicability to trade in services and other types of trade measure has yet to be so fully established. Also, the availability of reliable theoretical models is limited in respect of analysing the magnitude of impacts during the process of adjustment from one equilibrium state to another, and in assessing impact on underlying processes and long term dynamic effects.

The economic component of the assessment should therefore use a balance of modelling techniques, causal chain analysis and case study experience, to give a best estimate of overall short term, medium term and long term effects.

10. Impact assessment step 3: social and environmental effects

Once economic effects have been evaluated, the assessment can proceed to evaluate interlinkages between the production and consumption system and factors such as employment, investment, land use, environmental quality, natural resource stocks, biodiversity, the level and distribution of household income, gender balance of paid and unpaid labour, prices of essential goods and services, livelihood opportunities, poverty levels, and interactions between these effects. A combination of theoretical analysis and case study experience should be used.

Even when the prime purpose of the study is to assess a particular type of impact, e.g. on biodiversity, other environmental and social effects should also be considered, in order to take account of interactions.

11. Assessing impacts on biodiversity

Biodiversity impacts on terrestrial, freshwater and marine ecosystems may arise from any change in the trade regime, which affects agricultural or industrial production, including service industries such as tourism and transport. Industrial effects occur primarily through the generation of pollutants or consumption of natural resources, or physical damage to critical ecosystem components. Similar effects occur from agriculture, along with potentially significant impacts arising from changes in land use or in agricultural practices or technology.

Land use effects to be considered include fragmentation as well as changes in habitat area. Impacts arising from changes in technology or agricultural practice include cultural effects, such as the use of traditional knowledge, and commercial effects, such as the use of transgenic species.

As well as indirect effects arising through changes in economic incentives, increased agricultural trade can also have a direct impact on biodiversity through the introduction or increased survival rates of alien invasive species.

For the identification of potential impacts, the assessment should make use of relevant checklists available in the professional literature, as well as theoretical analysis of causal chains and experience from case studies. Where appropriate the assessment should consider genetic diversity, species diversity and ecosystem diversity. Criteria used for assessing the significance of biodiversity impacts should be consistent with the CBD Ecosystem Approach.

The quantification of biodiversity impacts is often problematic, largely because of lack of reliable modelling techniques, either for theoretical predictions or for attributing impacts identified through case study experience. In many cases, the effect of a change in a trade policy or agreement will be to accelerate or decelerate existing effects, or trigger other effects, associated for example with general developments in agricultural or industrial practice, or changes in transportation costs. In most cases, the magnitude and significance of impacts arising from underlying effects, and from the influence on them of a change in trade policy, will be strongly dependent on domestic policy and regulatory frameworks for environmental and natural resource management.

In these circumstances, the assessment should identify those aspects of biodiversity, which are already cause for concern, where the proposed change in trade policy may aggravate that concern. Irrespective of the magnitude of predicted impacts, the assessment should enable the design of mitigation and enhancement measures, which, at least, eliminate any aggravating effect, and preferably, result in a net beneficial effect. This is discussed more fully below.

In many cases, appropriate domestic policy responses will be the most important factor in containing or avoiding adverse biodiversity impacts. The assessment of a

proposed trade measure should therefore evaluate the extent to which it may enhance or impair a government's freedom or incentives to strengthen its regulatory and policy frameworks for managing biodiversity.

The proposed guidance may include advice on the following issues:

- What types of impacts on biodiversity are likely? E.g. a checklist of potential impact types could be developed: a generic list of impacts and/or potential impacts from particular sectors
- What methods should be used to assess biodiversity impacts?
- How will the significance of biodiversity impacts be judged?
- Use of the precautionary principle

12. Mitigation and enhancement

The design of mitigation and enhancement measures will depend on the decision-making context.

In the impact assessment of *corporate trade policy*, a clear distinction should be drawn between measures that are under the corporation's own control, and those which depend on actions taken by other bodies (e.g. governments in host countries). Ideally, the corporation should itself implement mitigation measures to fully counter any potentially significant adverse biodiversity impacts resulting from its own trade policy, assuming no change to regulation and government policy in the host country. Where this is not practicable, and successful mitigation or enhancement depends on government action, the economic and/or social costs of that action should be evaluated alongside the environmental benefits.

Similarly, the assessment of a *national trade policy or negotiating position* should evaluate the economic and/or social costs of any proposed measures for mitigating or enhancing biodiversity impacts in the home country.

Where the assessment evaluates *international impacts of a trade agreement*, supporting policies or flanking measures may be built into the agreement itself (e.g. the 'green box' exemptions of the WTO Agreement on Agriculture), or adopted as part of parallel international initiatives (e.g. bilateral or multilateral development assistance programmes).

In all cases, the assessment should evaluate the extent to which a proposed mitigation measure will influence the predicted effect (e.g. partially, mainly or wholly), even when a potential impact on biodiversity cannot be quantified. Where trade-offs are made between economic and environmental costs and benefits, the corresponding value judgements should be stated explicitly. If the parameter being evaluated is already cause for serious concern, and the proposed mitigation measure is not expected to fully eliminate any aggravating effect, the justification for not doing so should be clearly stated.

Mitigation or enhancement will often entail strengthening national policy or regulatory frameworks for managing biodiversity, or the provision of technical and financial assistance in support of this. To enable the design of appropriate measures, the assessment should evaluate the status and effectiveness of existing policy and regulatory frameworks. The CBD ecosystem approach to biodiversity management may be taken as a benchmark for such evaluations. Recommended mitigation and enhancement measures should be consistent with CBD principles for the ecosystem approach and international commitments and targets on biodiversity conservation.

The proposed guidance could include advice on use of the "no net loss principle" and adoption of the mitigation hierarchy whereby:

- Impacts on biodiversity should be avoided wherever reasonably possible, e.g. by changing the policy/agreement
- Where avoidance is not possible biodiversity impacts should be reduced as far as reasonably possible, e.g. by altering the policy/agreement
- Compensation should be provided for any residual impacts on biodiversity, e.g. restoration of existing/creation of new ecosystems
- Opportunities to enhance biodiversity should be sought wherever reasonably possible, e.g. opportunities to enhance sustainable use

13. Uncertainty, monitoring and policy adaptation

The high level of uncertainty inherent in strategic assessment of impacts on biodiversity should be explicitly acknowledged, and allowed for in the assessment. The precautionary principle should be applied, in such a way that action can be taken before serious or irreversible damage occurs. In particular the assessment should specify:

a) measurable indicators through which impacts that are identified as potentially significant may be monitored;
b) appropriate programmes for monitoring these indicators, in a time frame that permits effective response;
c) actions that will be taken if monitoring reveals significant adverse impacts.

In the case of bilateral, regional or multilateral trade agreements, the negotiation process may not be conducive to subsequent changes after an agreement has been made. The adaptive management processes and policy flexibility necessary for biodiversity conservation may not therefore be feasible within the trade negotiation arena itself. The assessment should therefore evaluate the extent to which other policy-making frameworks may compensate for this, at the appropriate national, bilateral, regional or multilateral level, taking account of interactions between these levels.

The proposed guidance could provide advice on determining which elements of biodiversity should be monitored, in what circumstances policy be adapted, and what adaptations might be appropriate.

Table 1. Summary of key issues for biodiversity at different stages in the impact assessment process

Impact assessment stage	Key issues for biodiversity
Screening	- Is the trade agreement/policy or any of its distinct measures likely to have a significant effect on biodiversity? - Consider biodiversity: ecosystems, species and genes. Consider whether there are likely to be effects on the conservation of biodiversity, the sustainable use of biodiversity and the fair & equitable sharing of the benefits arising out of utilisation of biodiversity
Scoping	- What elements of biodiversity/its sustainable use need to be considered in the assessment? Why are these elements/methods of use valuable? - What types of impacts on biodiversity are likely (direct, indirect, cumulative)? - What study area will the assessment cover? Is this meaningful for the elements of biodiversity/likely impacts on biodiversity? - What biodiversity information is available to inform the assessment? Is additional information needed? What biodiversity stakeholders might have relevant information/knowledge? - What methods/approaches should be used to assess biodiversity impacts?
Alternatives	- Are any of the alternatives likely to be particularly good/bad for biodiversity? - Are there other reasonable alternatives that would be preferable from a biodiversity point of view that should be considered?
Consultation and participation	- What biodiversity stakeholders should be consulted? - What is the most effective method for involving these stakeholders?
Impact assessment	- What methods should be used to assess biodiversity impacts? - How will the significance of biodiversity impacts be judged? - What impacts on biodiversity are predicted? - Use of the precautionary principle
Mitigation & enhancement	- The "no net loss principle" - Adoption of the mitigation hierarchy - Impacts on biodiversity should be avoided wherever reasonably possible eg by changing the policy/agreement. - Where avoidance is not possible biodiversity impacts should be reduced as far as reasonably possible eg by altering the policy/agreement - Compensation should be provided for any residual impacts on biodiversity eg restoration of existing/creation of new ecosystems - Opportunities to enhance biodiversity should be sought wherever reasonably possible eg opportunities to enhance sustainable use
Uncertainty, monitoring & policy adaptation	- Which elements of biodiversity should be monitored? - In what circumstances should policy be adapted and what adaptations might be appropriate?

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