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Background Paper

**Liberalization of International Trade in Environmental
Goods and Services**

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I. INTRODUCTION

1. Environmental goods and services (EGS) play an essential role in sustainable development and in the achievement of specific targets set out in the United Nations Millennium Declaration and at the World Summit on Sustainable Development (WSSD).¹ Strengthening EGS sectors in developing countries through, in particular, appropriate regulatory frameworks, international trade, investment, capacity building and development assistance is therefore of key importance.

2. According to the Doha Ministerial Declaration (DMD), negotiations on trade liberalization in EGS should enhance the mutual supportiveness of trade and environment, suggesting a potential for “win-win” outcomes.² Developed countries expect greater access to emerging environmental markets for their export-oriented EGS industries. Potential gains for developing countries include: (a) easier access to environmentally sound technology and know-how; (b) economic, environmental and developmental benefits resulting from improved resource management and environmental conditions; (c) new export opportunities in certain EGS sectors; and (d) enhanced capacity to comply with environmental requirements in international markets. Employment could also benefit, as developing countries possess significant human capital in areas related to the provision of certain EGS.

3. To put “win-win” scenarios into perspective, a number of factors need to be taken into account. First, developing countries are net importers of EGS. Second, proposed approaches to definitions and classifications in the WTO seem to include few products of export interest to developing countries. On the other hand, lists of environmental goods include many “multi-use” products. Third, most developing countries still need to design national policies and regulatory frameworks to ensure that, as much as possible, liberalization in environmental services and the commercial presence of foreign service suppliers strengthens national capacities, promotes the transfer of technology, and enhances efficiency and competitiveness. Fourth, developing countries need to collect systematic information on measures applied at the national and subnational levels to decide what limitations to market access and national treatment for various modes of supply to maintain,³ as well as which conditions to attach to possible liberalization commitments they may schedule under the General Agreements on Trade in Services (GATS).⁴ Fifth, the liberalization of trade in basic environmental infrastructure services may mean increased participation of foreign and domestic private actors in sectors of vital economic and social importance. This may raise issues of control over essential environmental resources, as well as social considerations, such as costs of and access to basic environmental services. The negotiations on EGS must therefore respect national objectives and the level of development of individual WTO Members.

4. Dealing with EGS in multilateral trade negotiations requires a careful balancing of interests. Direct trade gains (in terms of increased exports) from liberalization in EGS may flow largely to the more advanced WTO Members. Trading opportunities for developing countries could be improved to the extent that EGS negotiations result in the elimination or reduction of trade barriers facing goods and services of export interest to them.

5. There is a need to enhance understanding of how EGS liberalization works best and what have been the experiences of developing countries that have liberalized environmental services sectors. The Expert Meeting provides an opportunity to exchange national experiences, in particular regarding domestic regulations and linkages between regulatory frameworks and the outcomes of liberalization; explore possible actions at the national and international levels to enhance synergies between trade liberalization, strengthened national EGS capacities and development objectives; and identify information gaps and capacity building needs.

6. This paper addresses these issues mainly in the context of the WTO negotiations on EGS and related national policies aimed at strengthening EGS sectors in developing countries. It also touches on other areas

¹ For example, the commitment “to halve, by the year 2015, the proportion of people who are unable to reach or to afford safe drinking water and the proportion of people who do not have access to basic sanitation”.

² “With a view to enhancing the mutual supportiveness of trade and environment, we agree to negotiations, without prejudging their outcome, on:... the reduction or, as appropriate, elimination of tariff and non-tariff barriers to environmental goods and services”. Doha Ministerial Declaration, paragraph 31 (iii).

³ Under GATS Article XVI and XVII.

⁴ Under GATS Article XIX.2.

that have sometimes been brought up in discussions on EGS and in which UNCTAD has carried out substantive work, in particular the promotion of trading opportunities for “environmentally preferable products” (EPPs), BIOTRADE and organic agriculture. This is done without prejudice to how they may be dealt with in the WTO negotiations, if at all.

7. The note builds on previous UNCTAD expert meetings.⁵ Chapter II provides an overview of different approaches to defining the environmental industry. Chapter III surveys environmental markets and factors influencing trade flows. Chapter IV revisits issues of definition and classification in the context of trade policy and describes the state of play in the WTO negotiations. Chapter V examines the scope for possible export and developmental gains. Chapter VI draws some conclusions from the previous analysis with regard to the WTO negotiations, national policies and capacity building. Chapter VII provides an overview of commodity and regional patterns of trade in environmental goods, with particular emphasis on Asian developing countries. Annex II contains the preliminary version of the Chairman's Summary of the UNCTAD Expert Meeting on Definitions and Dimensions of Environmental Goods and Services in Trade and Development, which was held in Geneva from 9-11 July 2003.

II. DEFINING THE ENVIRONMENTAL INDUSTRY

Concepts of environmental goods and services

In the sustainable development debate, different concepts of “environmental goods” and “environmental services” are used. An environmental good can be understood as equipment, material or technology used to address a particular environmental problem or as a product that is itself “environmentally preferable” to other similar products because of its relatively benign impact on the environment.

Environmental services have been defined as: (a) services provided by ecosystems (e.g. carbon sequestration); or (b) human activities to address particular environmental problems (e.g. wastewater management).⁶ Many biodiversity-rich developing countries, for example, have great potential for deriving commercial and developmental benefits from environmental services provided by their ecosystems. In most cases, however, the economic value of such services has not been established. Numerous ongoing studies and projects focus on valuation techniques and instruments to commercialize such services.

The classification of (trade in) “environmental” services in the context of ongoing WTO negotiations is based on the concept of human-activities-related services, which provides the focus of this note. Two major subcategories are infrastructure-related services, such as sewage, refuse disposal and sanitation services, and environment-related commercial services.

8. The Organization for Economic Co-operation and Development (OECD) and the Statistical Office of the European Communities (Eurostat) have defined the environmental industry as: “activities which produce goods and services to measure, prevent, limit, minimize or correct environmental damage to water, air and soil, as well as problems related to waste, noise and ecosystems”.⁷

9. This definition provides a basis for an indicative list of EGS that extends across environmental media and classifies these under three broad rubrics: pollution management, cleaner technologies and products, and resource management. A number of commercial services are needed to provide environmental services, e.g. engineering, design and construction. Environmental infrastructure services and environment-related commercial services differ considerably in terms of market structure, regulatory frameworks and limitations to market access and raise different concerns in the context of trade negotiations.

⁵ In particular the Expert Meetings on Strengthening Capacities in Developing Countries to Develop their Environmental Services Sector (May 1998) and Environmental Requirements and International Trade (October 2002).

⁶ Catherin Cattafesta, “*Diagnostico preliminar, República Dominicana*”. Study prepared for the Ministry of Environment and Natural Resources of the Dominican Republic under the UNCTAD/FIELD project Building Capacity for Improved Policy Making and Negotiations on Key Trade and Environment Issues.

⁷ Environmental Goods and Services Industry: Manual for Data Collection and Analysis, OECD/Eurostat, 1999.

10. Many environmental goods that fall into the pollution or resource management categories have a low technological content. In the case of cleaner technologies and products, it is often difficult to draw the line between environmental protection and better process control. Environmental technology and its use are increasingly being driven by resource economics rather than environmental regulations. In this area the differences between goods and services may become blurred. Another problem is that it is sometimes difficult to define a discrete set of “environmental goods”, as many of these are subject to technological change and continuous innovation. According to the OECD, half of the environmental goods that will be in use 15 years from now do not currently exist.⁸

11. In many cases, environmental goods, such as equipment for waste and wastewater management, are used in conjunction with environmental services. The integrated nature of many environmental activities has led some analysts to believe that liberalization of trade in such environmental goods should take place in parallel with liberalization in environmental services.

12. “Environmentally preferable” products (EPPs) can be generally described as products that, from a life-cycle perspective, cause significantly less “environmental harm” than alternative products that serve the same purpose.⁹ Developing countries can derive economic, social and environmental benefits from the production and export of EPPs. However, there is no universally accepted definition of EPPs.

III. TRADE IN ENVIRONMENTAL GOODS AND SERVICES (EGS)

A. Environmental markets and trade flows

13. The size of the global environmental market is estimated at US\$ 550 billion.¹⁰ The developed countries account for about 90 per cent of the total market (85 per cent for the EU, the United States and Japan combined).¹¹ The environment industry is estimated to have grown by over 14 per cent between 1996 and 2000. Most analysts expect that the industry will continue to expand, reaching over US\$ 600 billion by 2010.¹² This is roughly the same size as the pharmaceuticals or information technology markets. The most important sectors are wastewater treatment, waste management and air pollution control. Saturation has slowed market growth in the developed countries to 3-5 per cent. Most of the future demand growth is expected to occur in developing countries and countries in transition – at an annual rate of 8 to 12 per cent.¹³

14. Basic services will represent the majority of environmental business opportunities in developing countries over the next 20 years. Market forecasts reveal a significant growth potential in emerging environmental markets. Energy production is set to become the fastest growing segment of the market as

⁸ The Global Environmental Goods and Services Industry, OECD, 1998.

⁹ Less environmental harm is generally established according to the following criteria: (a) use of natural resources and energy; (b) amount and hazardousness of waste generated by the product along its life cycle; (c) impact on human and animal health; and (d) preservation of the environment. For more information on the concept and criteria of EPPs, see: “Environmental Preferable Products (EPPs) as a Trade Opportunity for Developing Countries”, Report by UNCTAD secretariat, UNCTAD/COM/70, Geneva, December 1995. This report did not intend to define EPPs for the purposes of WTO negotiations.

¹⁰ Market surveys are based on data provided by suppliers and made according to three sources of revenue generation: services, equipment or resources. The estimates vary from US\$ 350bn to US\$550 bn, depending on the definition used. The two main sources are the Environmental Business International (EBI) and the Joint Environmental Markets Unit (JEMU). The significant differences in estimates have to do with the fact that the EBI statistics include certain sectors - water utilities, water treatment services and resources recovery - that do not correlate clearly with the JEMU statistics.

¹¹ Environmental Goods and Services: The Benefits of further Global Trade Liberalization, OECD, 2001, p. 12.

¹² “Environmental Benefits of Removing Trade Restrictions and Distortions”. Note by the Secretariat, Addendum. Committee on Trade and Environment. WT/CTE/W/67/Add.1, WTO, 13 March 1998, para. 1; *Implications of WTO Agreements for International Trade in Environmental Industries*, ITC, 1999.

¹³ Based on EBI estimates; UNCTAD estimates that the environmental industry in developing countries has grown between 5 and 25 per cent. See “Report of the Expert Meeting on Strengthening Capacities in Developing Countries to Develop their Environmental Services Sector”, 20-22 July 1998. TD/B/COM.1/18, TD/B/COM.1/EM.7/3, 5 August 1998. [UNCTAD, 1998(a)]

electric power generating companies install more efficient pollution-control equipment and replace old, coal- and oil-fired capacity with generating sets based on natural gas or renewable energy.

15. In terms of market structure, the environmental industry is characterized by a few dominant multinationals operating in the waste and water management sector and a large number of small and medium-sized firms in solid waste management, including in developing countries. Mergers, acquisitions and general consolidation are affecting the structure of the industry, reflecting a shift from compliance with environmental regulations to more efficient use of resources.

16. Traditionally, environmental infrastructure services have been in the public domain, but this situation is changing. Municipal services such as water delivery, water treatment and garbage collection have been privatized in some European countries, particularly France and the United Kingdom.

17. There is also growing private sector participation in environmental infrastructure services in developing countries. In some cases, however, poor performance of private companies and social discontent has been a matter of concern. Multilateral and bilateral lending agencies are important factors in determining how environmental infrastructure projects are developed and operated.

18. The combination of market saturation in developed countries, industry consolidation, privatization and deregulation of utilities such as water and electricity increase the share of EGS entering international trade, particularly in more mature areas such as water and waste management and air-pollution control. The proliferation of environmental standards across the world, including international standards introduced pursuant to multilateral environmental agreements (MEAs) such as the Montreal Protocol and the United Nations Framework Convention on Climate Change, has also created markets for EGS.

19. The European Union, the United States and Japan are net exporters of EGS. The European Union is the biggest exporter and the United States and Canada form the biggest market for EU products and services. South-east Asia has recently been replaced as the second biggest market by countries in accession to the European Union. Developing countries' exports tend to be orientated mainly towards regional markets.

20. Document TD/B/COM.1/EM.21/CRP.1 analyses trade flows for environmental goods on the basis of lists developed by OECD and Asia Pacific Economic Cooperation (APEC).¹⁴ Developing countries are net importers for the vast majority of these goods. Trade statistics, however, need to be interpreted with caution. The lists include a wide range of products that have multiple, including non-environmental, uses. In addition, the Harmonized Commodity Description and Coding System (HS) in most cases does not uniquely identify, at the six-digit level, environmental goods on those lists. Taken together, this means that corresponding trade statistics tend to be inflated.¹⁵

B. Market drivers

21. The demand for EGS is shaped by environmental regulations and market-based instruments; education, information and consumer pressure; economic and financial considerations; and tax policies.¹⁶ Environmental regulations are by far the most important factor.

22. In developed countries, regulatory reform focusing on the use of economic instruments has encouraged a shift from end-of-pipe pollution prevention in the direction of more cost-effective, multimedia approaches. This shift has tipped the balance in favour of services as “know-how” features predominantly in integrated packages of technology-intensive goods and services.

¹⁴ TD/B/COM.1/EM.21/CRP.1 (English only), which presents an overview of trade patterns in environmental goods from 1996 through 2001, will be made available at the Expert Meeting.

¹⁵ In principle, the HS captures all goods, including environmental goods, provided they are described in such a way that they can be identified on the basis of objective criteria when presented. In January 2002 the World Customs Organization (WCO) released for the first time stand-alone codes based on environmental criteria (for wastes and chemicals specified under certain MEAs, notably the Basel Convention and the Montreal Protocol). The WCO can provide technical advice on the possibility of providing for separate identification of goods in the HS.

¹⁶ UNCTAD, “Strengthening capacities in developing countries to develop their environmental services sector” (TD/B/COM.1/EM.7/2), para. 31.

23. In developing countries, population growth, urbanization and economic activity create significant environmental and resource management needs. Turning these needs into demand for EGS is a gradual process and also a function of resource availability. The usual sequence of evolving priorities is: water delivery, wastewater treatment, air pollution control, solid waste disposal, disposal of hazardous waste, and soil and water remediation. The need for enhanced environmental protection and cost-effectiveness are drivers of a trend towards cleaner production.

24. The need to comply with increasingly frequent, stringent and complex environmental requirements in international markets is leading to changes in production processes and generates demand for EGS. This trend is reinforced by the use of life cycle analysis and environmental management systems, e.g. ISO 14000, as companies move towards more efficient use of raw materials, water and energy. Another important factor is compliance with MEAs.

25. Easier access to EGS can help a broad range of pollution-intensive sectors, such as pulp and paper, metal refining and manufacturing, energy, coal, textiles and footwear, in increasing resource efficiency and reducing compliance costs. However, a gap remains between environmental needs and financial resources available for environmental purposes.

C. Barriers to trade

26. Actual or potential limitations to trade in EGS arise from tariff and non-tariff measures in the case of goods and restrictions with respect to national treatment and market access in the case of environmental services.

27. Currently applied and bound tariffs on many capital goods used to provide pollution-management services are low in developed countries - generally under 3 per cent for products on the OECD list.¹⁷ In most developing countries these tariffs remain relatively high, with bound tariffs ranging from 20 to 40 per cent and applied rates mostly ranging from 10 to 20 per cent.¹⁸ In some developing countries, rates are lower or higher.

28. Trade in EPPs may be affected by standards and certification requirements. On the other hand, trade in niche products seeking to enter new markets may be hindered by lack of appropriate standards for such products. Exports of “novel” food products may be subject to stringent testing in importing countries.

29. Protection against competition from foreign suppliers of services is granted largely through restrictions on foreign direct investment (“mode 3”). Developed countries have not specified many such limitations. However, environmental services trade may be affected by the lack of market access in other related services sectors such as construction, engineering, legal and consulting services. In some cases financial guarantees are required for cross-border supply (“mode 1”).

30. Individual service suppliers from developing countries may be affected by restrictions on the movement of natural persons (“mode 4”), including licensing requirements. Suppliers of professional services may be affected by requirements relating to qualifications and working experience.

31. Subsidies provided to the domestic environment industry may become trade barriers for EGS from other countries.

32. Developing countries’ service markets may also be affected by environmental regulations taken pursuant to technical assistance, which favours the donor country’s suppliers.¹⁹ The role of export credit agencies in the delivery of EGS may also need further assessment.

33. Cleaner production and resource management services depend on access to environmentally sound technologies (ESTs). Some existing ESTs may involve proprietary knowledge²⁰ developed by and belonging

¹⁷ Extended information is available at <http://www.oecd.org/pdf/M00037000/M00037633.pdf>

¹⁸ In practice, imports of environmental goods may sometimes benefit from incentives.

¹⁹ “Environmental Services”, Background Note by the Secretariat; Council for Trade in Services. S/C/W/46, WTO, 6 July 1998, para. 36-40.

to transnational corporations (TNCs). Barriers to trade in EGS may also be created where specific patented or patentable technical knowledge is adopted as a standard for an industry through governmental regulation, standards or special provisions in MEAs.

IV. EGS IN THE WTO DOHA WORK PROGRAMME

34. In accordance with arrangements made following the Doha Ministerial Conference, EGS are negotiated in different WTO bodies. Negotiations on environmental goods take place in the Negotiation Group on Market Access for Non-Agricultural Products (NGMA) whereas negotiations on environmental services are conducted in the Council for Trade in Services, in Special Session (CTS). The Committee on Trade and Environment, in Special Session (CTESS), may play an important role in clarifying the concept of environmental goods. The classification work on environmental services is done in the Committee on Specific Commitments, which may eventually submit recommendations to the CTS. No links or sequencing have been established in the work of the negotiating bodies.

A. Environmental goods

1. Definitions, lists and criteria

35. There is no definition in the GATT/WTO for environmental goods. Lists of “environmental goods” developed by the OECD and APEC have been circulated in the NGMA.²¹ The OECD list was developed for analytical purposes.²² The APEC list was compiled in the late 1990s, based on proposals by individual APEC members, as a bottom-up approach to the Voluntary Sectoral Liberalization initiative (EVSL), which included the environmental sector. Interestingly, there is no consensus in APEC on the definition and categorization of the environmental industry.²³ The current definitions and categorizations employed by member economies differ greatly. In the WTO, some countries consider such lists as a good starting-point for discussions. Others are of the view that they cannot be used as the basis for negotiations.

36. Japan has circulated a list that is based on the OECD list and includes additional energy-efficient consumer products such as microwave ovens, refrigerators and video projectors, as well as other less-polluting and more resource-efficient goods.

37. Several developing countries argue that the product coverage of environmental goods would need to include more products of export interest to them. For instance, India argues for inclusion of some EPPs, although not on the basis of processes and production methods (PPMs).²⁴ Many other WTO Members oppose the use of criteria based on non-product-related PPMs on systemic or practical grounds.

38. Qatar has proposed including certain energy-efficient technologies and the natural gas and liquid fuels used for these technologies. It links the proposal with the objectives of MEAs, in particular the UNFCCC and its Kyoto Protocol, and claims that non-tariff barriers are serious impediments to global trade in these goods.²⁵

39. Several Members have expressed the view that no definitional exercise is required until an agreement on modalities is reached. In principle, the NGMA may negotiate a list, without having to first

²⁰ See “Factors affecting Transfer of Environmentally Sound Technology”. Note by the Secretariat. WT/CTE/W/22, WTO 1996.

²¹ Environmental Aspects of the Negotiations on Market Access, WT/CTE/GEN/9, TN/MA/7, WTO, 21 February 2003.

²² See “Environmental goods: A comparison of the APEC and OECD lists”, OECD document COM/ENV/TD(2003)10/FINAL, 28 April 2003.

²³ Negotiators, who drew up the APEC list, were constrained by a number of practical realities; these included, *inter alia*, questions of customs administration, dual use issues, differing national nomenclatures below the HS 6-digit level and WTO legal issues (e.g., like products and PPMs). For further detail: See submission of the United States to the NGMA, TN/TE/W/34, TN/MA/W/18/Add.4.

²⁴ Market access for non-agricultural products. Submission by India. TN/MA/W/10, WTO, 22 October 2002.

²⁵ “Negotiations on Environmental Goods: Efficient, Lower-Carbon and Pollutant-Emitting Fuels and Technologies”, Submission by the State of Qatar, TH/TE/W/19, TH/MA/W/24, WTO, 28 January 2003.

agree on a definition. However, Members would probably need a common understanding on what categories of products could be included. Some have proposed that the NGMA could seek inputs from the CTESS on the concept of “environmental goods.”

40. Different suggestions have been made regarding criteria for identifying environmental goods. “End-use” or “predominant end-use” criteria could be applied to select equipment used in environmental activities, such as pollution control or waste management.²⁶ In principle, there is broad support for this criterion.²⁷ However, other criteria would have to be applied to identify EPPs, in particular inherently environment-friendly products, of export interest to developing countries.²⁸

41. Performance-based criteria, such as energy efficiency during use, have also been proposed. As mentioned earlier, however, it may sometimes be difficult to apply these criteria because of continuous technological progress and innovation.

42. It is important to clarify the criteria that demarcate environmental goods from mainstream products. Unclear criteria may turn into NTBs for products that could be considered as “like products” and/or significantly increase the costs of conformity assessment, in particular certification.

43. The issue of appropriate criteria will not have to be resolved right away when agreeing on a list of environmental goods for departure. However, such list would have to be reviewed and the review mechanism should be based on suitable criteria.

2. State of play

44. Developing countries have argued that, in accordance with paragraph 16 of the DMD, the negotiations should pay particular attention to “products of export interest to developing countries”; take fully into account the special needs and concerns of, and require “less than full reciprocity in reduction commitments” from, developing and least developed countries; and establish modalities for studies and capacity building measures.

45. Some Members view paragraph 31(iii) of the DMD as providing for special treatment for environmental goods in the form of, for example, deeper cuts, and some support a “zero-for-zero” agreement. Some others argue that there is no justification for providing such special treatment. It has also been suggested by some that priority could be given to reaching agreement on modalities for all goods negotiated in the NGMA and that subsequently the NGMA could evaluate whether additional reductions are needed to fulfil the mandate of paragraph 31(iii).

B. Environmental services

1. Definitions and classification

46. Environmental services²⁹ are included as one of the 12 sectors in the Services Sectoral Classification List (W/120),³⁰ which is based on the UN Provisional Central Product Classification (CPC). It outlines four categories of environmental services, classified according to environmental media: sewage, refuse disposal, sanitation and “other”.³¹ The WTO members can decide collectively whether there is a need to update the

²⁶ “End-use” criteria can be applied to select products to be put on lists of “environmental goods”, but cannot be used in the context of customs administration.

²⁷ The issue of how to deal with multiple-use products remains a problem.

²⁸ It has been argued that expanding the scope of environmental goods to include products based on PPM-related criteria would be counterproductive not just for the environmental goods negotiations themselves but more broadly for the full market access negotiations.

²⁹ The GATS does not precisely define the term “services”. Article I: 2 defines “trade in services” by reference to the delivery of services, known as “modes of supply”.

³⁰ Services Sectoral Classification List, Note by the Secretariat, MTN.GNS/W/120.

³¹ The revised CPC has subcategories of environmental sectors. For instance, refuse disposal services have been divided into non-hazardous and hazardous waste collection, treatment and disposal services.

classification in the light of developments in the environmental industry, services negotiations and ongoing work elsewhere.³²

47. Several Members are of the view that the W/120 classification needs to be updated, invoking a series of drawbacks:³³ (a) it establishes only partial correlation with primary media, especially in the case of water and solid waste; (b) it is limited to “end-of-pipe” services, i.e. it does not cover pollution prevention and sustainable resource management; (c) it includes services provided in operation, but not services that make facilities operable; and (d) it does not capture services provided directly to industry.³⁴

48. Proposals for updating the W/120 include several subsectors, such as water delivery; (hazardous) waste management; recycling; and protection of air quality and climate.

49. The EU proposal includes “water for human use and wastewater.” Some civil society groups have expressed concern over the fact that the proposed heading “Water Collection, Purification and Distribution Services” would explicitly bring “water distribution” under the GATS classification.³⁵ They claim that the proposed heading “Water Collection, Purification and Distribution Services Through Mains” raises questions about market access *versus* access to and control over water resources.³⁶

50. The general obligations under GATS, including MFN and national treatment, do not apply to services supplied under government authority that are not supplied on a commercial basis or in competition with other service suppliers.³⁷ WTO members can therefore protect those public utilities or other environmental services essential to the economy or society from participation by foreign actors.³⁸

51. Some developing countries have suggested that the category “other” services could include sectors of export interest to them, e.g. studies on the evaluation of environmental impacts or consultancy for environmental policy and management. Many developing countries argue that there is a need for “stability” in the services classification and that any revision should be agreed multilaterally.

52. An important feature of the W/120 is that services sectors are classified in a mutually exclusive way, e.g. services in one sector cannot be covered by another. This has implications for the cross-sectoral approach to the design and delivery of integrated environmental services.

53. Some WTO Members propose that, apart from “purely” or “core” environmental services (based on W/120 with possible amendments), negotiations could also focus on certain “related” environmental services. These would include professional services; research and development; consultancy, subcontracting and engineering; and construction relating to the environment.³⁹

54. To preserve the mutually exclusive nature of W/120, only commitments concerning “purely” environmental services would be entered in schedules for the environmental services sector, whereas commitments concerning “related” services would be entered in schedules for sectors other than “environmental services”. This is known as a “core and cluster” approach. Some have expressed concern that this approach could result in unintended commitments. Such concerns could be addressed by drawing up a

³² “Environmental Services”, Background Note by the Secretariat. Council for Trade in Services. S/C/W/46, WTO, 6 July 1998, para 18.

³³ See “Environmental Services”, Communication from the United States, Council for Trade in Services – Special Session, S/CSS/W/25, WTO, 18 December 2000; “Classification Issues in the Environment Sector”, Communication from the European Communities and their Member States, S/CSC/W/25, WTO, 28 September 1999, as modified by job 7612 dated 28 November 2000.

³⁴ See also Dale Andrew, “Modernizing the List of Environmental Services: OECD Proposals”. In *Energy and Environmental Services: Negotiating Objectives and Development Priorities*, UNCTAD/DITC/TNCD/2003/3, New York and Geneva, 2003.

³⁵ Such concerns were expressed, for example, at the Third World Water Forum in Kyoto, Shiga and Osaka, Japan, 16 to 23 March, 2003

³⁶ GATS does not cover ownership of natural resources.

³⁷ GATS Article I(3).

³⁸ The United States offer, for example, applies only to environmental services open to private sector participants and does not give foreign service suppliers the right to acquire or invest in government monopolies supplying services. The offer does not include water supply or distribution, as the United States considers that GATS is not the appropriate vehicle for pursuing privatization of US public services.

³⁹ These are “multiple-use” services that can be defined as environmental only through their “end use”.

checklist for “cluster” services, with Members able to consider for each service on the list what sort of commitments – if any – they wish to make. This could promote recognition of the economic linkages between different services, while preserving the voluntary “bottom-up” nature of GATS commitments.

2. State of play

55. Negotiations on trade in services started in January 2000, pursuant to Article XIX of GATS, and as part of the “built-in” agenda. The DMD marked the beginning of the market access negotiations and invited Members to table initial requests for specific commitments by 30 June 2002 and initial offers by 31 March 2003. Environmental services are an important area in requests and offers made by developed countries. Issues raised in the negotiations include increased country coverage and reduction of barriers to trade, especially for “mode 3” (commercial presence) and “mode 4” (presence of natural persons); regulatory issues; and the classification.

56. As compared to other sectors, liberalization bound under the GATS in environmental services appears rather limited. However, WTO members' policies may be more liberal in practice than is reflected in their schedules. Overall, few limitations to market access and national treatment have been scheduled. However, the scope of the commitments is restricted in a number of cases by horizontal limitations and restrictive definitions of the activities covered.⁴⁰

57. The regulatory issues include the need for increased transparency, implementation of Article I:3(a) of the GATS, and recognition of environment-related professional qualifications.⁴¹ Some members indicated that liberalization must not impair the ability of Governments to impose performance and quality controls on environmental services and to otherwise ensure that service providers are fully qualified and carry out their tasks in an environmentally sound manner. It has also been noted that the GATS recognizes the right to regulate and does not prevent foreign service suppliers from being subject to the prevailing regulatory requirements – or even to additional, stricter requirements, provided they are scheduled as national treatment restrictions.

58. Developing countries are increasingly interested in multilateral discussions in the Working Party on Domestic Regulations. Discussions on subsidies (Article XV) and government procurement (Article XIII) in the Working Party on GATS Rules are in a tentative stage.

59. As disciplines on subsidies are yet to be developed under GATS, more sector-specific analysis of subsidies and their effects – positive or negative – would be helpful to trade negotiators. Environmental services could be an important area for such analysis.

60. Where there is a strong public function in the provision of certain essential services, e.g. in water supply and waste management, many Governments have established monopoly or exclusive supplier rights in respect of public utilities. GATS Article VIII provides disciplines on monopolies and exclusive service suppliers, but the obligations relating to procurement or subcontracting of services by private firms with exclusive supplier rights granted by Governments are not clear.

61. The issue of classification should be addressed in the Committee on Specific Commitments. For the moment, WTO Members are using various classifications of environmental services in their bilateral requests and offers.

⁴⁰ “Environmental Issues Raised in the Services Negotiations”, WT/CTE/GEN/11, WTO, 16 April 2003.

⁴¹ *Ibid.*

V. POTENTIAL BENEFITS FOR DEVELOPING COUNTRIES

A. Potential for export gains

62. Some developing countries may be able to compete in subregional or regional markets where experience in similar environmental problems is key. Moreover, they may be able to offer a range of products and services that are not only price competitive, but also based on technology adapted to the local conditions.

63. Some developing countries have export potential and a positive trade balance in specific EGS sectors. Mexico, for example, is competitive in equipment to monitor air quality and atmospheric emissions and in services to optimize energy use in industrial processes. India has large renewable energy programmes and exports renewable energy systems and products, such as wind-powered generating systems⁴² and photovoltaic cells.

64. The analysis in TD/B/COM.1/EM.21/CRP.1 shows that during the period 1996-2001 developing countries as a group were net exporters for 14 of the 128 “environmental goods” on the OECD list. Examples of energy-efficient consumer goods where certain developing countries have become significant suppliers to the global market are florescent lamps (China, Mexico, Republic of Korea, Indonesia, Thailand and Chile) and multi-layered insulating glass windows (Mexico, Saudi Arabia, Republic of Korea and Brazil). Clean bio-fuels, such as ethanol, represent significant exports for Brazil, Jamaica, Argentina, Bolivia, Costa Rica, El Salvador and Guatemala. Artisanal manufactures such as hand brooms are key exports for Iran, Bhutan, Kenya, Sri Lanka and Nepal.

65. Some gains may be generated from trade in EPPs. Tariffs are less of a problem for these products, except for value-added agricultural and natural-resource-based goods. However, progress can be made in lowering NTBs, especially those relating to certification requirements.

66. Developing countries may have export potential in environment-related professional services. Cuba, for example, has supplied environment-related services in the form of studies, assessments and consultancies to various countries in Latin America and the Caribbean.⁴³ Colombia proposes including the implementation and auditing of environmental management systems, the evaluation and mitigation of environmental impact, and advice in the design and implementation of clean technologies in the negotiations.⁴⁴

67. Partnerships can provide environmental services suppliers in developing countries with business opportunities, while at the same time allowing technology transfer and capacity building.⁴⁵

B. Potential for environmental and developmental gains

68. Developing countries may derive important environmental and developmental benefit from trade liberalization in EGS. Since the provision of basic environmental services requires high levels of investment and expertise, the commercial presence of foreign enterprises may contribute to increased investment and capital formation; improvements in the coverage and quality of environmental services; transfer of technology, know-how and best practices; and enhanced competitiveness.⁴⁶

69. Some developing countries have argued that liberalization of trade in EGS should provide conditions for the transfer, on a favourable commercial basis, of environmental technologies and associated “know-

⁴² Indian companies have commercialized both equipment and maintenance services.

⁴³ Raúl Garrido Vázquez. “Evaluación Nacional sobre Servicios Relacionados con el Medio Ambiente. Estudio de caso de Cuba”. Prepared for the project Building Capacity for Improved Policy Making and Negotiations on Key Trade and Environment Issues.

⁴⁴ Communication from Colombia: Environmental Services, S/CSS/W/121, WTO, 27 November 2001.

⁴⁵ Report of the Expert Meeting on Strengthening Capacities in Developing Countries to Develop their Environmental Services Sector. TD/B/COM.1/18 - TD/B/COM.1/EM.7/3, August 1998, paragraph 31.

⁴⁶ Communication from Colombia: “Environmental Services”, S/CSS/W/121 and Nicaragua, Ministry of Development, Industry and Commerce (MIFIC), “Estudio Preliminar de la Situación de Servicios Ambientales en Nicaragua”. Prepared for the UNCTAD/FIELD project “Building Capacity for Improved Policy Making and Negotiations on Key Trade and Environment Issues”.

how”, as well as for the development of national capabilities, both human and institutional, in the environmental sector.⁴⁷

70. While trade in EGS is a direct route for technology transfer, it might be important to link it to other channels such as investment, licensing of intellectual property rights, government procurement, MEAs and development cooperation.

71. The WTO Working Group on Trade and Technology Transfer could make a substantive contribution by identifying steps that might be taken within the WTO’s mandate to increase flows of technology to developing countries. The role of effective multilateral instruments such as the Multilateral Fund under the Montreal Protocol should also be noted.

72. To capture the benefits of liberalization, developing countries have to strengthen their regulatory regime in relation to their own developmental and environmental needs. This will attract the “right” EGS, create or preserve space for the domestic environmental industry, including a reliable supply from SMEs, promote opportunities for switching to clean(er) technologies, and eventually lead to a better match between technological solutions and local environmental and resource management problems.

VI. CONCLUSIONS

72. So far, this paper has outlined potential benefits of EGS trade liberalization for developing countries. To turn liberalization into real sustainable development benefits, developing countries need to build supply capacities, adapt regulatory frameworks and develop supportive infrastructure. Developing countries need to participate effectively in EGS trade negotiations, as well as to enhance policy coordination at the national level. National consultations, information gathering and capacity building are important in this context.

73. The definition of the environmental industry is still evolving. Trade negotiators have yet to reach an agreement on the coverage of “environmental goods” and on a re-classification of environmental services, if and when necessary. Direct trade gains from liberalization in EGS may flow largely to the more advanced WTO Members, which stand to benefit from improved access to expanding EGS markets in developing countries. Efforts should be made to increase the potential for direct trade gains for developing countries.⁴⁸ Since the negotiations on EGS form part of the single undertaking, there is also an opportunity to trade off results in EGS with other sectors under negotiation.

A. Issues in the negotiations

1. Environmental goods

74. Discussions on environmental goods have focused on the product coverage of the negotiations and on negotiating objectives. It is possible that Members will seek to agree on a list, based on a common understanding, rather than trying to define “environmental goods”. Such a list may be based on a combination of “end-use” criteria for select product categories used in activities such as pollution control and renewable energy, plus specific criteria for EPPs.

75. To date, the proposed lists of environmental goods have centered on selective coverage of environmental equipment, chemicals (in the case of the OECD list), scientific instruments and a few energy-efficient products. In general, developing countries are net importers of these products and their applied tariffs are higher than those in the developed countries. It is also argued that many “multiple use” products

⁴⁷ Communication from Cuba, Negotiating Proposal on Environmental Services, S/CSS/W/14222, WTO, March 2002.

⁴⁸ Paragraph 16 of the DMD calls for particular attention to be paid to products of export interest to developing countries. Similarly, paragraph 15 reaffirms that the negotiations on services should be conducted with a view to achieving the objectives of the GATS, as stipulated in the Preamble, Article IV and Article XIX of that Agreement, which includes increased participation of developing countries in trade in services.

may, in practice, have relatively little application for environmental purposes.⁴⁹ For these reasons, some developing countries seem inclined to keep any list of environmental goods short and current.⁵⁰

76. At the same time, some developing countries have argued that negotiations concerning environmental goods should include more products of export interest to them. Many of these products, however, fall into the category of EPPs. Inherently environmentally preferable products, such as renewable-energy products, biodegradable products from natural fibers such as jute and coir, recyclable products, non-timber forest products and clean fuels such as methanol/ethanol or biomass, could be considered under the negotiations on environmental goods.⁵¹ Reducing non-tariff barriers to trade affecting EPPs is of key importance. It is also important to ensure that any selection of categories of EPPs for negotiating purposes is based on objective criteria to avoid possible new NTBs and additional costs, e.g. for certification.

77. For some EPPs, including those based on PPM-related criteria, developing countries could seek to improve market access by means other than the negotiations in the NGMA. For example, concerns related to standards, certification and conformity assessment procedures could be addressed under the Agreement on Technical Barriers to Trade, which covers, for example, organic agriculture. The CTESS could also play a role here. Developing countries could find it useful to explore creating markets in EPPs through trade facilitation and promotion measures.⁵² UNCTAD, in cooperation with other institutions, could be of assistance, drawing on its work on commodities, BIOTRADE and the International Task Force on Harmonization and Equivalence in Organic Agriculture, created jointly with the FAO and the International Federation of Organic Agriculture Movements (IFOAM).

2. *Environmental services*

78. Developing countries may derive environmental and developmental benefits from liberalization in environmental services. However, a few factors would appear to suggest the need for well-prepared and gradual approaches to market access and national treatment commitments in the context of GATS: (a) regulatory frameworks are still being established; (b) more information may need to be collected on how environmental services are provided, including at the state or municipal levels and by the SME and informal sectors; and (c) the potential of domestic companies and national professionals to supply environmental services is not well assessed. National consultations and support for capacity-building efforts play an important role in addressing such issues.

79. Classification issues may grow in importance and are best addressed multilaterally. As far as proposals for new subsectors of the “core” services are concerned, “water distribution” is the most sensitive area. Countries can also make commitments on any “related” or “cluster” services. Market access goals for these services should be set carefully through an appropriate scheduling of commitments.

80. The negotiations on environmental services are not linked to the negotiations on environmental goods. However, it is important for trade negotiators to monitor developments on both fronts. For instance, a checklist may be created for environmental goods that are integral to the provision of environmental services in those sectors where the number and extent of requests are significant.

81. The growing scope for prevention activities increases the importance of consultancy and engineering services. Consequently, the need for “mode 4” commitments will also increase. It would be important to facilitate the participation of developing countries in mutual recognition agreements. If the ILO International Standard Classification of Occupation (ISCO) is used for establishing occupations relevant to trade in services, developed countries could make exemptions from the economic needs test for developing countries, specific to certain occupations listed under environmental sectors.

⁴⁹ This has been found in an analysis by the TATA Energy Research Institute (TERI) in India.

⁵⁰ In the case of multiple purpose products, fiscal or financial incentives for imports of specific products with clear environmental end-uses, for example under priority environmental projects, may be effective in promoting sustainable development

⁵¹ The NGMA does not cover agricultural products. Trade liberalization of agricultural EPPs could perhaps be discussed in the CTESS.

⁵² The WSSD Plan of Implementation calls on countries to “support voluntary, WTO compatible, market-based initiatives for the creation and expansion of domestic and international markets for environmentally friendly goods and services, including organic products, which maximize environmental and developmental benefits...., paragraph 93 (b).

82. Two distinctly different categories of environmental services – environmental infrastructure and environment-related commercial services – will require different approaches in the negotiations, as well as on the domestic front. In the case of infrastructure services, the overriding objective is to build domestic capacity by aligning liberalization with evolving developmental and environmental priorities. This objective will move to the forefront issues relating to domestic regulatory regimes. For environment-related commercial services, identifying and capturing export opportunities is going to be more important, with a consequent shift of emphasis towards mutual recognition and technical standards.

83. Provisions in GATS Articles IV and XIX:2 are relevant to both these categories of environmental services. Article IV provides for increasing participation of developing countries in trade in services through strengthening of their domestic services capacity and its efficiency and competitiveness, *inter alia*, through access to technology on a commercial basis. Article XIX:2 gives countries the flexibility for individual developing country Members to open fewer sectors, liberalize fewer types of transactions, progressively extend market access in line with their development situation and, when making access to their markets available to foreign service suppliers, attach to such access conditions aimed at achieving the objectives referred to in Article IV.

B. Coordinating trade negotiations with national policies

84. A large number of developing countries have received requests from trading partners to make market access and national treatment commitments in different environmental services sectors. In many countries, authorities responsible for trade negotiations have organized consultations with other ministries and with service suppliers to determine in which sectors and modes of supply commitments, if any, would be appropriate and what conditions should be listed to support the national development of environmental services and ensure consistency with national policies.

85. Detailed information is needed on the regulatory and administrative regimes influencing the provision of environmental services in different regions and localities and on possible future changes in these regimes. Commercial presence and the movement of natural persons being key to the delivery of environmental services, this may touch on foreign investment regulations, immigration restrictions, health and environmental requirements, property, planning and zoning laws, competition policies, particularly in relation to the regulation of utility monopolies, company laws, and intellectual property regimes.

86. Learning-by-doing will require Governments to go through an iterative regulatory process. At the early stages, it is critical to retain flexibility to reverse policies that are not working, which is much easier to do before GATS commitments are made. Specific investment projects may be used as a testing ground for a variety of measures to promote trade in EGS.

C. Capacity building

87. Through the project on *Building Capacity for Improved Policy Making and Negotiations on Key Trade and Environment Issues*,⁵³ UNCTAD has been assisting some countries in Central America and the Caribbean in addressing issues related to EGS, particularly through the promotion of national studies.⁵⁴ These studies have been drawn upon in relevant parts of this note.

88. The preliminary results of these studies⁵⁵ were discussed at a subregional workshop on EGS organized jointly by the secretariats of UNCTAD and the Economic Commission for Latin America and the

⁵³ Implemented in cooperation with the Foundation for International Environmental Law and Development and funded by the UK Department for International Development (DFID).

⁵⁴ Experts from Brazil, Colombia, Cuba, Dominican Republic, Guatemala, Honduras, Mexico, Nicaragua and Panama participated in the workshop. Studies and presentations are available at the UNCTAD website.

⁵⁵ Studies on Cuba, Dominican Republic, Honduras and Nicaragua reveal that a certain level of information is available concerning water, sewage, solid and hazardous waste management, cleaning of exhaust gases, recycling, and professional services. However, little information is available on noise abatement; nature and landscape protection; and “other” environmental protection services.

Caribbean (ECLAC) in Havana, Cuba, in March 2003. National workshops on EGS are scheduled to take place in India (May 2003)⁵⁶ and Nicaragua (June 2003).

89. The UNCTAD secretariat has been invited to address issues relating to EGS at WTO regional seminars and events held in conjunction with these seminars under the UNEP-UNCTAD Capacity Building Task Force on Trade, Environment and Development (CBTF).⁵⁷

90. The BIOTRADE Initiative, which explores ways and means to promote trade in goods derived from bio-resources, and the Science and Technology Diplomacy Initiative, which was established to support developing countries in their participation in substantive discussions in the WTO Working Group on Trade and Technology Transfer, are also relevant to issues raised in this note.

91. The UNCTAD/FAO/IFOAM International Task Force (ITF) on Harmonization and Equivalence in Organic Agriculture aims at facilitating international trade and access of developing countries to international organic markets.⁵⁸

92. Further work may also address gender-related issues in EGS and may focus on examining the implications of trade liberalization on those environmental services where women represent an important part of the work force and the role of women in the production and commercialization of EPPs.

VII. AN OVERVIEW OF THE COMMODITY AND REGIONAL PATTERNS OF TRADE IN ENVIRONMENTAL GOODS

A. Defining environmental goods

93. There is no agreed definition of “environmental goods”. Such goods generally fall into one of two categories. The first category includes raw and manufactured industrial goods used to provide an environmental service such as wastewater treatment, solid waste management, air pollution control, etc. These goods, which include a wide variety of industrial products such as valves, pumps and compressors, can be specifically employed for environmental purposes. The second category of environmental goods includes both industrial and consumer goods whose production, end-use and/or disposal have reduced negative, or potentially positive, environmental impacts relative to a substitute good providing similar function and utility.⁵⁹ These latter goods are generally employed for primary purposes other than environmental, and, for instance, may include items such as chlorine-free paper, energy-efficient office machines, organic soaps, natural fiber packaging, or floor covering materials. Such goods, sometimes referred to as environmentally preferable products (EPPs), have inherent environmentally superior qualities compared to substitute goods (UNCTAD, 1995). The tree diagram in Figure 1 presents a summary of criteria that can be used to identify environmental goods, and provides examples of goods meeting these criteria.

B. The OECD and APEC lists of environmental goods

94. In recent years, several governments, intergovernmental organizations, industry research groups and other nongovernmental organizations have begun efforts to identify and classify environmental goods. Among these efforts, the classification work of the Organisation for Economic Cooperation and Development (OECD) and the Asia Pacific Economic Cooperation Secretariat (APEC) have attracted particular attention.

95. The OECD has classified the environmental sector as the set of “firms producing goods and services capable of measuring, preventing, limiting or correcting environmental damage such as pollution of water, air, soil, as well as waste and noise-related problems” (OECD, 1996). Based on this definition, the OECD categorized environmental management functions, and defined a corresponding list of 164 goods providing

⁵⁶ Under the project “Strategies and Preparedness for Trade and Globalization in India”, funded by DFID.

⁵⁷ Singapore, May 2002; Latvia, September 2002, and Bolivia, February 2003.

⁵⁸ For more information, see: www.unctad.org/trade_env/test1/projects/ifoam2.htm

⁵⁹ Yet another concept of environmental goods are products derived from biodiversity.

these functions.⁶⁰ This list was later adopted by OECD Member States to collect, compare and consolidate consistent economic data on the sector (OECD, 1999). As a preliminary effort subject to revision, the OECD emphasizes that its list of environmental goods is illustrative rather than definitive (OECD, 2001).

96. The OECD list contains those goods needed to support environmental services including sewage and water treatment services, waste disposal services, cleaning and maintenance of public property, and sanitation services, as well as other environment-related services such as eco-tourism and services to enhance resource-efficiency in industrial and natural resource based production activities. The list includes goods spanning 132 6-digit Harmonized Commodity Description and Coding System (HS) codes.⁶¹ Of these, 25 are minerals and chemicals used in water and waste treatment, and in renewable energy systems, and 97 are manufactures that serve as components of the systems and infrastructure used to provide environmental services. Also included in the list are some environmentally sound technologies⁶² (ESTs), such as integrated turn-key pollution prevention systems and cleaner/resource efficient systems (e.g., fuel cells, electric transportation vehicles and fluidized bed combustion), however there exist no HS codes to classify these technologies in the form of integrated capital goods,⁶³ and thus their trade is not tracked by internationally reported national trade flows at the 6-digit HS level (OECD, 2003).

97. Separately from the OECD effort, in order to advance voluntary liberalization of environmental goods by its Member States, in 1998 APEC assembled and published a list of 109 environmental goods (APEC, 2001).⁶⁴ The APEC list of environmental goods spans 104 HS codes, with 44 goods on the APEC list qualified by ex-heading specifications (i.e., providing descriptive product details at a higher level of desegregation than the international or common 6-digit HS level).⁶⁵

98. A comparison of the APEC and OECD lists of environmental goods reveals similarities – both lists share a common set of environmental functions for which they seek to define goods and the two lists have 54 goods in common – and differences – 50 (68) goods on the APEC (OECD) list do not appear on the OECD (APEC) list (OECD, 2003). Differences in the composition of the two lists are significant; minerals and chemicals for water/waste treatment are exclusive to the OECD list, while the APEC list includes a relatively more extensive set of goods needed for environmental monitoring and assessment. These differences are discernable from the combined OECD and APEC lists of goods organized by the functions and services that each good supports, that is presented in Table 1.

99. The OECD list contains a large number of EPPs, whereas the APEC list contains a more limited number. Research on EPPs dating back to 1995 (UNCTAD, 1995) has proposed a wide range of natural and traditional knowledge based goods as EPPs (GoI, 2003). Within the context of WTO negotiations, governments have begun to table specific proposals for various other EPPs to be included as environmental goods.⁶⁶ As with the broader OECD and APEC lists of environmental goods, the feasibility and benefits of including EPPs as environmental goods for the purposes of trade negotiations remains to be adequately explored.

⁶⁰ See: List of environmental goods, WTO Doc. TN/TE/W/18, WTO, Geneva.

⁶¹ In addition, for several of the environmental goods identified by the OECD there is no corresponding HS classification.

⁶² Also referred to as ‘clean technologies’. For a full discussion of ESTs, see United Nations, Commission on Sustainable Development, Transfer of environmentally sound technologies, cooperation and capacity-building, Report of the Secretary-General, UN Document No. E/CN.17/1995/17, 1995, New York.

⁶³ Some of the components of these technologies fall under HS headings not already included in the OECD list.

⁶⁴ See: List of environmental goods, WTO Doc. TN/TE/W/18, WTO, Geneva.

⁶⁵ For example, the APEC list includes only the ex-heading item waste incinerators of heading HS 841780 for industrial or laboratory furnaces and ovens.

⁶⁶ The Government of Japan has recently proposed a wide-ranging group of energy efficient home and office products as environmental goods in the WTO. See Government of Japan, Market Access for Non-Agricultural Products, Communication from Japan, WTO Document No. TN/MA/W/15 & TN/TE/W/17. Additionally, the Government of Qatar has proposed that combined-cycle gas turbine power generation technologies as environmental goods in the WTO. See Negotiations on Environmental Goods: Efficient, lower-carbon and pollutant-emitting fuels and technologies, Submission by the State of Qatar, WTO Document No. TN/TE/W/19 and TN/MA/W/24.

C. Trade in environmental goods in the OECD and APEC lists

1. Principal limitations and methods

100. There are inherent difficulties in measuring trade in goods used to support environmental services.⁶⁷ These arise from lack of an agreed definition of environmental goods, incompleteness in reported trade data, limitations in the Harmonized System nomenclature for the classification of environmental goods, and the fact that many environmental goods have multiple end-uses, only one of which may be environmental.

101. The Harmonized System used to classify internationally traded goods does not, in most cases, identify environmental goods at the 6-digit level. Multiple products classified under a common 6-digit code, of which only one, or a subset, are considered as environmental goods, may thus pose an administrative difficulty for tariff liberalization for some countries applying tariffs at the 6-digit level. Although some goods, for example, water purification equipment, are uniquely defined at the 6-digit level, many others, such as trash compacting machines, and plastic films and strainers, are not. Analyses of trade data at the 6-digit level permit accurate measurements of trade flows for the former, however trade flows for the latter typically represent only a small fraction of international trade flows identifiable at the 6-digit HS level.

102. A specific example to show how limited the “environmental goods” fraction of trade can be at a 6-digit HS level is illustrative. The OECD list includes trash compactors as an environmental good under the environmental group “pollution management” and functional classification “solid waste management”. However, HS code 847989 (other machines, nes, having individual functions) encompasses a range of machines of which trash compactors are only a minority subset (one of many ex-heading items). Isolating trade flows in trash compactors requires national trade data beyond the 6-digit level. Using such data from the United States, which is publicly available, shows that for the US, trash compactors are specified at the 8-digit level as item 84798955. In 2000, US import data indicated that imports of trash compactors represented less than 1 per cent of total imports under the 6-digit HS code 847989. This is an extreme, yet illustrative, demonstration that for many proposed environmental goods that are ex-heading items, trade flows at the 6-digit HS level may grossly overestimate trade of the underlying environmental good. It also suggests that trade liberalization of environmental goods associated with tariff reductions at the 6-digit HS level may extend far beyond targeted environmental goods (one of several ex-heading items) to a range of non-environmental goods (other ex-heading items).

103. For environmental goods, which represent only a subset of the 6-digit HS code used to classify them, computations of trade flows at the 6-digit level will overestimate the trade for environmental purposes. Moreover, should countries seek to limit tariff liberalization strictly to environmental goods, they may need to assess whether it is either desirable or feasible to specify environmental goods beyond the international 6-digit HS level in order to avoid trade liberalization in related yet non-environmental goods.⁶⁸

104. Many environmental goods are intermediate products – such as chemicals, filters, pumps, valves, turbines, chemicals, meters, lasers, spectrometers, etc – that have multiple end-uses. Environmental goods therefore include a wide range of multiple-use products for which there are various non-environmental end-uses.

105. A detailed analysis, based on work undertaken by the Tata Energy Research Institute (TERI), and recently published by the Government of India (GoI, 2003), emphasizes that there are multiple end-uses for most of the goods on the APEC list. For example, the GoI report finds that conveyers (HS 842833) are not used exclusively for solid waste management, but rather, more generally, they have end-uses in a wide range of industrial applications. On the other hand, the environmental benefits of some goods on the OECD and APEC lists are not affected by multiple-use, for example, silencers and exhaust pipes for motor vehicles (HS 870892) and fluorescent lamps (HS 853931) provide the respective benefits of noise reduction and reduced energy consumption whenever they are used.

⁶⁷ See OECD, 2003 for a full discussion.

⁶⁸ The World Customs Organization could develop special codes for environmental goods.

106. Data on the final end-use of traded goods is not recorded and cannot be systematically attained for analytical purposes. For environmental goods affected by multiple-use, computations of trade flows thus overestimate the trade in these goods that is for environmental purposes. Multiple-use may be an important issue for countries which are interested in providing preferential treatment to goods when they are used for environmental purposes, but do not favor providing such treatment to the same goods when used for non-environmental purposes. Should multiple-use be an issue of concern, negotiators may also need to decide how to set tariffs on environmental goods when such goods are used for non-environmental purposes.

107. Analyses of trade flows for environmental goods are thus confronted by fundamental uncertainties. This suggests that analyses of trade statistics serve only to trace, rather than accurately measure, trade in environmental goods. In general, due to the effects of broad HS classifications and multiple-use for many environmental goods, estimated trade flows for this group of goods will necessarily be inflated.

108. A "back-of-the-envelope" estimate of how inflated the trade figures may be is helpful. While the size of the global environmental goods and services industry is referenced by UNCTAD to be 550 \$b (UNCTAD, 2003), it is generally believed that 50 to 75 percent of this figure is associated with environmental services. Therefore, the size of the global market for environmental goods would be in the range of 140-225 \$b. This figure represents the sum of domestic sales and exports. Even if as much as 50 per cent of environmental goods enter international markets, world trade in EG should not exceed 70 to 140 \$b. By contrast, the size of the global market for traded environmental goods inferred from analyses of trade data (Table 2; see below), which are necessarily inflated for the reasons outlined above, is in the order of 220 \$b and 245 \$b for goods contained in the APEC and OECD lists respectively. This suggests that analyses of trade data at the 6-digit level may significantly overestimate trade in environmental goods.

2. Trade patterns

109. While there is no agreed definition of environmental goods, the lists of such goods formulated by the OECD and APEC have been circulated within the WTO by developed country WTO members to potentially serve as a starting point – to be elaborated with both additions and deletions, including possibly through a periodic review process – for negotiations on trade liberalization of environmental goods. In this paper, these lists are used as an entry point for analyses of trade patterns in environmental goods at the regional and country levels. These analyses can be used by negotiators to assess the potential implications of future trade liberalization for environmental goods.

110. Trade patterns in environmental goods can be revealed using nationally reported data on trade in goods that is readily available for most countries. Once a set of environmental goods is specified, estimates of trade in environmental goods can be made using national trade flows; for example, those reported to the United Nations according to the 1996 6-digit HS system. Using the World Bank/UNCTAD World Integrated Trade Solution (WITS) application (World Bank, 2001) and nationally reported trade data from the United Nations' Comtrade database (Comtrade, 2003), and defining environmental goods as those in the OECD and APEC lists of environmental goods, trade flows of environmental goods can be analyzed.

111. Trade flows between developed and developing countries for the set of goods on either the OECD or APEC lists (herein referred to as the O+A list) from 1996 through 2001 indicate the size of the global market for traded goods on the O+A list to be about 290 \$b (as mentioned above in paragraph 88, this figure is inflated). Trade data show an overall negative, although improving, balance of trade for developing countries' trade in these goods with the rest of the world. For the aggregate set of all goods (at the 6 digit HS level) on the O+A list, developed countries were net exporters, and developing countries net importers, of environmental goods. However, underlying this situation are increases in developing country exports of environmental goods. As shown in Figure 2, the ratio of developing country exports to imports rose from 0.36 in 1996 to 0.52 in 2001, with a corresponding decline in the same figure for developed countries from 1.39 in 1996 to 1.25 in 2001.

112. A snapshot of regional trade positions in 2000 for the OECD, APEC and O+A lists is presented in Figure 3 and Table 2. The charts in Figure 3 indicate that developed countries dominate both the import and export markets for environmental goods on the O+A list. The developing countries' share of the global

export market for environmental goods in 2000 was only 16 per cent, while their share of global imports was 32 per cent. Data in Table 2 show developed countries have the strongest trade positions, particularly Japan and the developed countries of Europe. Among developing countries, those in Asia⁶⁹ dominate trade in these goods (accounting for about 3/4 of total trade by developing countries), while developing countries in Africa and least developed countries (LDCs) have the weakest trade positions. Specifically, in 2000, exports of O+A listed goods from Africa amounted to only 240 \$m (less than one per cent of the global market), while exports from LDCs was only 71 \$m.⁷⁰

113. The data in Table 2 also show, that for all regions, the value of aggregate imports of environmental goods contained in the three lists represent only about 3-6 per cent of aggregate imports of manufactured goods. This suggests that, despite the fact that both the OECD and APEC lists contain a wide range of manufactured goods, trade liberalization of environmental goods based on these lists would only affect a small portion of developing countries' current imports, and an even smaller portion of their current exports, of manufactures.

114. When data is analyzed to uncover intra- and inter-regional trade patterns, the importance of intra-regional exports for developing countries as well as imports from developed country regions in proximity is revealed. For example, exports from Latin America and the Caribbean are predominantly to the United States and Canada, and those from Africa flow mostly to Developed and Eastern Europe. These tendencies are apparent from the graphs in Figure 4 (data in Table 3). It is notable that regional levels of South-South trade in the Asian and Latin American regions are relatively high, suggesting that there is quite some potential for increased South-South trade in environmental goods.

115. Developing countries continue to rely on developed countries as their principal source of environmental good imports (see Figure 5). In 2000, about 82 per cent of developing countries' environmental good imports originated in developed countries, however, as demonstrated above, this dependence is decreasing. Nevertheless, developing country export flows to other developing countries remains substantial at 42 per cent, mostly attributable to trade between developing countries in Asia. At much lower levels, Africa and Latin America and the Caribbean are also engaged in South-South trade, and like Asia, this trade is primarily of a local intra-regional nature. At the same time, developing country exports are predominantly directed to the closest developed country markets (see Figure 4).

116. Analyses of individual products trade flows shows, that in 2000, developing countries as a group were net exporters for 26 of the 182 goods on the O+A list.⁷¹

Goods on the O+A list for which developing countries (as a group) were net exporters in 2000 include: household & toilet articles of plastic, electrical machines and apparatus with one function, articles of cast iron, methanol, office machines, electric space heating and soil heating apparatus, fluorescent lamps, mats and screens of vegetable materials, instantaneous or storage non-electric water heaters, thermometers, pyrometers, cans < 50 liters, multiple walled insulating units of glass, ethanol, activated carbon, hand brooms, articles of cement or concrete, tanks and vats > 300 liters, lead monoxide, weighing machines of capacity <30 kg, laminated fabrics, positive displacement pumps, hydrated lime, woven pile & chenille fabrics of other textile materials

Goods on the O+A list for which Asian developing countries (as a group) were net exporters in 2000 include: Parts for internal combustion piston engines; other machines, nes, having individual functions; other electrical machines and apparatus with one function; other air or gas compressors or hoods; other machinery materials treatment by change of temperature; parts for air or gas compressors, fans or hoods; methanol; photosensitive semiconductor devices, incl. solar cells; parts for diesel or semi-diesel engines;

⁶⁹ Trade data for Asia were available for the following countries: Armenia, Azerbaijan, Bhutan, China, China, Hong Kong SAR, China, Macao SAR, Georgia, India, Indonesia, Iran, Jordan, Kazakhstan, Lebanon, Malaysia, Maldives, Nepal, Oman, Philippines, Qatar, Rep. of Korea, Saudi Arabia, Singapore, Sri Lanka, Thailand, Turkey, and Turkmenistan.

⁷⁰ Trade data for LDCs is only available for ten countries: Benin, Gambia, Guinea, Maldives, Nepal, Swaziland, Togo, Uganda, Tanzania and Zambia. An extrapolation for all LDCs on the basis of these ten countries results in an export share of all LDCs in all developing countries of 0.75%.

⁷¹ It is apparent that many of these goods have multiple uses. Experts could assess the extent to which each is used for environmental purposes.

anhydrous ammonia; safety valves; parts for filtering or purifying machinery; instruments for measuring the flow or level of liquids; instruments for measuring or checking pressure; fluorescent lamps, hot cathode; other glass fiber products; other office machines; valves, check; other instantaneous or storage water heaters, non-electric; other radiography apparatus and parts; parts for heat exchange equipment; other cans < 50 l; tanks, vats, etc. > 300 l; radiography apparatus; instruments for analyzing gas or smoke; other ceramic wares; other surveying instruments; multiple walled insulating units of glass; parts for thermometers, hydrometers, barometers, etc.; parts for hydraulic turbines; other machinery; goods containing alumina, silica; industrial/lab electric furnaces & ovens, nes; other furnaces, ovens, incinerators, non-electric; other taps, cocks, valves, etc.; other articles of cement, concrete; cans < 50 l, closed by soldering or crimping; parts & accessories of surveying instruments; tanks, drums, etc. >50 l < 300 l; ethanol; machinery to clean, dry bottles, etc.; parts of centrifuges; other refractory bricks, blocks, tiles etc.; articles of cast iron; weighing machines capacity <30 kg; other mixing or kneading machines for earth, stone, sand, etc.; hydrometers, barometers, hygrometers, etc.; industrial or laboratory induction or dielectric furnaces; machinery for liquefying air or other gases; hydraulic turbines; sorting, screening, separating & washing machines; other floating structures; weighing machines; lasers; weighing machines capacity >30 kg <500 kg; Other refractory ceramic goods containing graphite, carbon; lead monoxide; hydraulic turbines; aluminium hydroxide; slaked (hydrated) lime; other generating sets; wind powered; manganese oxides.

Moreover, disaggregated trade data for individual developing countries (see Annexes 2 and 3; described below), many have positive trade balances for a wider range of goods than for developing countries as a group.

117. There are also many goods on the O+A list for which developing countries as a group are net importers, however, individual developing countries are net exporters.⁷² This is evident from the table presented in Annex 2, which lists the top 5 trade balances by country⁷³ and product for goods on the O+A list in 2000.

118. When trade statistics are analyzed at the country level and compared, substantial differences in the levels of trade in environmental goods are discernable. An examination of exports by individual countries in Figure 6 shows the top twenty-five developing country exporters of O+A listed environmental goods in 2000. China, Thailand, and the Philippines are in the list of the top 15 exporters among developing countries, besides some other Asian countries, such as Singapore, Republic of Korea, Malaysia, Indonesia and India. These data further indicate that exports from the top nine exporting countries represented 90 per cent of total developing country exports in that year; China alone accounts for almost a quarter.

119. The top twenty environmental good exports of developing countries are presented in Figure 7. Exports of these goods represent 68 per cent of total developing country exports for the O+A list. The top four exported goods alone account for 30 per cent of total developing country exports for the O+A list. The top twenty environmental good imports of developing countries are presented in Figure 8. Imports of these twenty goods represent 64 per cent of total developing country imports for the O+A list. The top four imported goods alone account for 30 per cent of total developing country imports for the O+A list. Both figures show trade in goods at the 6-digit level.

120. It is significant that most of the goods comprising developing countries' top environmental good exports are also among their top environmental good imports. There are several possible reasons for this coincidence between exports and imports of similar goods, including intra-industry trade; significantly broad HS product classifications, each comprising many differentiable traded goods; significant South-South trade with exports and imports of the same goods by different developing countries.

121. The table in Annex 1 presents aggregate trade data of individual countries for the OECD, APEC and O+A lists. It is immediately apparent from the table that, systematically, relative to corresponding values of imports, individual developing countries' exports are generally lower for the APEC list than for the OECD

⁷² An EXCEL spreadsheet with detailed trade data for individual Asian countries is accessible on the website, created for the Bangkok workshop at www.unctad.org/trade_env/test1/meetings/bangkok4.htm.

⁷³ For reporting developing countries with trade data available on the UN Comtrade database for at least one of the years from 1997 to 2001.

list. This is reflected in the predominantly lower (higher) export-to-import ratios for the APEC (OECD) list for developing countries. This is largely due to the absence of chemical products on the APEC list – for which developing countries are among the major exporters – and the greater proportion of monitoring and analysis equipment – for which developed countries are the dominant exporters – relative to other manufactured goods on the APEC list. For this reason, most of the top trade balances for the O+A list are for goods on the OECD list.

122. As shown in Figure 9, these country data indicate that there is significant dispersion in countries' export propensities (i.e., export-to-import ratios) relative to the average for developing countries. Countries with the highest ratios, above the developing country average, are China, Singapore, Mexico, Brazil and Georgia – largely based on their exports of manufactures – and Guinea, Trinidad and Tobago, Jamaica, based on their exports of chemical products.

123. In many cases, goods with the top trade balances (Annex 2) are not countries' most traded goods. Therefore, in the table of Annex 3, the top 5 imports and exports of goods on the O+A list are presented for individual developing countries.⁷⁴ Very few of goods for which individual countries exhibit net trade surpluses appear among their top exported goods. Exports of chemicals and minerals – such as ethanol, methanol, limestone, aluminum hydroxide, activated carbon, etc. – from those few countries with relevant resource endowments are clearly visible exceptions. Moreover, although for developing countries as a group (see Figures 8 and 9) top exports and imports span many of the same goods, this is not commonly observed to be the case for individual countries. The exception being for trade in broad product classifications, particularly 'other' items traded by industrializing developing countries.

D. Trade in environmentally preferable products

124. Definitions of environmental goods may also include EPPs supplied to industrial and consumer markets. Although businesses and consumers may distinguish between like products based on environmental characteristics related to processes and production methods (PPMs), the WTO multilateral trading system does not permit Member States to differentiate among 'like products' based solely on differences in their PPMs. However, WTO trade rules do allow Member States to differentiate between products based on their product and disposal characteristics as these relate to the environment.

125. The market potential of EPPs has grown significantly in response to consumers' increased environmental awareness and concern. Some EPPs, such as organic agricultural products or recycled paper, are attractive to certain consumers who perceive that they have been produced in an environmentally preferable way, while others, such as natural soaps and detergents, are sought for their environmentally preferable product and disposal characteristics. Industry is also a growing source of demand for EPPs in the areas of energy and resource efficient products, such as energy efficient office machines/lighting and renewable energy fuels/systems, and environmentally benign intermediate goods such as CFC-free refrigerants and biodegradable natural fibers used for packaging.

1. Renewable energy and energy-efficiency related goods

126. One EPP class of products that could be more fully elaborated would be goods incorporated into renewable/clean energy technologies that generate final energy from renewable resources and/or through low-emission intensity processes. Relative to conventional power generation technologies, these technologies have lowered negative impacts on environmental systems since, on an equivalent final energy output basis, they emit less CO₂, CO, SO₂, NO_x, particulates and other pollutants into the atmosphere. Based on their lowered environmental impact during operation (i.e., end-use) renewable/clean energy technologies may be recognized as environmental goods. By consequence, the component goods required to construct renewable/clean energy technologies may also be recognized as environmental goods. Table 4 presents a summary of such goods that are included on the OECD or APEC lists, and Figure 10 (page 26) summarizes exports and imports of these goods from developing countries as a group.

⁷⁴ *ibid* 13.

127. An analysis of trade data for the goods listed in Table 4 indicates a small trade surplus for developing countries as a group. Moreover, as shown in Table 5, 13 of the top 20 developing country exporters for this list have positive trade balances. Even when chemicals on the list are excluded, four of these countries – Malaysia, Thailand, Philippines and Argentina – maintain a trade surplus.

2. Natural fibers, dyes, soaps and other natural products

128. UNCTAD (2000, 2001) has identified categories of products which can potentially be considered as EPPs, although not necessarily in the context of WTO trade negotiations. These include:

- (i) Organic products
- (ii) Certified timber products
- (iii) Non-timber forest products
- (iv) Natural resource- or biological-material-based products based on traditional knowledge

In addition, products made from natural fibers may also be considered as EPPs (GoI, 2003).

129. For illustrative purposes, this section examines trade data for products which may qualify as EPPs based on their environmental impacts of consumption and disposal characteristics; i.e., not based on their process and production methods. This list (herein referred to as the EPP list), presented in Table 6, contains natural fibers, dyes, soaps, and other natural products including non-timber forest products.

130. Trade flows between developed and developing countries for the set of goods on the EPP list from 1996 through 2001 shows a positive and stable balance of trade for developing countries' trade in these goods with the world. For the aggregate set of all goods on the EPP list (see Figure 11), developed countries were net importers, and developing countries net exporters.

131. A snapshot of regional trade positions in 2000 for the EPP list is presented in Figure 12. As with goods on the OECD and APEC lists, the charts indicate that developed countries dominate both the import and export markets for environmental goods on the EPP list, however developing countries benefited from a trade surplus for the aggregate set of EPP list goods in 2000; their share of the global export market for these environmental goods was 38 per cent while their share of global imports was only 30 per cent. Moreover, developed countries, particularly the developed countries of Europe, and developing countries of Asia have the strongest trade positions, while developing countries in Africa appear to have the weakest trade positions, for the goods on the EPP list.

E. Tariffs on environmental goods

132. Trade barriers in environmental goods primarily take the form of import tariffs in destination markets.⁷⁵ An examination of average applied *ad-valorem* tariff rates for these goods in Figures 13 and 14 show clear distinctions between average developed and developing countries' applications of tariffs on environmental goods on the O+A and EPP lists; both rates are uniformly lower in developed countries.⁷⁶ This difference is significant. In 2001, the applied *ad-valorem* tariff rates of developed countries – averaged over all countries and over the full O+A list of goods – was less than 1 per cent, while the same figure for developing countries was almost 10 per cent. This magnitudes and differences in rates applied by developed and developing countries are not unique to the O+A list, rather, they are similar to the tariff rates applied by developed and developing countries to manufactured goods more generally (WTO, 2003).

133. For the indicative EPP list of goods in Table 6, the difference in rates is greater. In 2000, the average developed country tariff rate was about 1 per cent, although for developing countries this rate approached 19 per cent.

134. The data in Figure 13 show a more or less consistent trend towards tariff reduction on the O+A list of goods in both developed and developing countries over the past decade. While developed countries have

⁷⁵ Also important are non-tariff barriers to trade in environmental goods, which have not been reviewed by this study.

⁷⁶ Rates for individual countries may vary considerably from the average. Applied rates for the O+A list of some developing countries (e.g., Costa Rica, Jamaica and Malaysia) are as low as those of developed countries.

lowered their applied rates on these goods to levels under bindings assumed in the Uruguay Round, developing countries, which bound tariffs for very few manufactured goods, have reduced their applied rates unilaterally. The average bound rate on O+A listed goods remains relatively high, however average applied rates are considerably lower than bound ceilings. For example, although the average bound rate of developing countries for goods on the O+A list can range from 30 – 40 per cent, their average applied rate in 2000 for the entire list was approximately 10 per cent.

135. The evolution of applied rates on the EPP list is different from that of the O+A list (see Figure 14). After falling from 1996 to 1999, the average trade-weighted applied rate in developing countries rose from 11.5 per cent to almost 19 per cent between 1999 and 2001.

136. Multilateral trade liberalization in environmental goods would require developing countries to reduce bound tariff rates, and currently applied rates to the extent they might exceed new bindings, on a set of agreed environmental goods. Partial and general equilibrium modelling of the economic effects of tariff reduction may be helpful in assisting developing countries to assess the trade and environment benefits, as well as the costs, of trade liberalization. Model scenarios that provide mutually supportive net trade and environment benefits, not only for developed, but also for developing countries, could be identified to guide negotiations.

ANNEX I

FIGURES AND TABLES

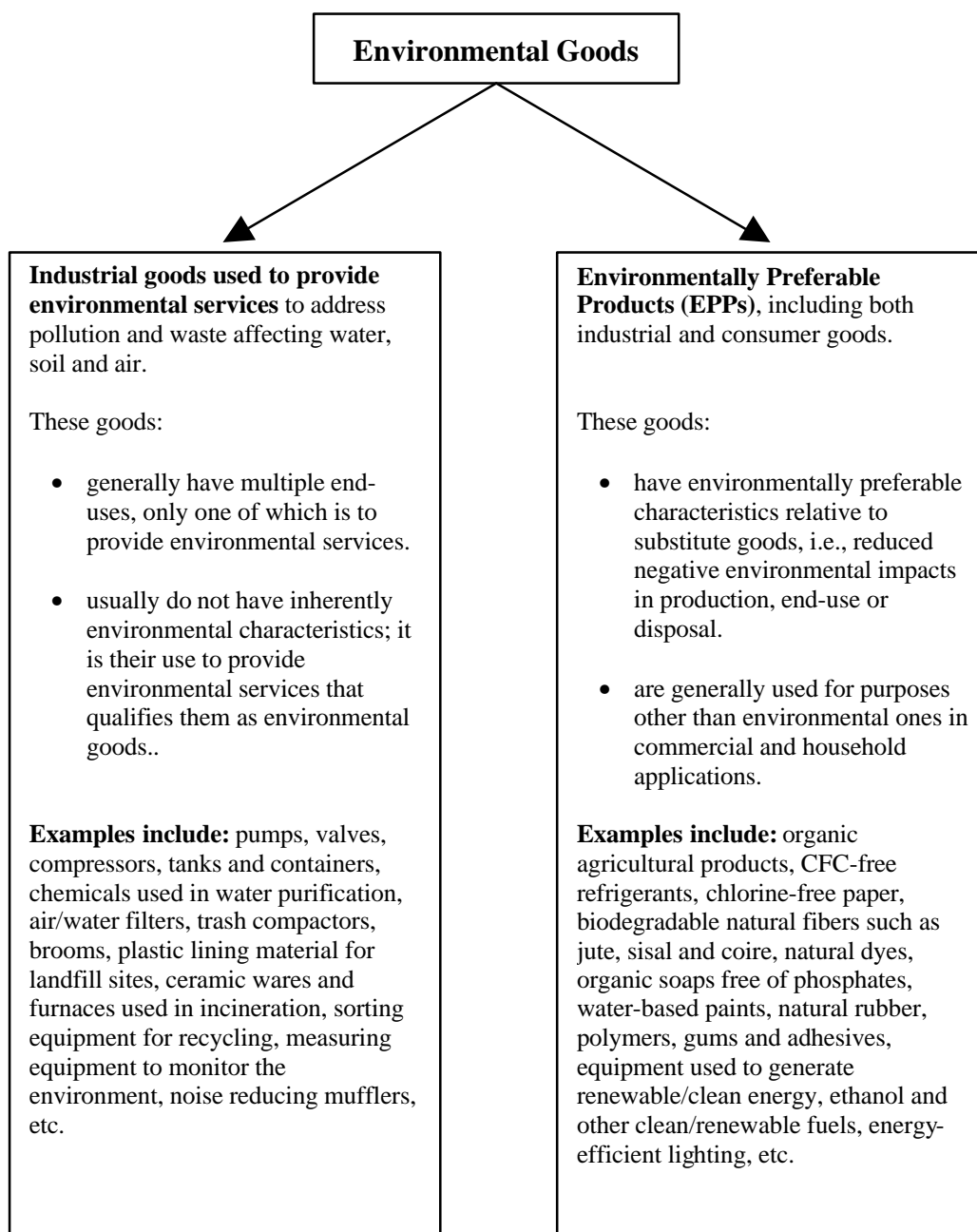


Figure 1: Criteria to identify broad types of environmental goods and examples of goods meeting these criteria.

Combined OECD and APEC list of Environmental Goods

A. POLLUTION MANAGEMENT

1. Air pollution control

841410, 841430, 841440, 841480, 841490, 842139, 842199, 252100, 252220	840410, 840420
281610, 842139, 842199, 842139, 842199, 701990, 841960, 841989, 842139	840510, 841459
842199, 841780, 842139, 842199, 851410, 851420, 851430, 851490, 842490	

2. Wastewater management

841430, 841440, 841480, 841490, 252100, 252220, 280110, 281410, 281511, 281512	460120
281610, 281830, 282010, 282090, 282410, 283210, 283220, 283510, 283521, 283822	560314
283523, 283524, 283525, 283526, 283529, 380210, 842121, 842129, 842199, 842119	591190
842191, 842121, 842129, 842199, 392690, 842121, 842129, 842199, 580190, 730900	842833
731010, 731021, 731029, 841000, 841011, 841012, 841013, 841090, 841780, 842381	843680
842382, 842389, 842490, 851410, 851420, 851430, 851490, 732510, 841320, 841350	847990
841360, 841370, 841381, 848110, 848130, 848140, 848180, 902610, 902620	

3. Solid waste management

681099, 780600, 851629, 901320, 392490, 960310, 960350, 980390, 392020 842220,	846291
847439, 847982, 847989, 841780, 841790, 851410, 851420, 851430, 851490	847290
	850590

4. Remediation and cleanup

851629, 901320, 854389	230210, 890710
	890790

5. Noise and vibration abatement

840991, 840999, 870892

6. Environmental monitoring, analysis and assessment

902511, 902519, 902580, 902680	690210, 690220, 690290, 690310, 690320, 690390, 690919
902690, 902710, 902720, 902730	701710, 701720, 701790, 841940, 901540, 901580, 901590
902740, 902750, 902780, 902790	902229, 902290, 902590, 902830, 902890, 903020, 903031
903010, 903149, 903180, 903220	903039, 903083, 903089, 903090, 903110, 903120, 903130
903281, 903289, 903210	903190, 903290, 903300

B. CLEANER TECHNOLOGIES AND PRODUCTS

1. Cleaner/resource efficient technologies and processes

847410, 847432

2. Cleaner/resource efficient products

280110, 320910, 320990

C. RESOURCES MANAGEMENT GROUP

1. Indoor air pollution control

2. Water supply

280110, 220100, 285100, 391400

3. Recycled materials

4. Renewable energy plant

841911, 841919, 854140, 290511, 220710

850231

5. Heat/energy savings and management

381500, 700800, 701990, 841950, 841990, 853931, 902810, 902820, 903210

6. Sustainable agriculture and fisheries

7. Sustainable forestry

8. Natural risk management

9. Eco-tourism

10. Other

Table 1: The combined OECD and APEC list of environmental goods organized by the environmental function or service that they support. The goods are presented by their 6-digit HS codes and sorted by environmental management functions defined by the OECD. Some codes appear in more than one functional category. HS codes in the shaded region at the right are for those goods in the APEC list which do not otherwise appear in the OECD list. Some goods on the OECD list have no HS classification, and thus do not appear in the table. (Source: WTO, 2002, which contains both the complete OECD and APEC lists).

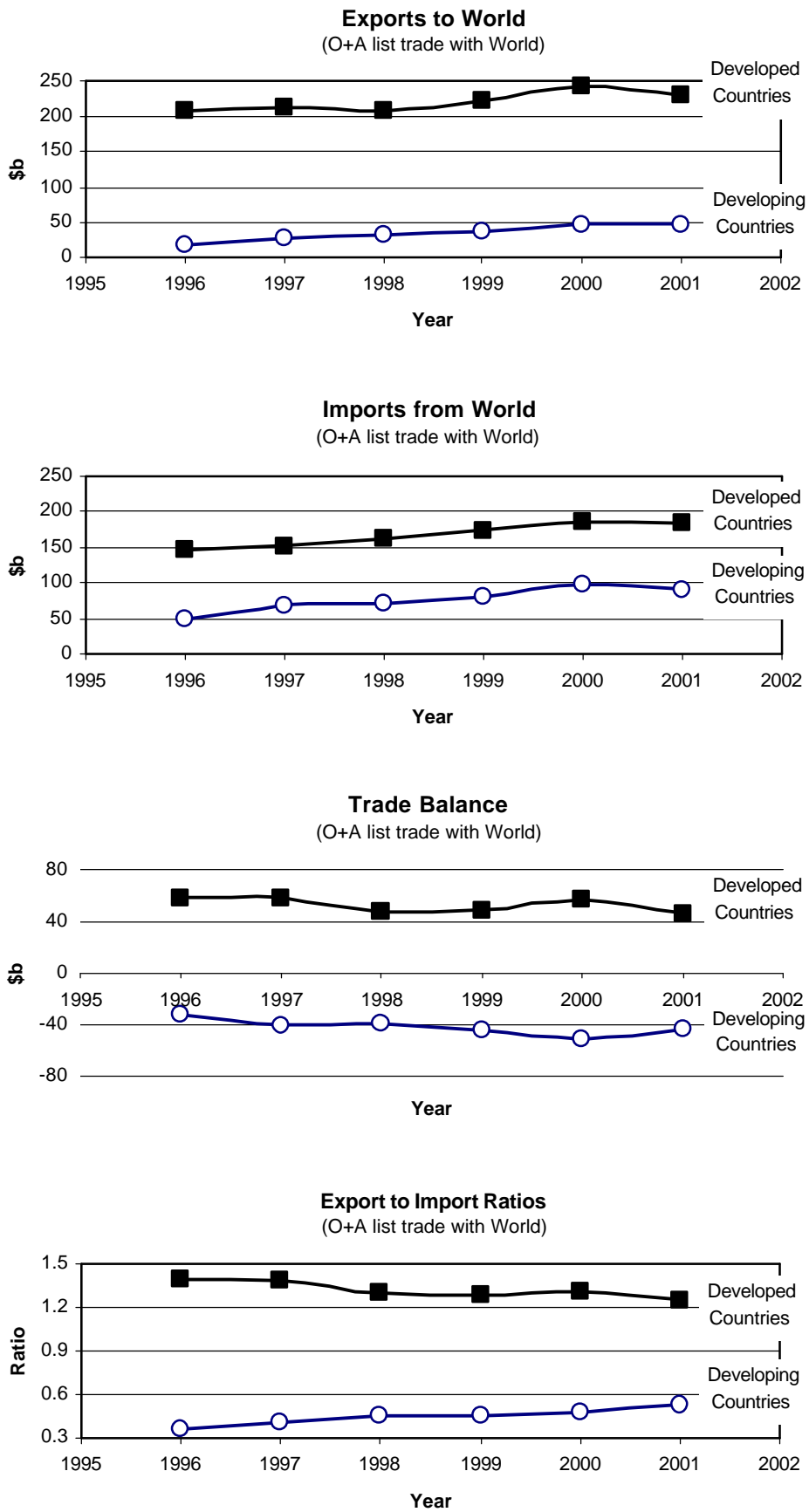


Figure 2: Total exports, imports, trade balance, and export-to-import ratio for environmental goods on the O+A list for developed and developing countries.

Regional trade data for the APEC, OECD and combined O+A lists

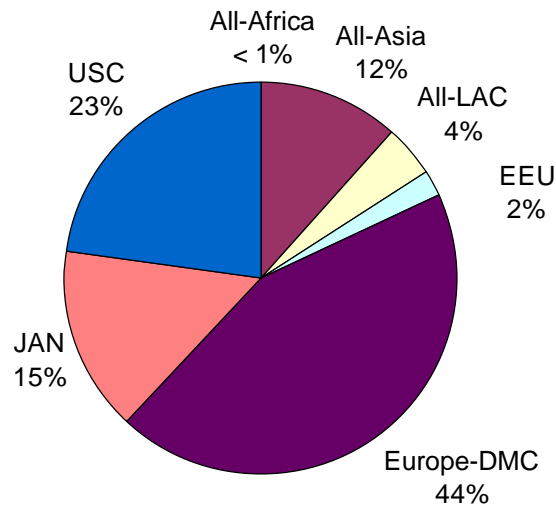
All data are for the year 2000

Trade flow values are in thousands of \$US

Region	EG List	Exports (X)	% of Mfg Exports	Imports (M)	% of Mfg Imports	Trade balance (X-M)	Export-to-Import ratio (X/M)
Developed Countries	Alist	184,881,821	5	132,681,532	3	52,200,289	1.39
	Olist	197,434,081	6	154,800,354	4	42,633,726	1.28
	O+A list	242,686,267	7	185,788,313	5	56,897,954	1.31
Developed Europe	Alist	93,314,578	4	71,669,459	3	21,645,119	1.30
	Olist	106,482,739	5	84,473,974	4	22,008,765	1.26
	O+A list	129,525,990	6	101,575,949	5	27,950,041	1.28
Japan, Australia and New Zealand	Alist	36,682,741	7	14,136,242	4	22,546,499	2.59
	Olist	35,979,358	7	15,025,104	4	20,954,253	2.39
	O+A list	44,219,278	9	18,697,585	5	25,521,693	2.36
United States and Canada	Alist	53,577,149	6	45,988,747	3	7,588,402	1.17
	Olist	53,880,148	6	54,671,800	4	-791,652	0.99
	O+A list	67,550,511	7	64,589,991	5	2,960,520	1.05
Developing Countries	Alist	32,396,704	2	75,972,500	5	-43,575,796	0.43
	Olist	39,898,581	2	82,460,983	5	-42,562,402	0.48
	O+A list	47,109,797	3	98,920,339	6	-51,810,542	0.48
Africa	Alist	78,965	0	1,176,420	3	-1,097,455	0.07
	Olist	212,749	0	1,575,121	5	-1,362,372	0.14
	O+A list	239,944	0	1,893,660	6	-1,653,715	0.13
Asia	Alist	23,946,488	2	55,434,074	5	-31,487,586	0.43
	Olist	27,938,882	2	58,527,554	5	-30,588,672	0.48
	O+A list	34,040,163	3	71,362,991	6	-37,322,828	0.48
Latin America and the Caribbean	Alist	8,275,907	3	18,211,465	6	-9,935,559	0.45
	Olist	11,482,704	4	20,720,060	6	-9,237,355	0.55
	O+A list	12,526,613	5	23,704,079	7	-11,177,466	0.53
Least Developed Countries	Alist	5,337	0	190,849	3	-185,512	0.03
	Olist	67,324	3	248,521	4	-181,197	0.27
	O+A list	70,854	3	293,090	4	-222,235	0.24
Countries with Economies in Transition	Alist	3,701,271	2	9,450,227	5	-5,748,956	0.39
	Olist	5,458,746	3	11,051,842	6	-5,593,096	0.49
	O+A list	6,548,834	3	12,840,246	7	-6,291,412	0.51
World	Alist	220,979,796	4	218,104,259	4	0	1
	Olist	242,791,407	4	248,313,179	5	0	1
	O+A list	296,344,898	5	297,548,899	5	0	1

Table 2: Total exports, imports, trade balance and export-to-import ratio for environmental goods on the O+A list for developed and developing country regions.

O+A-list Exports in 2000 (% of world total: 290 \$b)



O+A-list Imports in 2000 (% of world total: 290 \$b)

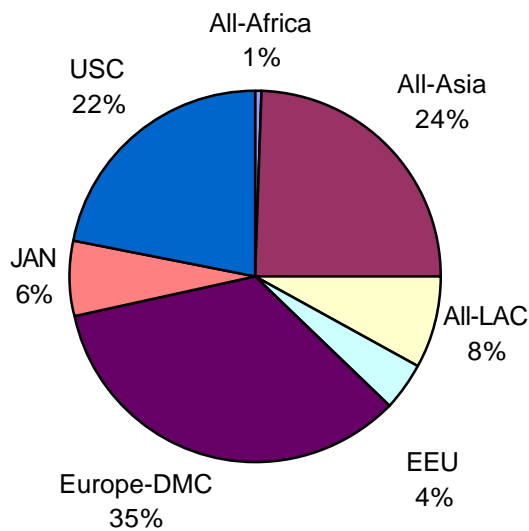


Figure 3: Regional shares of global market for environmental goods on the O+A list. Abbreviations are as follows: All-Africa, All-Asia, and All-LAC includes all developing countries in Africa, Asia and Pacific, and Latin America and the Caribbean respectively. EEU includes countries in Eastern Europe with economies in transition. Europe DMC includes the developed countries in Western Europe. JAN includes Japan, Australia and New Zealand. USC includes the United States and Canada.

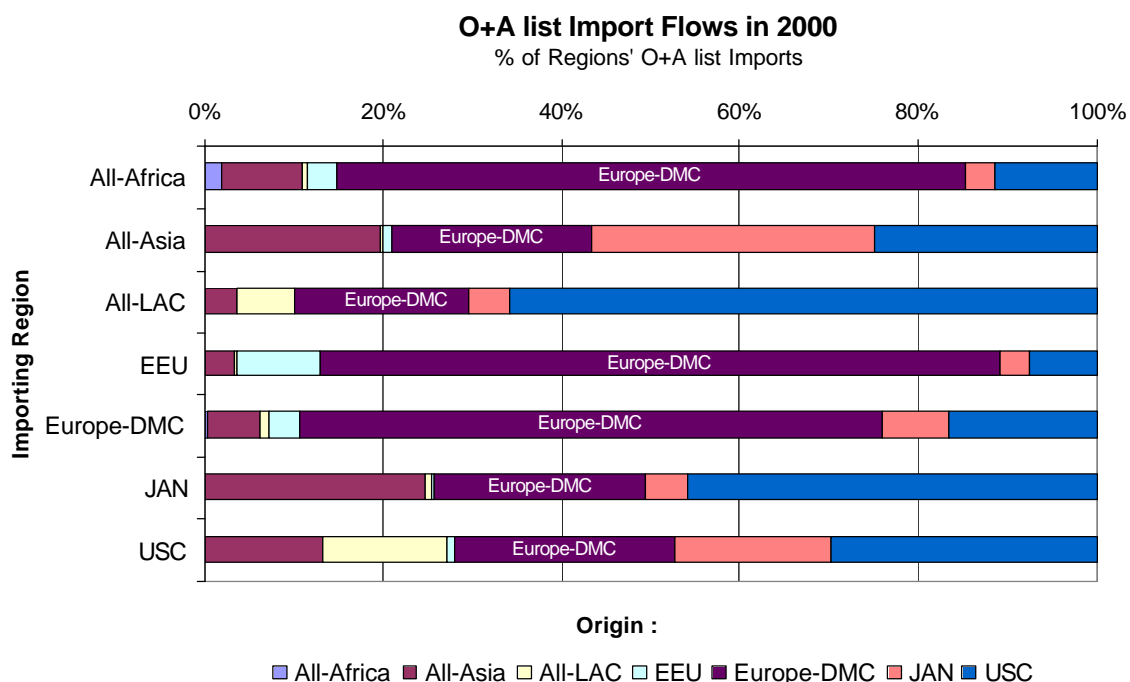
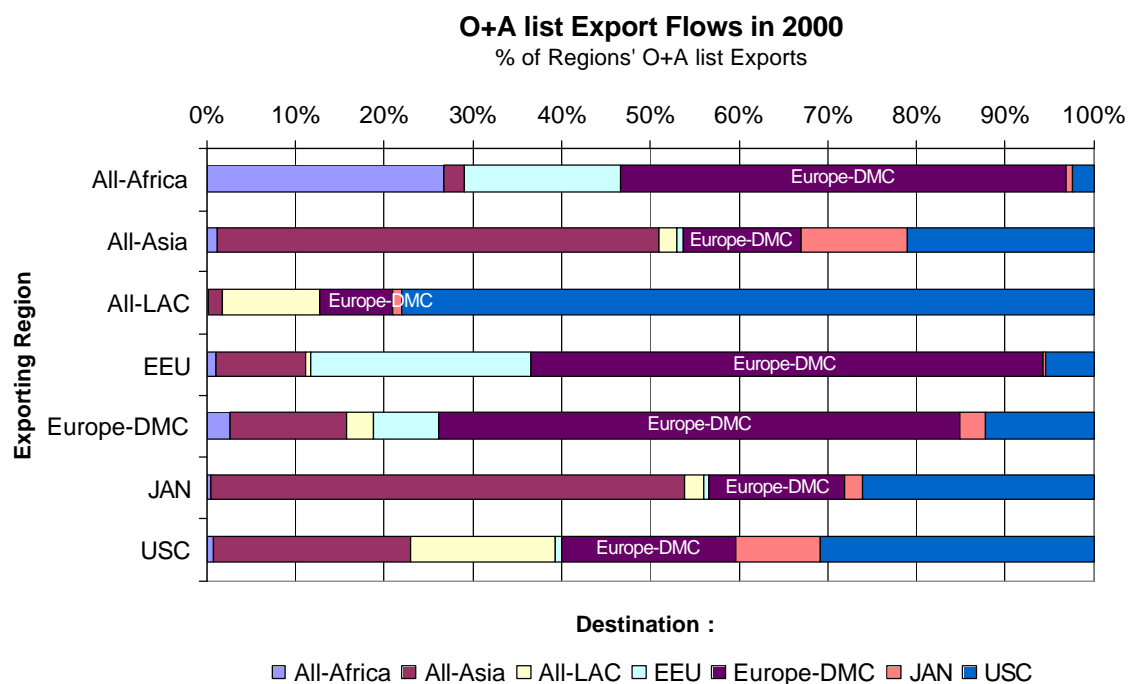


Figure 4: Intra- and inter-regional trade flows for environmental goods on the O+A list. Abbreviations are as follows: All-Africa, All-Asia, and All-LAC includes all developing countries in Africa, Asia and Pacific, and Latin America and the Caribbean respectively. EEU includes countries in Eastern Europe with economies in transition. Europe DMC includes the developed countries in Western Europe. JAN includes Japan, Australia and New Zealand. USC includes the United States and Canada. (Tabular data is reproduced in Table 3).

O+A list Export Flows in 2000
Value of Regions' O+A list Imports

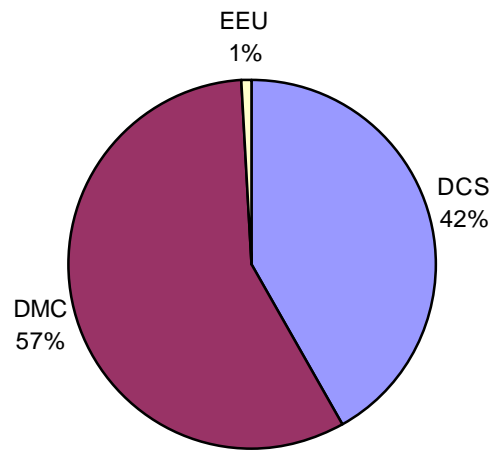
O+A list trade in 2000 (US\$ thousands)		Importing Regions (Partners)							Total
		All-Africa	All-Asia	All-LAC	EEU	Europe-DMC	JAN	USC	
Exporting Region (Reporters)	All-Africa	56,643	4,634	0	37,436	106,321	1,761	4,886	211,681
	All-Asia	407,700	16,616,736	651,190	291,282	4,418,331	3,984,351	7,036,075	33,405,665
	All-LAC	28,479	198,319	1,333,240	20,861	1,002,111	125,827	9,617,885	12,326,722
	EEU	64,372	668,705	40,874	1,609,001	3,781,002	18,611	359,265	6,541,831
	Europe-DMC	3,159,692	16,635,043	3,946,212	9,229,328	74,373,759	3,806,487	15,368,266	126,518,787
	JAN	156,246	23,519,009	933,355	233,165	6,760,785	829,615	11,452,950	43,885,124
	USC	535,146	14,689,029	10,739,305	480,448	12,957,229	6,323,430	20,376,688	66,101,276
	Total	4,408,277	72,331,474	17,644,176	11,901,521	103,399,538	15,090,083	64,216,017	288,991,086

O+A list Import Flows in 2000
Value of Regions' O+A list Imports

O+A list trade in 2000 (US\$ thousands)		Exporting Regions (Partners)							Total
		All-Africa	All-Asia	All-LAC	EEU	Europe-DMC	JAN	USC	
Importing Region (Reporters)	All-Africa	33,156	150,864	9,363	54,924	1,188,859	53,353	194,917	1,685,437
	All-Asia	25,698	13,929,334	250,366	592,610	15,848,042	22,434,373	17,651,287	70,731,711
	All-LAC	1,746	886,378	1,466,772	39,700	4,525,232	1,101,017	15,436,713	23,457,557
	EEU	1,263	424,701	50,652	1,202,743	9,758,856	412,602	981,379	12,832,196
	Europe-DMC	363,235	5,876,019	1,048,775	3,528,673	65,338,225	7,491,338	16,671,412	100,317,676
	JAN	1,962	4,515,107	150,113	28,363	4,367,263	866,361	8,407,654	18,336,823
	USC	14,934	8,391,539	8,965,147	459,793	15,824,388	11,115,220	19,035,640	63,806,662
	Total	441,993	34,173,942	11,941,190	5,906,806	116,850,865	43,474,265	78,379,002	291,168,062

Table 3: Data tables for the graphs in Figure 4. Intra- and inter-regional trade flows for environmental goods on the O+A list. Abbreviations are as follows: All-Africa, All-Asia, and All-LAC includes all developing countries in Africa, Asia and Pacific, and Latin America and the Caribbean respectively. EEU includes countries in Eastern Europe with economies in transition. Europe DMC includes the developed countries in Western Europe. JAN includes Japan, Australia and New Zealand. USC includes the United States and Canada.

Developing Country O+A-list Exports by Destination in 2000



Developing Country O+A-list Imports by Origin in 2000

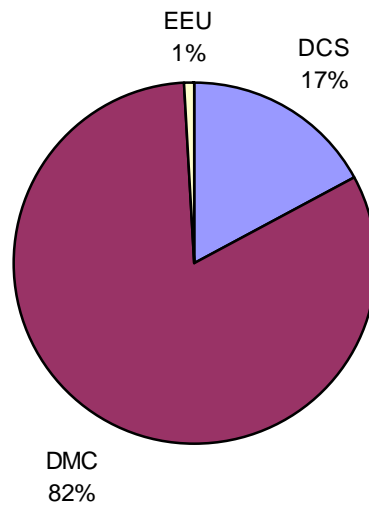


Figure 5: Top chart is the origin of developing country imports of O+A listed goods, and bottom chart the destination of developing country exports of O+A listed goods. Abbreviations are as follows: DCS is the group of all developing countries, EEU is the group of all countries in Eastern Europe with economies in transition, and DMC is the group of all developed countries.

**Top Environmental Good Exporting Developing Countries in 2000
O+A list**

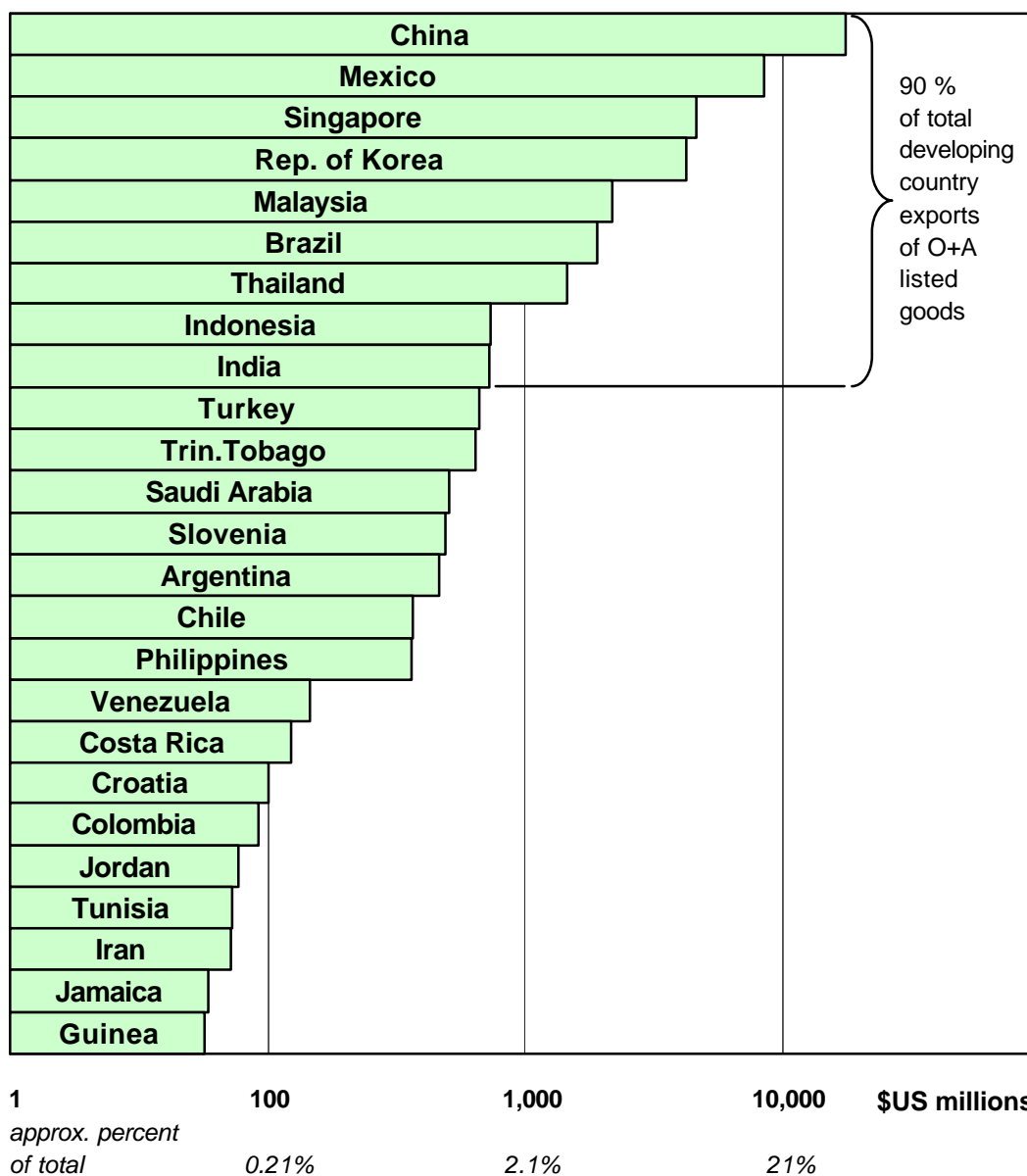
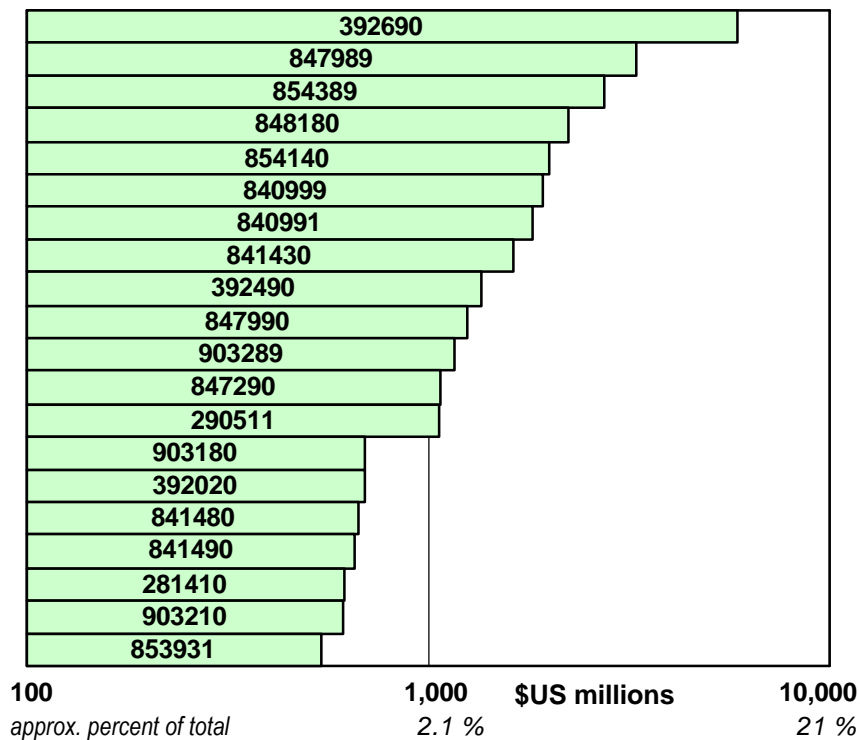


Figure 6: The top twenty-five developing country environmental good exporters and the value, in millions of \$US, of their total exports of environmental goods on the O+A list in 2000 (plotted on a logarithmic scale). These values are also shown as their approximate percentage of total O+A listed environmental good exports from all developing countries in 2000. Developing countries for which HS96 data were not available from the Comtrade database for analysis, such as Bangladesh, Cuba and Egypt, among others, were not included in the analysis.

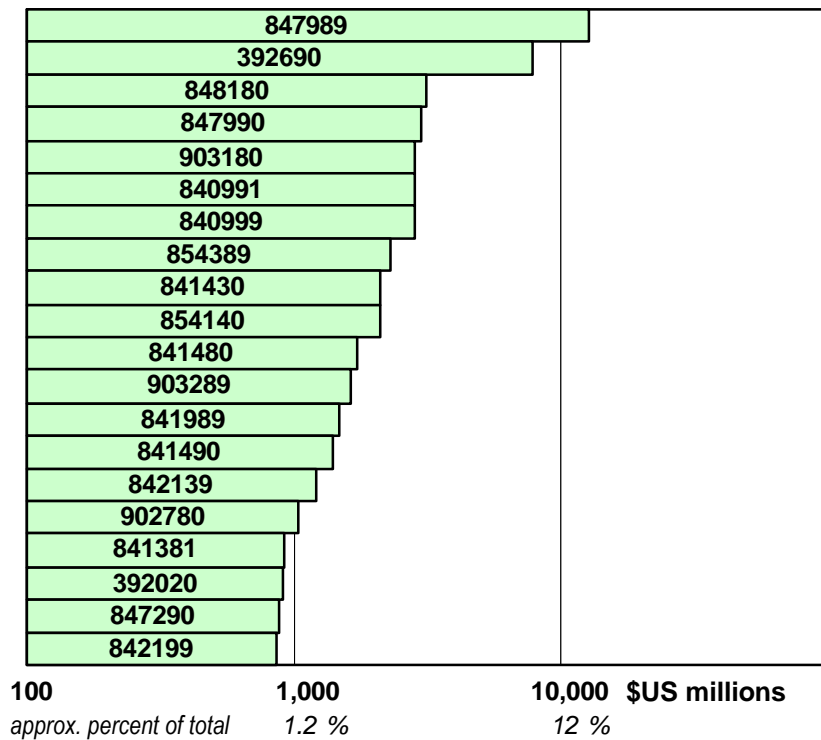
**Top Environmental Good Exports
of Developing Countries in 2000
O+A list**



- 1) 392690 Other articles of plastic
- 2) 847989 Other machines, nes, having individual functions
- 3) 854389 Other electrical machines and apparatus with one function
- 4) 848180 Other taps, cocks, valves, etc.
- 5) 854140 Photosensitive semiconductor devices, incl. solar cells
- 6) 840999 Parts for diesel or semi-diesel engines
- 7) 840991 Parts for internal combustion piston engines
- 8) 841430 Compressors of a kind used in refrigerating equipment
- 9) 392490 Household & toilet articles of plastic
- 10) 847990 Parts of machines (of heading 8479)
- 11) 903289 Other automatic regulation, control instruments
- 12) 847290 Other office machines
- 13) 290511 Methanol
- 14) 903180 Other measuring or checking instruments
- 15) 392020 Polypropylene sheeting
- 16) 841480 Other air or gas compressors or hoods
- 17) 841490 Parts for air or gas compressors, fans or hoods
- 18) 281410 Anhydrous ammonia
- 19) 903210 Thermostats
- 20) 853931 Fluorescent lamps

Figure 7: The top twenty developing country environmental good exports (O+A list) in 2000 and the total value, in of \$US, of each good's exports from developing countries in 2000 (plotted on a logarithmic scale). Export values are also shown as their approximate percentage of total O+A listed environmental good exports from all developing countries in 2000. HS codes and their respective product descriptions are noted.

**Top Environmental Good Imports
of Developing Countries in 2000
O+A list**



- 1) 847989 Other machines, nes, having individual functions
- 2) 392690 Other articles of plastic
- 3) 848180 Other taps, cocks, valves, etc.
- 4) 847990 Parts of machines (of heading 8479)
- 5) 903180 Other measuring or checking instruments
- 6) 840991 Parts for internal combustion piston engines
- 7) 840999 Parts for diesel or semi-diesel engines
- 8) 854389 Other electrical machines/apparatus with one function
- 9) 841430 Compressors of a kind used in refrigerating equipment
- 10) 854140 Photosensitive semiconductor devices, incl. solar cells
- 11) 841480 Other air or gas compressors or hoods
- 12) 903289 Other automatic regulation, control instruments
- 13) 841989 Other machinery to treat materials by temperature change
- 14) 841490 Parts for air or gas compressors, fans or hoods
- 15) 842139 Filtering or purifying machinery/apparatus for gases
- 16) 902780 Other instruments for physical or chemical analysis
- 17) 841381 Other pumps
- 18) 392020 Polypropylene sheeting
- 19) 847290 Other office machines
- 20) 842199 Parts for filtering or purifying machinery

Figure 8: The top twenty developing country environmental good imports (O+A list) in 2000 and the total value, in millions of \$US, of each good's imports by developing countries in 2000 (plotted on a logarithmic scale). Import values are also shown as their approximate percentage of total O+A listed environmental good imports by all developing countries in 2000. HS codes and their respective product descriptions are noted.

Export-to-Import Ratios for O+A list

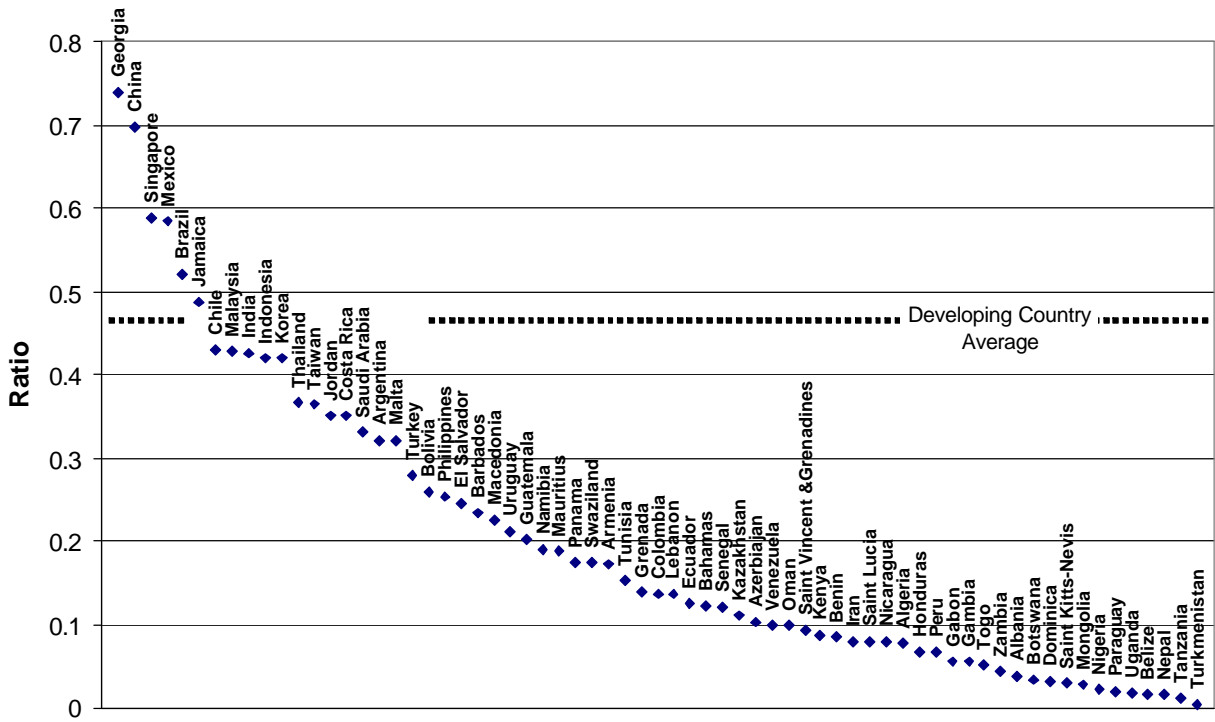
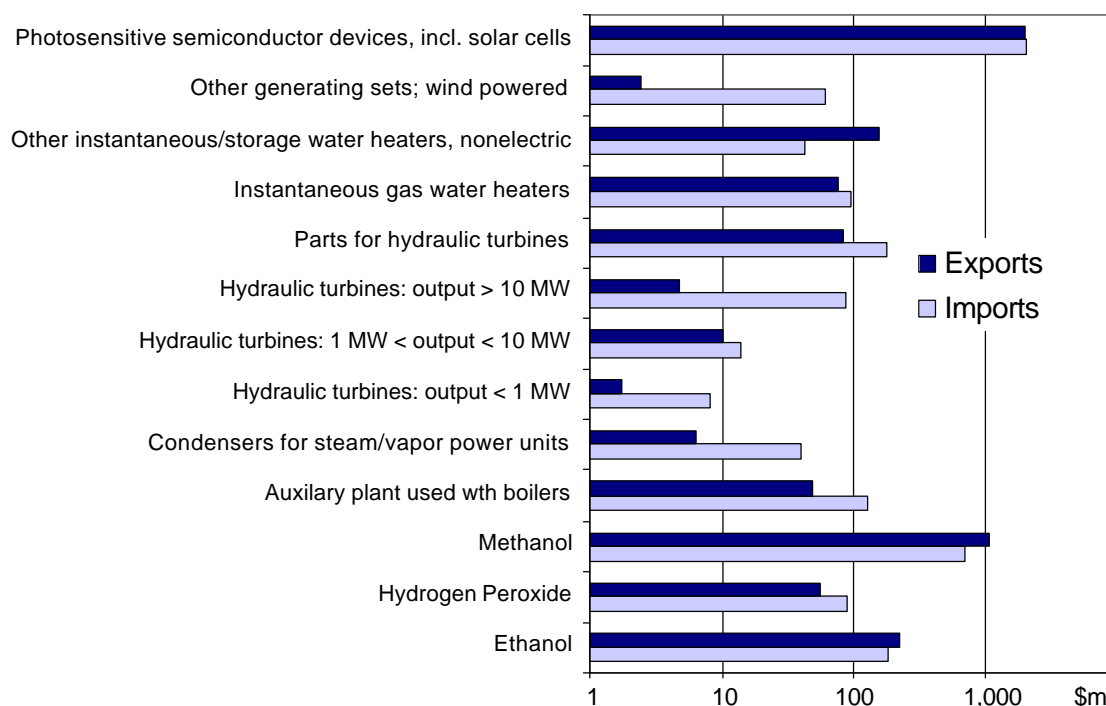


Figure 9: Export-to-Import Ratio for the O+A list for developing countries. Both Guinea and Trinidad and Tobago are outside of the plotted area with ratios of 3.62 and 2.88 respectively. These high ratios are principally generated by Guinea’s exports of aluminium hydroxide and Trinidad and Tobago’s exports of anhydrous ammonia and methanol.

HS96	OECD list	APEC list	Description
220710	v		Ethanol
284700	v		Hydrogen peroxide
290511	v		Methanol
841011	*	v	Hydraulic turbines, water wheels and regulators: output < 1 MW
841012	*	v	Hydraulic turbines, water wheels and regulators: 1 MW < output < 10 MW
841013	*	v	Hydraulic turbines, water wheels and regulators: output > 10 MW
841090		v	Parts for hydraulic turbines, including regulators
841911	v		Instantaneous gas water heaters
841919	v		Other instantaneous or storage water heaters, non-electric: solar water heaters
850231		v	Wind powered generating sets
854140	v	v	Photosensitive semiconductor devices, including photovoltaic cells

Table 4: Renewable/clean energy goods on the OECD and APEC lists (v - appears on the lists as a renewable/clean energy good, * - appears on the lists but not as a renewable/clean energy good).

Developing Countries' Trade in Renewable and Energy Efficiency Goods on the O+A List



HS	Description	Export (\$m)	Import (\$m)
220710	Ethanol	227	188
284700	Hydrogen Peroxide	56	90
290511	Methanol	1,071	703
841011	Hydraulic turbines: output < 1 MW	2	8
841012	Hydraulic turbines: 1 MW < output < 10	10	14
841013	Hydraulic turbines: output > 10 MW	5	87
841090	Parts for hydraulic turbines	85	182
841911	Instantaneous gas water heaters	77	95
841919	Other instantaneous/storage water heaters, nonelectric	158	42
850231	Other generating sets; wind powered	2	61
854140	Photosensitive semiconductor devices, incl. solar cells	2,004	2,100
Grand Total		3,696	3,570

Figure 10: (in graph form above and table form below) For the year 2000, total exports (to world) and imports (from world) for environmental goods listed in Table 4 for developing countries as a group (plotted on a logarithmic scale).

Reporter	Export (\$m)	Import (\$m)	Balance
China	901	1,298	-397
Malaysia	561	225	336
Chile	303	20	283
Saudi Arabia	299	23	276
Trinidad and Tobago	267	9	258
Singapore	251	347	-97
Mexico	201	359	-158
Rep. of Korea	172	535	-363
Thailand	153	112	42
Philippines	104	50	53
Indonesia	91	44	48
Venezuela	74	21	53
Brazil	60	128	-68
Turkey	43	75	-32
Argentina	39	24	15
Jamaica	38	1	37
India	37	81	-44
Slovenia	25	9	16
Algeria	12	7	5
Guatemala	9	5	3
Grand Total	3,640	3,374	265

Table 5: The top 20 developing country exporters of renewable/clean energy goods on the OECD and APEC lists (as contained in table 4) in 2000.

HS (1996)	Description
46	Manufactures of straw, of esparto or of other plaiting materials; basketware and wickerwork
2303	Residues of starch manufacture and similar residues, beet-pulp, bagasse and other waste of sugar manufacture, brewing or distilling dregs and waste, whether or not in the form of pellets
2513	Pumice; emery; natural corundum, natural garnet and other natural abrasives, whether or not heat-treated
3401	Soap; organic surface-active products and preparations for use as soap
3402	Organic surface-active agents (other than soap); surface-active preparations, washing preparations and cleaning preparations, whether or not containing soap, other than those of heading 3401
3912	Cellulose and its chemical derivatives, not elsewhere specified or included, in primary forms
4001	Natural rubber, balata, gutta-percha, guayule, chicle and similar natural gums, in primary forms or in plates, sheets
4504	Agglomerated cork (with or without a binding substance) and articles of agglomerated cork
5301	Flax, raw or processed but not spun; flax tow and waste (including yarn waste and garnetted stock)
5303	Jute and other textile bast fibers (excluding flax, true hemp and ramie), raw or processed but not spun; tow and waste of these fibers (including yarn waste and garnetted stock)
5304	Sisal and other textile fibers of the genus Agave, raw or processed but not spun; tow and waste of these fibers (including yarn waste and garnetted stock)
5305	Coconut, abaca (Manila hemp or <i>Musa textilis</i> Nee), ramie and other vegetable textile fibers, not elsewhere specified or included, raw or processed but not spun; tow, noils and waste of these fibers (including yarn waste and garnetted stock)
5306	Flax yarn
5307	Yarn of jute or of other textile bast fibers
5308	Yarn of other vegetable textile fibers; paper yarn
5309	Woven fabric of flax
5310	Woven fabrics of jute or of other textile bast fibers
5311	Woven fabrics of other vegetable textile fibers; woven fabrics of paper yarn
5608	Knotted netting of twine, cordage or rope; made up fishing nets and other made up nets, of textile materials
6701	Skins and other parts of birds with their feathers or down, feathers, parts of feathers, down and articles thereof
050900	Natural sponges of animal origin
121110	Licorice roots
121120	Ginseng roots
121130	Coca leave
121140	Poppy straw
121190	Other plants and parts of plants
130110	Lac
130120	Gum arabic
130190	Turpentine gum, balsams, tragacanth, karaya
140410	Raw vegetable materials of a kind used primarily in dyeing or tanning
152000	Glycerol, crude; glycerol waters and glycerol lyes
152110	Vegetable waxes
152190	Beeswax
310100	Animal or vegetable fertilizers, whether or not mixed together or chemically treated; fertilizers produced by the mixing or chemical treatment of animal or vegetable products
340119	Soap; organic surface-active products and preparations for use as soap: Other: natural soaps made from vegetable oil
391390	Natural polymers: Other: Chemical derivatives of natural rubber
560710	Twine, cordage, ropes and cables of jute or other textile bast fibers
570220	Twine, cordage, ropes and cables of sisal or other textile fibers of the genus Agave
630510	Sacks and bags, of a kind used for the packing of goods of jute or of other textile bast fibers

Table 6: A short list of products which may qualify as Environmentally Preferable Products (EPPs) based on their end-use and disposal characteristics alone; i.e., not based on their process and production methods.

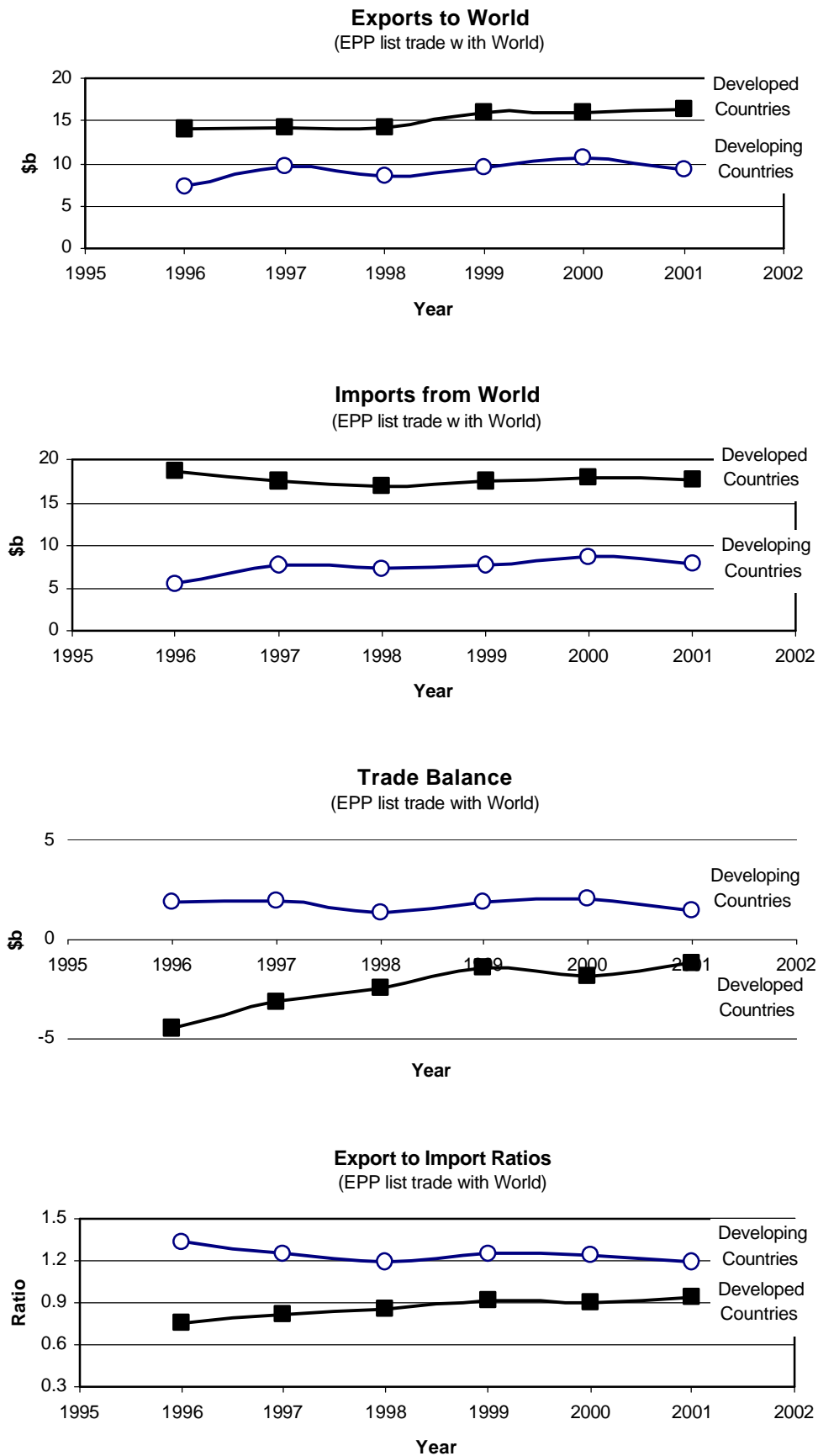
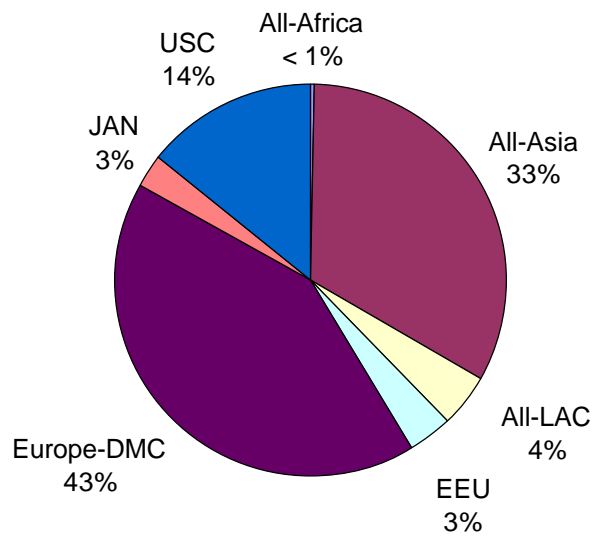


Figure 11: Total exports, imports, trade balance, and export-to-import ratio for environmental goods on the EPP list for developed and developing countries.

EPP list Exports in 2000 (% of world total: 28 \$b)



EPP list Imports in 2000 (% of world total: 28 \$b)

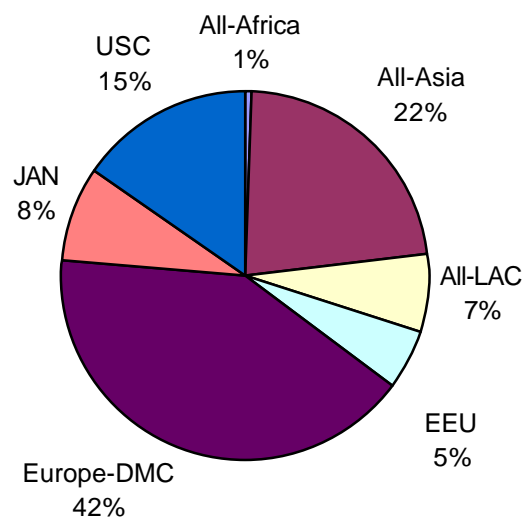
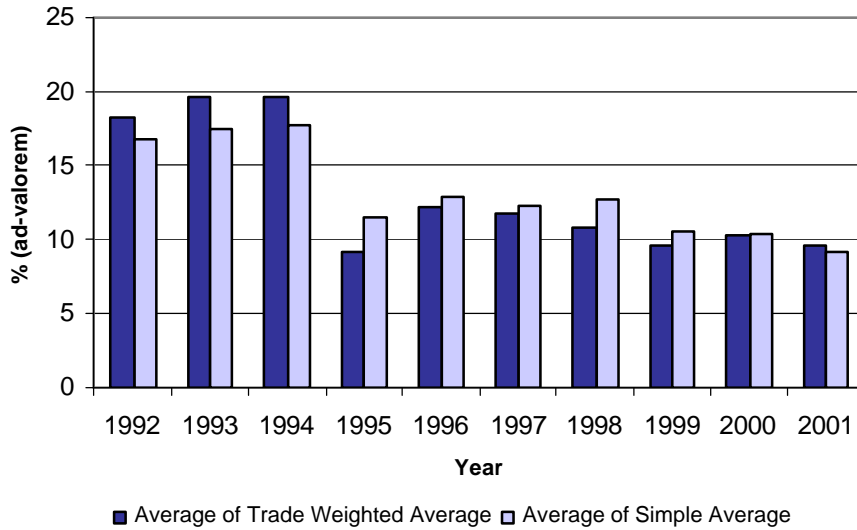


Figure 12: Regional shares of global market for environmental goods on the EPP list. Abbreviations are as follows: All-Africa, All-Asia, and All-LAC includes all developing countries in Africa, Asia and Pacific, and Latin America and the Caribbean respectively. EEU includes countries in Eastern Europe with economies in transition. Europe DMC includes the developed countries in Western Europe. JAN includes Japan, Australia and New Zealand. USC includes the United States and Canada.

Average Tariffs for O+A list applied by developing countries



Average Tariffs for O+A list applied by developed countries

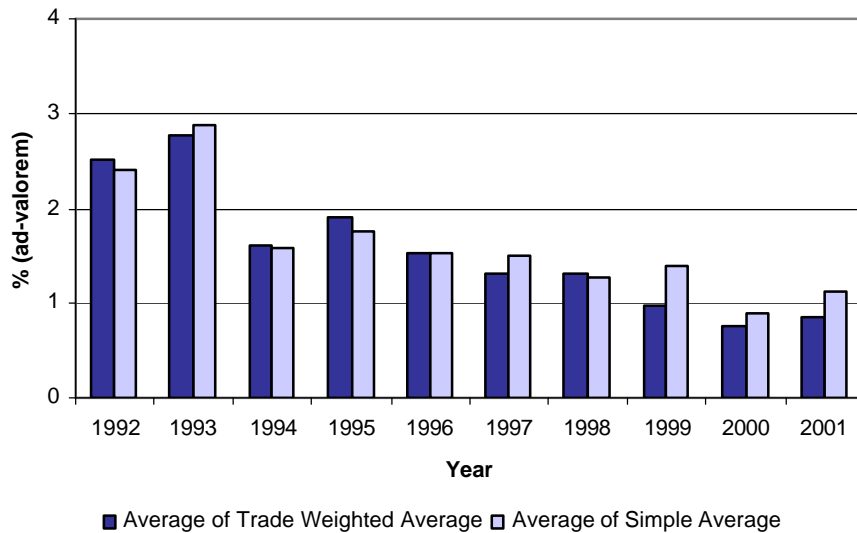
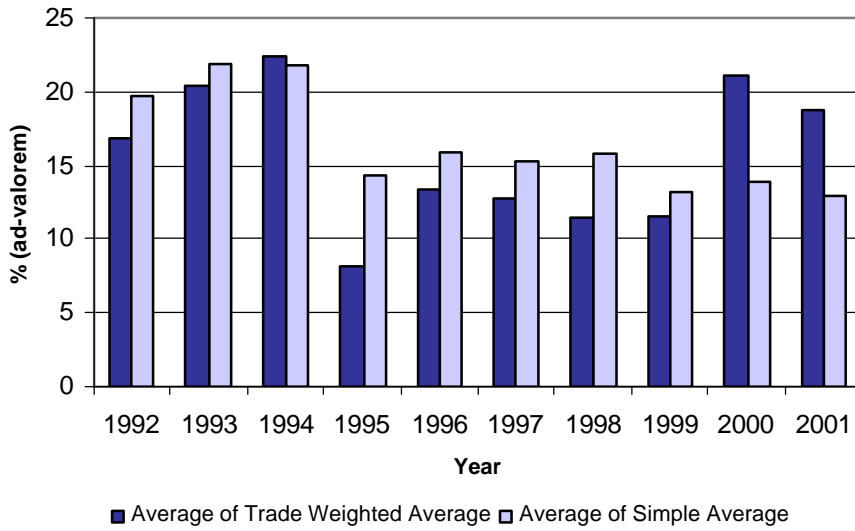


Figure 13: Simple average and trade-weighted tariffs applied to O+A listed goods by developed and developing countries from 1992-2001. Averages have been taken over all countries and all goods in the sample. (Source: UNCTAD TRAINS).

Average Tariffs for EPP list applied by developing countries



Average Tariffs for EPP list applied by developed countries

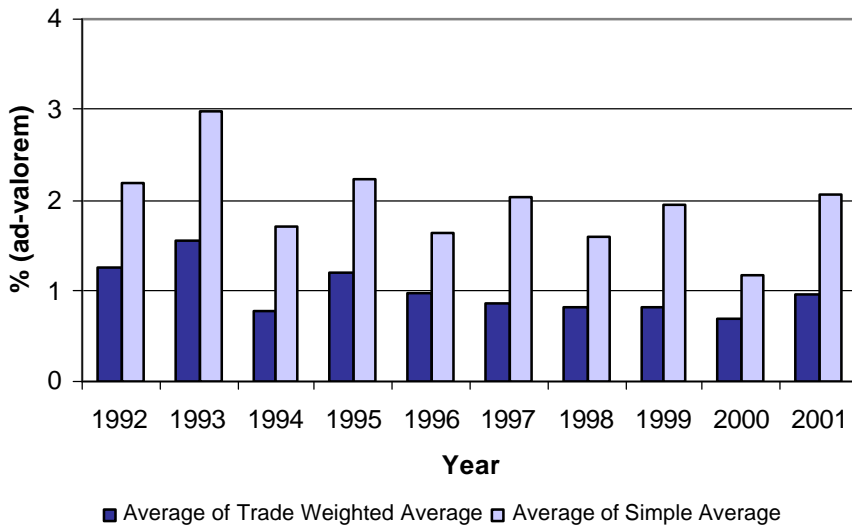


Figure 14: Simple average and trade-weighted tariffs applied to EPP listed goods by developed and developing countries from 1992-2001. Averages have been taken over all countries and all goods in the sample. (Source: UNCTAD TRAINS).

Table 7: Year 2000 trade data of individual countries for the OECD, APEC and O+A lists

Trade flow values in thousands of \$US

Reporter	List	Export (X)	Import (M)	Trade balance (X-M)	Export-to-Import ratio (X/M)
China	APEC list	8,911,076	14,418,261	-5,507,185	0.62
	OECD list	10,710,598	15,193,593	-4,482,995	0.70
	O+A list	12,789,131	18,365,220	-5,576,089	0.70
India	APEC list	460,567	1,153,910	-693,343	0.40
	OECD list	649,253	1,562,774	-913,521	0.42
	O+A list	787,807	1,853,302	-1,065,495	0.43
Indonesia	APEC list	241,805	1,235,129	-993,325	0.20
	OECD list	663,546	1,483,347	-819,801	0.45
	O+A list	735,309	1,752,224	-1,016,915	0.42
Korea, Republic of	APEC list	2,837,215	8,132,706	-5,295,491	0.35
	OECD list	3,426,406	8,523,589	-5,097,183	0.40
	O+A list	4,280,671	10,209,364	-5,928,693	0.42
Malaysia	APEC list	1,856,550	4,315,021	-2,458,471	0.43
	OECD list	1,661,231	3,868,604	-2,207,373	0.43
	O+A list	2,214,938	5,186,339	-2,971,401	0.43
Mongolia	APEC list	486	19,562	-19,076	0.02
	OECD list	225	18,619	-18,393	0.01
	O+A list	655	24,035	-23,381	0.03
Nepal	APEC list	15	43,214	-43,199	0.00
	OECD list	729	44,927	-44,199	0.02
	O+A list	734	48,273	-47,539	0.02
Philippines	APEC list	260,603	1,060,815	-800,211	0.25
	OECD list	281,643	988,220	-706,577	0.29
	O+A list	358,768	1,410,574	-1,051,805	0.25
Singapore	APEC list	4,044,837	6,862,240	-2,817,403	0.59
	OECD list	3,578,979	6,063,033	-2,484,054	0.59
	O+A list	4,738,295	8,065,290	-3,326,995	0.59
Taiwan, Province of China	APEC list	3,933,662	11,317,174	-7,383,512	0.35
	OECD list	4,290,457	12,143,965	-7,853,509	0.35
	O+A list	5,284,046	14,530,790	-9,246,744	0.36
Thailand	APEC list	887,244	3,204,295	-2,317,050	0.28
	OECD list	1,347,817	3,536,287	-2,188,470	0.38
	O+A list	1,456,330	3,979,017	-2,522,687	0.37

Table 8: Top trade balances by country & good in 2000 for goods on the O+A list

2000 trade values in \$US.

Reporter	HS	Export (\$)	Import (\$)	Balance of Trade (\$)	HS Description
China	392690	3,822,383,384	-1,597,208,332	2,225,175,052	Other articles of plastic
	392490	1,144,321,067	-234,817,767	909,503,300	Household & toilet articles of plastic
	854389	1,076,598,844	-556,061,759	520,537,085	Other electrical machines and apparatus with one function
	847290	855,753,394	-467,609,564	388,143,830	Other office machines
	732510	322,286,700	-14,797,950	307,488,750	Articles of cast iron
India	732510	29,187,836	-119,037	29,068,799	Articles of cast iron
	841440	27,554,884	-6,202,256	21,352,628	Air compressors mounted on a wheeled chassis for towing
	701990	24,495,612	-4,741,221	19,754,391	Other glass fiber products
	854140	28,115,176	-12,266,875	15,848,301	Photosensitive semiconductor devices, incl. solar cells
	281830	14,170,302	-313,096	13,857,206	Aluminium hydroxide
Indonesia	281410	135,816,352	-116,607	135,699,745	Anhydrous ammonia
	290511	60,349,708	-20,011,344	40,338,364	Methanol
	392020	51,639,496	-11,586,589	40,052,907	Polypropylene sheeting, etc.
	730900	42,920,728	-4,491,828	38,428,900	Tanks, vats, etc. > 300l
	853931	50,915,888	-12,641,072	38,274,816	Fluorescent lamps, hot cathode
	854140	512,576,832	-175,104,608	337,472,224	Photosensitive semiconductor devices, incl. solar cells
Malaysia	903130	67,221,376	-2,725,421	64,495,955	Profile projectors
	903289	106,490,752	-43,411,972	63,078,780	Other automatic regulation & control instruments
	903210	58,861,444	-10,740,135	48,121,309	Thermostats
	847290	51,769,096	-22,263,268	29,505,828	Other office machines
Nepal	960310	685,639	-3,905	681,734	Brooms, hand
	848130	31,892	-17,869	14,023	Valves, check
	252100	1,057		1,057	Limestone flux
	903020		-45	-45	Cathode-ray oscilloscopes
	283220		-53	-53	Other sulphites
Philippines	854140	103,381,280	-12,105,602	91,275,678	Photosensitive semiconductor devices, incl. solar cells
	380210	31,017,260	-2,934,318	28,082,942	Activated carbon
	392020	28,416,962	-19,935,240	8,481,722	Polypropylene sheeting, etc.
	842220	7,618,565	-2,232,814	5,385,751	Machinery to clean, dry bottles, etc.
	701990	6,570,031	-2,822,331	3,747,700	Other glass fiber products
	841430	377,154,592	-218,402,816	158,751,776	Compressors of a kind used in refrigerating equipment
Rep. of Korea	392690	271,831,200	-148,532,240	123,298,960	Other articles of plastic
	560314	117,375,824	-4,488,127	112,887,697	Man-made filament weighing >150g/sqm
	730900	113,790,472	-21,425,316	92,365,156	Tanks, vats, etc. > 300l
	841989	212,576,432	-128,379,216	84,197,216	Other machinery materials treatment by change of temperature
	841430	167,285,504	-66,982,648	100,302,856	Compressors of a kind used in refrigerating equipment
Singapore	392690	382,368,320	-285,444,096	96,924,224	Other articles of plastic
	902780	127,557,744	-54,709,536	72,848,208	Other instruments for physical or chemical analysis
	902620	55,232,788	-20,938,832	34,293,956	Instruments for measuring or checking pressure
	903289	111,511,112	-85,699,728	25,811,384	Other automatic regulation & control instruments
	854140	131,508,384	-59,937,120	71,571,264	Photosensitive semiconductor devices, incl. solar cells
Thailand	392020	60,026,156	-17,690,598	42,335,558	Polypropylene sheeting, etc.
	853931	45,962,960	-7,363,166	38,599,794	Fluorescent lamps, hot cathode
	392490	29,093,332	-1,853,476	27,239,856	Household & toilet articles of plastic
	854389	218,050,048	-191,161,600	26,888,448	Other electrical machines and apparatus with one function

Table 9: Top exports & imports by country & good from 1997-2001 for goods on the O+A list

Average annual trade values in \$US

Reporter	Flow	HS	Export	HS Description
Bhutan	Export	252100	312,011	Limestone flux
		230210	36,822	Bran sharps & other residues of maize
		392490	34,222	Household & toilet articles of plastic
		960310	11,333	Brooms, hand
		380210	9,262	Activated carbon
	Import	841012	1,433,566	Hydraulic turbines
		841990	921,856	Parts for heat exchange equipment
		847982	894,813	Other machines for mixing/grinding
		841440	831,679	Air compressors mounted on a wheeled chassis for towing
		841090	805,483	Parts for hydraulic turbines
China	Export	392690	688,706,778	Other articles of plastic
		392490	229,571,559	Household & toilet articles of plastic
		854389	167,828,280	Other electrical machines and apparatus with one function
		847989	141,570,328	Other machines, nes, having individual functions
		847290	129,874,090	Other office machines
	Import	847989	940,134,776	Other machines, nes, having individual functions
		392690	443,325,670	Other articles of plastic
		854140	227,948,985	Photosensitive semiconductor devices, incl. solar cells
		903180	215,993,319	Other measuring or checking instruments
India	Export	392690	45,489,413	Other articles of plastic
		840999	36,487,328	Parts for diesel or semi-diesel engines
		848180	28,256,102	Other taps, cocks, valves, etc.
		840991	27,729,028	Parts for internal combustion piston engines
		847990	21,673,242	Parts of machines
	Import	281410	183,043,456	Anhydrous ammonia
		848180	100,662,676	Other taps, cocks, valves, etc.
		847989	99,648,188	Other machines, nes, having individual functions
		840999	87,322,232	Parts for diesel or semi-diesel engines
		903180	73,550,303	Other measuring or checking instruments
Indonesia	Export	281410	95,929,530	Anhydrous ammonia
		392020	44,395,913	Polypropylene sheeting, etc.
		290511	43,936,421	Methanol
		730900	30,075,457	Tanks, vats, etc. > 300l
		853931	29,834,202	Fluorescent lamps, hot cathode
	Import	848180	111,982,573	Other taps, cocks, valves, etc.
		841480	98,603,886	Other air or gas compressors or hoods
		840999	91,684,558	Parts for diesel or semi-diesel engines
		840991	87,686,289	Parts for internal combustion piston engines
		841989	75,389,497	Other machinery materials treatment by change of temperature
Malaysia	Export	854140	443,978,867	Photosensitive semiconductor devices, incl. solar cells
		392690	166,129,318	Other articles of plastic
		847990	111,725,454	Parts of machines
		903289	91,426,082	Other automatic regulation & control instruments
		841480	90,807,821	Other air or gas compressors or hoods
	Import	847989	729,673,971	Other machines, nes, having individual functions
		392690	304,868,422	Other articles of plastic
		903180	294,632,483	Other measuring or checking instruments
		847990	260,364,160	Parts of machines
903190	220,246,227	Parts and accessories for measuring/checking instruments		

Reporter	Flow	HS	Export	HS Description
Mongolia	Export	851490	1,414,142	Parts for industrial or laboratory electric furnaces
		847439	330,000	Other mixing or kneading machines for earth, stone, sand, etc.
		220710	172,781	Ethanol
		851430	158,777	Industrial/lab electric furnaces & ovens, nes
		841350	108,433	Other reciprocating positive displacement pumps
	Import	841381	1,845,403	Other pumps
		903090	1,495,585	Parts and accessories for measuring instruments
		848180	1,301,641	Other taps, cocks, valves, etc.
		840999	1,131,992	Parts for diesel or semi-diesel engines
		392690	887,507	Other articles of plastic
Nepal	Export	960310	683,571	Brooms, hand
		252100	238,968	Limestone flux
		730900	70,571	Tanks, vats, etc. > 300l
		731010	41,420	Tanks, drums, etc. >50 l < 300 l
		848130	31,892	Valves, check
	Import	847989	21,207,362	Other machines, nes, having individual functions
		854389	4,241,060	Other electrical machines and apparatus with one function
		841090	2,963,908	Parts for hydraulic turbines
		843680	2,579,497	Other machinery
902780	1,866,832	Other instruments for physical or chemical analysis		
Philippines	Export	854140	97,997,496	Photosensitive semiconductor devices, incl. solar cells
		847990	44,771,084	Parts of machines
		392020	31,789,313	Polypropylene sheeting, etc.
		380210	29,415,814	Activated carbon
		847989	22,344,030	Other machines, nes, having individual functions
	Import	847990	294,392,288	Parts of machines
		847989	280,602,184	Other machines, nes, having individual functions
		392690	78,145,996	Other articles of plastic
		281410	39,938,736	Anhydrous ammonia
		841430	39,110,151	Compressors of a kind used in refrigerating equipment
Rep. of Korea	Export	847989	643,536,826	Other machines, nes, having individual functions
		841430	343,498,035	Compressors of a kind used in refrigerating equipment
		392690	282,940,714	Other articles of plastic
		847990	248,538,646	Parts of machines
		848180	206,986,854	Other taps, cocks, valves, etc.
	Import	847989	1,883,472,525	Other machines, nes, having individual functions
		903180	426,350,656	Other measuring or checking instruments
		848180	426,029,990	Other taps, cocks, valves, etc.
847990	341,038,854	Parts of machines		
840999	308,875,331	Parts for diesel or semi-diesel engines		
Singapore	Export	847989	518,976,026	Other machines, nes, having individual functions
		847990	353,949,235	Parts of machines
		392690	299,887,741	Other articles of plastic
		841430	194,680,579	Compressors of a kind used in refrigerating equipment
		854140	173,311,402	Photosensitive semiconductor devices, incl. solar cells
	Import	847989	1,347,404,787	Other machines, nes, having individual functions
		847990	599,049,478	Parts of machines
		840999	289,496,643	Parts for diesel or semi-diesel engines
		854389	262,615,677	Other electrical machines and apparatus with one function
392690	261,098,998	Other articles of plastic		
Sri Lanka	Export	380210	15,770,099	Activated carbon
		960310	8,620,378	Brooms, hand
		392690	1,651,973	Other articles of plastic
		903180	1,033,557	Other measuring or checking instruments
		903120	676,299	Test benches
	Import	392690	28,651,512	Other articles of plastic

Reporter	Flow	HS	Export	HS Description
		848180	8,216,548	Other taps, cocks, valves, etc.
		850590	7,681,912	Electro magnets & similar devices
		392020	6,785,931	Polypropylene sheeting, etc.
		847989	6,777,093	Other machines, nes, having individual functions
Thailand	Export	841430	194,889,408	Compressors of a kind used in refrigerating equipment
		854389	146,392,917	Other electrical machines and apparatus with one function
		392690	139,355,157	Other articles of plastic
		854140	88,125,763	Photosensitive semiconductor devices, incl. solar cells
		840991	80,730,377	Parts for internal combustion piston engines
	Import	392690	667,617,109	Other articles of plastic
		847989	499,340,555	Other machines, nes, having individual functions
		840999	251,716,619	Parts for diesel or semi-diesel engines
		903180	200,135,376	Other measuring or checking instruments
		841430	187,715,925	Compressors of a kind used in refrigerating equipment

ANNEX II

DRAFT CHAIRMAN'S SUMMARY

UNCTAD Expert Meeting on Definitions and Dimensions of Environmental Goods and Services in Trade and Development

Geneva, 9-11 July 2003

1. The Expert Meeting was attended by a large number of Government experts (from both trade and environment ministries) from developed and developing countries and countries with economies in transition, some private companies supplying environmental services, academics, intergovernmental organizations and NGOs. Participants expressed appreciation for the fact that the Meeting had been scheduled back-to-back with the regular and special sessions of the WTO Committee on Trade and Environment (CTE).
2. Experts addressed issues relating to trade liberalization in environmental goods and services (EGS) from two perspectives. First, they considered issues of definitions, classifications and negotiating approaches in the context of the WTO mandate provided for in paragraph 31 (iii) of the Doha Ministerial Declaration. Second, they discussed the role of EGS in sustainable development, in particular policies and measures that could be carried out at the national and international levels to strengthen the various EGS sectors in developing countries and to contribute to achievement of the Millennium Goals and the implementation of the Johannesburg Plan of Action adopted at the World Summit on Sustainable Development (WSSD).
3. A great deal of the discussions focused on potential benefits from the liberalization of trade in EGS. Most experts referred to the need to secure "win-win-win" outcomes for trade, environment and development. As net importers of EGS, developing countries were more likely to benefit from increased availability of cheaper EGS rather than from increased exports. Developed countries expected benefits in terms of improved access to emerging environmental markets in developing countries and countries with economies in transition. While environmental benefits were of key importance to developing countries, a situation where environmental benefits go to one set of countries and trade gains to another would not be a balanced outcome of the negotiations. The negotiations should therefore take fully into account EGS of export interest to developing countries.

POTENTIAL BENEFITS FOR DEVELOPING COUNTRIES

4. Experts enumerated a number of potential benefits of EGS liberalization for developing countries including, in particular: access to environmentally sound technology (EST) and know-how; possible reduction in the relative prices of EGS; economic, environmental and developmental gains resulting from upgraded environmental infrastructure, more efficient resource management and improved environmental conditions; and enhanced capacity to comply with environmental requirements in domestic and international markets.
5. However, many experts expressed the view that caution and a gradual approach are needed in view of insufficient regulatory frameworks and institutional capacities, difficulties in assessing demand and supply as well as insufficient understanding of implications of liberalization, in particular in sub-sectors for which data were largely unavailable. Several experts mentioned that there was a need to study the experiences of developing countries that had already liberalized certain environmental services sub-sectors. Several developing countries have liberalized certain sub-sectors and allow foreign direct investment, although no commitment have been made in the GATS context. A number of experts mentioned that no commitments could be made for services that were provided under Government authority. Some experts mentioned that a balanced outcome of the negotiations would require commitments being made on "mode 4" concerning sectors of interest to developing countries.

ENVIRONMENTAL INDUSTRY: TRENDS, MARKETS, TRADE FLOWS

6. The meeting was apprised of the following trends in the environmental industry and markets:

7. The total size of the global environmental market is estimated at \$550 billion in 2003. USA, Japan and Western Europe account for 85 per cent of revenue generation in 2001. Annual growth in developed countries was at 1.6 per cent in 2000 and 2001; and in developing countries at 7-8 per cent. Environmental infrastructure services (water, wastewater, solid waste) constitute 62 per cent of the global market.

8. Markets in developed countries are "mature": they are highly competitive, with a highly sophisticated customer base, and experience slow or negative growth in many segments. Conversely, markets in developing countries represent a lot of environmental *needs*. Translating these needs into consistent market *demand* required for investment by private sector in business development, which hinges on a number of factors: regulations and enforcement; capital and companies; ownership and/or contract mechanisms to assure collection of fees, especially for water and waste infrastructure projects etc. Capital requirements, in particular in water and wastewater management, are driving privatization and liberalization. In spite of environmental regulatory drivers, environmental markets are very sensitive to economic cycles.

9. Market determinants also differ. In developed countries, demand for services related to pollution control, compliance and clean-up or remediation are declining, and have been replaced by demand for services such as environmental consulting, eco-design of products, risk assessments, and similar services. In many developing countries, on the other hand, market development is still determined by the need for basic environmental infrastructure services, and pollution control and clean-up services.

10. The biggest environmental companies are also concentrated in developed countries. However, the participation by companies from developing countries in the water and waste-water and consulting sub-sectors is increasing. These are often companies from Asian and Latin American countries, which have acquired technological and services capacities, in part through joint venture investment in the environmental sector in their own country. The most recent publication by UNCTAD, *Energy and Environmental Services: Negotiating Objectives and Development Priorities*, gives important evidence of how capacity to provide and export environmental services has been developed in a number of developing countries.

11. A great number of environmental solutions are "low-tech" and require engineering and management skills as well as capital rather than proprietary technology. Clean, or "green" technology, as opposed to end-of-pipe, "brown" environmental technology, is difficult to pursue as a discrete business; and is difficult to assess by researchers and policymakers.

12. Ozone depletion, climate change and the management of hazardous substances, chemicals and waste, to name but the most important, are issues that require and have already led to some globalization of environmental policy. Market instruments offer potential to augment regulations in some segments, creating an incentive for "better than compliance" through partial internalization of environmental costs.

ENVIRONMENTAL SERVICES

13. Environmental services differ greatly in market structure and behaviour, regulatory frameworks and technological development. Therefore, it is useful to distinguish between (a) environmental infrastructure services, mainly related to water and waste management, (b) non-infrastructure, commercial environmental services, comprising most of the activities in CPC Division 94, e.g. site clean-up and remediation, cleaning of exhaust gases, noise abatement, nature and landscape protection, and (c) related services with environmental end-use, classified under different divisions in the CPC, such as construction or engineering services.

14. Environmental infrastructure services, such as water and wastewater management, are essentially a development issue rather than a trade issue. Therefore the liberalization of trade in water services should be seen in a broader context of sustainable development.

15. Environmental commercial services are knowledge-intensive and provided on an integrated basis. They are generally not subject to market access and national treatment limitations. The key issues with

regard to these services are: access to technology and know how, capacity building, certification and recognition of qualifications (for both natural persons and companies); and, "tied aid" as a restriction to trade.

16. There is a range of services *related* to the environment. These are "multiple-use" services for which the questions of definition and coverage are as relevant as they are to most environmental goods.

17. Environmental infrastructure services should be seen in conjunction with other services. A number of industrial or services sectors in developing countries benefit from the provision of efficient environmental services. On the other hand, environmental support services are essential for commercially meaningful liberalization of environmental infrastructure services. In some environmental support services developing countries increasingly find export opportunities, e.g. environmental assessments, consultancy services, implementation and auditing of environmental management systems, the evaluation and mitigation of environmental impact, and advice in the design and implementation of clean technologies. Partnerships can expand the scope for business opportunities for services suppliers in developing countries, while at the same time allowing technology transfer and capacity building.

18. Factors other than trade liberalization primarily determine countries' level of environmental protection and the use of environmental services. These factors include: environmental regulatory frameworks, including enforcement, the evolution towards pollution prevention approaches, the different needs in terms of environmental services in developing countries, economies in transition and developed countries, and the implementation of multilateral environmental agreements (MEAs).

19. Increased trade is expected to improve the availability of environmental infrastructure services as well as modern environmental services to protect and preserve eco-systems, biodiversity, address air, soil and water pollution, and contribute to transfer of environmental skills, knowledge and technology.

20. The main way to trade environmental services is through commercial presence, linked with the temporary movement of natural persons, given the need for highly specialised professionals in many of these services. The importance of "mode 4", especially for environmental support services, is growing. Individual service providers from developing countries are subject to discriminatory treatment. In this context, a question was raised as to whether there is a compilation of existing qualification and certification requirements.

21. Environmental services are playing an important role in ongoing negotiations under Article XIX of the GATS. Most developing countries have received requests to undertake specific commitments in all environmental services, largely from developed countries. Some members have incorporated new or improvements in existing commitments: of 26 initial offers, 9 have incorporated environmental services. The task of the negotiations is to set the right framework, which would require agreeing on the classification and identifying and reducing main barriers to trade.

22. At their current stage, the negotiations on environmental services raise the following issues: convergence on the classification of environmental services for negotiations purposes; a common understanding of what is meant, in a commercial sense, by some proposed new categories of services such as biodiversity protection; remediation and clean-up of soil and water; need for a clear picture of the extent and scope of subsidization of environmental services; problems associated with the recognition and certification of professional services; "tied aid", i.e. situations where a service provider is pre-selected as part of a development assistance package; qualification and certification requirements for individual service providers; and technology transfer.

23. National classifications of environmental services have not been drawn up for trade negotiations and differ greatly. The two main instruments used in the WTO are the Provisional Central Product Classification and the Services Sectoral Classification List (W120). However, no classification is obligatory and WTO Members are free to use any classification they prefer or develop a classification of their own. Both national and international classifications are rather removed from market realities. Some expressed concern that different classifications are used in the bilateral requests and offer process rather than addressing classification issues multilaterally in the competent body, the Committee on Specific Commitments.

24. Proposals had been made to update the classification of environmental services to better reflect market realities. In addition, attempts were made to take account of environmental “end use” services or services with an “environmental component” to secure commercially meaningful commitments.
25. The most far-reaching proposal for updating the W/120 comes from the European Union. It is based on the OECD/Eurostat definition of environmental services and goes beyond the issues relating to trade negotiations. In particular, it addresses the entire water cycle and the protection and preservation of landscape, eco-systems and biodiversity.
26. The proposal by the EU is indicative of the strong trade interest of EU companies in all environmental services. The EU has made requests for liberalization of environmental services to 64 WTO members, but on a differentiated basis, taking into account the level of their development. Conversely, the EU has not included liberalization of water distribution services in its initial offer, mainly because there was only one request.
27. While governments may resort to their preferred classification, the use of new definitions, overlaying on the CPC classification, may have implications as when included in the schedule, usually as the CPC number, the definitions become binding. It has been pointed out that any new classification may raise adaptation problems with respect to existing commitments from the Uruguay Round. The translation of commitments from one classification to another might imply a modification of such commitments.
28. The sectoral scope of GATS is defined by Article I of the Agreement. Classification issues do not influence the scope of GATS. The discussions about the classification of environmental services are therefore of little relevance to the question of which sectors are covered by the agreement.
29. Arguably, the specific commitments of market access (Article XVI of GATS) and national treatment (Article XVII of GATS) have the greatest potential impact on national regulatory regimes. Since commitments are made on a sectoral basis, classification of services is of vital importance in this context. Classification is therefore also of relevance in the current GATS 2000 negotiations about future commitments.
30. It is important to realize that trade in environmental services can take place, and does take place, in the absence of commitments under GATS. While there are barriers to international trade in services, the main problem is not so much restrictions to trade as the lack of demand. The main issue therefore is how to strengthen demand for environmental services and promote appropriate implementation of environmental policy, including through the establishment and enforcement of environmental standards and regulation.
31. Environmental infrastructure services have some of the characteristics of a “public good.” Key concerns in these services are universal access and prices. These services are highly subsidized in many developing countries as well as in some developed countries, and provided largely by the public sector, private suppliers or through public–private arrangements.
32. The more traditional environmental infrastructure services, such as water and waste management, are provided mostly by the public sector. Moreover, these services often are, or are close to, natural monopolies, or are provided through monopolies for public policy reasons. Even when the provision of these services is handed over, or shared with, the private sector, it often happens under monopolistic structures. Therefore, competition takes place for markets, rather than in markets.
33. The private sector provides water distribution services to about 5 percent of the world's population. The private provision of water service is a politically and socially sensitive issue. The main concerns have to do with price increases, unsustainable use of water resources, loss of public ownership, and rent-seeking practices. Few countries have their water services fully privatized. Public-private partnerships, especially concessions, are preferred over full privatization.
34. Companies operating in the environmental industry use various contractual arrangements to form public-private partnerships (PPP), which are adapted to local and national conditions, to meet the expectations of municipalities and governments, and to comply with national regulations. The perceived gains of PPP for developing countries are of financial (capital inflow), technical (optimised operations;

technical assistance from other countries; training of personnel) and managerial nature (more efficient organizational structure; billing and fee collection; financial savings on purchases).

35. Issues relating to charges for water and subsidies have to be seen in a pragmatic perspective. Pricing is not exclusively a private sector problem. In a subsidized environment, the private sector may sometimes operate similar to a public company operating in a non-subsidized environment.

36. Large private operators currently have a very small market share in developing countries. Small-scale independent water providers, operating small pipe networks, distribution at kiosks and water trucks, currently play a major role in developing countries, where in many cities half of the population or more is served by water suppliers other than the utility. Until now the trade liberalization and water services debate has focused on large-scale operators and ignored small-scale operators. It is important to broaden the debate to address issues specific to decentralized water systems, particularly the ways and means to promote partnerships involving local engineering companies and engineering companies from developed countries,

37. Given the sheer magnitude of intergovernmental commitment on water and sanitation, the public sector should be central to the development and use of water resources and remains a necessary option in water management. Public sector water undertakings (PWU) are the providers of water and sanitation services for the great majority of the population in developed and developing countries. Ignoring a public sector option means that the main competitor to any of the private companies is being excluded.

38. There are evidence problems with PPPs, and evidence that the public sector can successfully operate PWUs in developing countries. Therefore, policy makers should always construct and consider a public sector option; always evaluate any PPP proposal against a public sector option, in a public process.

39. GATS neither requires nor precludes a particular regulatory regime. WTO members are free to design a regime of infrastructure services regulations according to their national priorities and development strategies. WTO members must, however, observe certain GATS disciplines when adopting and implementing particular regulatory instruments. WTO members must also be aware that GATS unfolds a dynamic towards liberalization of service regulation. Hence, WTO members choosing a regulatory regime that relies on government intervention into the market and restrictions of economic activities may have to be more aware of possible constraints of GATS on national regulation than WTO members opting for solutions relying on competition and market forces.

40. WTO members who want to rely on domestic services and service suppliers in a particular sector or who want to retain a maximum degree of regulatory flexibility may consider remaining unbound in that sector, i. e. not making any commitments. WTO members who want to commit certain sectors should carefully assess their regulatory regime and the implications of market access and national treatment on it and should also consider their need for future regulatory flexibility when scheduling limitations on their commitments.

41. Water regulation often pursues goals, which are specific to the water sector, such as managing scarce resources, guaranteeing drinking water quality, and aiming at or securing universal access to water. Water regulation can also aim at other goals such as efficiency of distribution, transfer of technology or rural and agricultural development. Some of these goals may require instruments, which could be incompatible with market access and national treatment and may therefore require scheduling limited commitments or abstaining from commitments altogether.

42. For example, managing scarce resources may require quantitative limitations on services or services output. This could be incompatible with Article XVI:2(a) or XVI:2(c) of GATS. Requiring foreign companies to establish themselves in the host country could be incompatible with Article XVI:2(d) GATS. Transfer of technology obligations or residence requirements could be incompatible with Article XVII GATS. Some instruments ensuring universal service obligations could also be incompatible with Articles XVI and XVII. WTO members employing or planning to employ such instruments must therefore carefully schedule limitations on any commitments in market access and national treatment.

43. WTO members should also assess the ongoing negotiations on disciplines for domestic regulation in the Working Party on Domestic Regulation in light of their regulatory requirements. Pursuant to Article VI:4 GATS such disciplines should ensure that certain domestic regulation (measures relating to licensing and

qualification requirements and procedures, and technical standards) is no more burdensome (no more trade restrictive) than necessary to achieve the quality of the services. Depending on the scope of future disciplines and the specific design of a "necessity test" in such disciplines, certain domestic regulation such as quality standards or universal service obligations could be seen as more burdensome than necessary. This may put them under pressure from the multilateral trading system.

44. Water services are either privatized or provided directly by central or local authorities, with the latter being excluded from the coverage of GATS. In this context, it has been pointed out that there is a need to clarify the meaning of *services provided under governmental authority* and of *market access*. With respect to services provided under governmental authority there are differing interpretations of the scope of the exclusion. According to some, in order for the exclusion to apply the service must not be supplied on a commercial basis nor in competition, and if one of these conditions is not met then the exclusion does not apply. On the contrary for others it is sufficient that one of the conditions to be met for the exclusion to apply. With respect to market access, the question was raised as to whether the right to participate in the bidding process amounts to granting market access, and if concessions fall within the real of government procurement therefore being excluded from GATS provisions.

45. Some of the various forms of relationship between government authority and a private supplier would correspond to government procurement and are therefore exempted from the relevant GATS disciplines. However, the distinction between these various forms is not always clear, prompting questions about what types of water contract could or could not be considered government procurement.

46. GATS is a flexible instrument, but only of it is used in such a way. Options available to developing countries in managing the impact of liberalization of public services under GATS include: horizontal exclusion of public services (e.g. Dominican Republic); sector specific exclusion of public services (e.g. Norway and Switzerland); commitments limited to private sector suppliers (e.g. sewage services in the US); sub-sectoral "carve-outs", e.g. for infrastructure; specific limitations to exclude certain regulatory measures, e.g. subsidies.

47. Countries have the possibility to tailor their commitments through the bottom-up approach, to define their way to market access. However, there is a lot of pressure on national and local regulatory authorities, which often lack the necessary resources and capacity. Regulations are key to ensuring the "quality" of the liberalization process. There is need to sequence regulatory consolidation and liberalization. Detailed knowledge of regulations are also key to negotiations. In a sense, it would be fair to say that trade negotiators should know what regulators know and *vice versa*.

ENVIRONMENTAL GOODS

48. The Doha mandate explicitly calls for the liberalization of trade in environmental goods. From a policy perspective, relevant questions are: (a) whether to grant special treatment to such goods and in what form; (b) to which goods such special treatment would be granted; (c) the relative importance of tariffs and non-tariff barriers; and (d) supply capacity. The Doha mandate appears to impose two sets of conditions. First, the language of paragraph 31 suggests that in order to benefit from special treatment, environmental goods should be identified "with a view to enhancing the mutual supportiveness of trade and environment." This, in turn, raises the question of, how to go about "multiple use" products. Second, negotiations on environmental goods should take into account the overall objectives of market access negotiations. They should therefore also be guided by paragraph 16 of the DMD and pay particular attention to "products of export interest to developing countries"; take full account of the special needs and concerns of developing countries, require "less than full reciprocity in reduction commitment" from developing countries and promote capacity building.

49. Current approaches do not adequately reflect developing countries' interests. Several experts made proposals aimed at achieving a more balanced outcome of the negotiations, in particular by identifying products of export interest to developing countries; excluding "multiple use" products that may have little environmental application; and addressing technology and capacity building needs.

50. As there is no agreed definition of environmental goods in the WTO, experts focused their discussions on various "lists" of environmental goods, rather than on issues of definition.

51. The OECD and the Asia Pacific Economic Cooperation (APEC) have developed lists of “environmental goods.” While the OECD list was developed for analytical purposes, the APEC list was compiled based on proposals by individual APEC members, as a bottom-up approach to the Early Voluntary Sectoral Liberalization initiative (EVSL), which includes the environmental sector. While the OECD list does not go beyond the 6-digit HS classification, the APEC list includes many “ex-headings” (nationally defined tariff lines). The APEC list might therefore be more precise in identifying environmental goods, although the problem of “multiple-use” products remains. In the EVSL context, some goods (e.g. waste incinerators) had been excluded from the APEC lists at the request of the civil society. One expert mentioned that large hydraulic turbines should not be put on lists of environmental goods, because of adverse environmental implications. It has been pointed out that many pollution abatement products on the OECD and APEC lists are “end-of-pipe” technologies.

52. Some experts proposed that the APEC list could be used as a starting point, but by no means the end point, in identifying environmental goods for the purposes of trade negotiations. Some others thought that the APEC list was not a good starting point and that any list could be used. It has been emphasized that, in principle, no products were *a priori* excluded from the scope of environmental goods and no proposals have been made to that effect. Most WTO Members, however, have objected, on practical and systemic grounds, to the use of criteria based on non-product-related processes and production methods (PPMs) to define environmental goods for the purposes of the negotiations.

53. Products proposed for listing as environmental goods because of performance criteria, such as energy efficiency at consumption, are another problematic category. The main reason is that these products are subject to innovation and technological change and products that are environmentally superior today may not be so tomorrow.

54. Criteria should be practical and simple, and that adequate account should be taken of capacity constraints of Customs authorities to administer products subject to special treatment. Any lists of environmental goods should be kept current, so as to regularly include new products and exclude products that no longer qualify as environmental goods.

55. It may become necessary to make proposals for tariff reductions at the national tariff line level (beyond the 6-digit level of the HS classification), as had been done in the Agreement on Information Technology. Some experts mentioned that the World Customs Organization could be asked to introduce new tariff lines to capture environmental goods. There may be a need to look into the question of how to deal with agricultural products in the context of the negotiations.

56. The US expert familiarized the participants with a proposal submitted recently by the US to the NGMA, which contains elements concerning both product coverage and modalities for negotiations. According to the US proposal, two lists of environmental goods could be developed. A core list would comprise products on which there was consensus that they constituted environmental goods. A complementary list could be developed for additional products that could have significance for environmental protection, pollution prevention or remediation, and sustainability.

57. Tariffs should be eliminated for all products on the core list as soon as possible but no later than 2010. With regard to the complementary list, Members would be required to eliminate tariffs for a certain (“x”) percent of these tariff lines by 2010. For developing countries, this percentage could be lower in order to reflect the less than full reciprocity provisions.

58. The UNCTAD secretariat circulated a Conference Room Paper (TD/B/COM.1/EM.21/ CRP.1) examining recent patterns of international trade in products on the OECD and APEC lists as well as certain products that, for illustrative purposes, could be considered as EPPs based on product characteristics. However, the secretariat emphasized that trade statistics at the 6-digit level of the HS tend to significantly overestimate trade flows, as many “environmental goods” are “ex” items. The fact that many products listed as “environmental goods” are in fact “multiple use” products aggravates this problem. Some conclusions can nevertheless be drawn (based on trade statistics for the year 2000):

- All developing countries for which trade data are available are net importers of EGs on the APEC list. Only two developing countries (Guinea and Trinidad and Tobago) are net exporters of products

on the OECD list as a result of exports of one or two chemical products (the chemical sector is excluded from the APEC list).

- "Multiple use" products represent a large share of developing countries' trade in products on both lists as is illustrated by the fact that the major export and import items of developing countries are "basket" items.
- Trade data for all regions show that the products on either the APEC or OECD lists represent not more than 3 per cent of exports and not more than 6 per cent of imports of manufactured goods (i.e. products covered by the negotiations in the NGMA). South-South trade may be relatively more important, in particular trade between developing countries in Asia.
- Developing countries as a group are net exporters of 26 of the 182 environmental goods on the APEC and OECD lists.

59. There is a need to identify a larger range of products of export interest to developing countries to work towards a more balanced outcome of the negotiations. At the same time, several experts said that a range of "multiple use" products with predominant industrial, as opposed to environmental, end use should be excluded from any lists of environmental goods. The issue of "multiple use products" is more important to developing countries, which maintain relatively higher tariffs as it could involve the loss of significant tariff revenues without necessarily generating environmental benefits.

60. Experts from several developing countries proposed to include certain categories of EPPs within the scope of the negotiations on environmental goods, while avoiding possible new NTBs and additional costs, e.g. for certification.

61. In particular, proposals have been made to include non-timber forest products; products based on traditional knowledge (TK) and products made from natural fibres such as jute and coir. One expert proposed a list of environmental goods consisting of recycled waste, water products, air-pollution-abatement products, soil-conservation products and products derived from ecosystems.

62. Examples have been given of tariff and non-tariff measures affecting trade in EPPs. Trade in TK-based products is affected by registration requirements, health requirements and "novel food" legislation. In the case of jute and coir, tariffs in developed countries were low for raw materials, but relatively high for manufactured and semi-manufactured goods in some markets. Concern has been expressed that certain packaging requirements could discriminate against jute as a packaging material. In the area of renewable energy products, a case study on solar energy equipment shows that some developing countries have acquired international competitiveness, but tied aid is an obstacle to their exports.

63. Several experts argued for expanding the scope of negotiations beyond the lists of goods to include technology and financing and thereby promote an integrated approach to environmental problems.

64. Most experts are of the view that certain categories of EPPs would be problematic in the context of the WTO negotiations concerning paragraph 31(iii). Examples cited include organic agricultural products and products requiring an eco-label or other form of certification to be identified as EPP. However, this should not detract from the importance of removing obstacles to and promoting exports from developing countries in these products. E.g. in the area of organic agriculture, there is a need to address problems such as standards, certification and subsidies in some developed countries. In this context, references have been made to the WSSD call for actions to "[S]upport voluntary WTO compatible market-based initiatives for the creation and expansion of domestic and international markets for environmentally friendly goods and services, including organic products, which maximize environmental and developmental benefits through, *inter alia*, capacity-building and technical assistance to developing countries."

65. References have been made to the work on EPPs that UNCTAD has been carrying out for several years, although not in the context of the WTO negotiations on environmental goods. It would be useful to review this work. This could be helpful in identifying products and measures that could be covered in negotiations under paragraph 31(iii) and issues that could be addressed more effectively in other WTO bodies dealing with NTBs or through trade promotion measures.

66. UNCTAD, in cooperation with other institutions, could be of assistance, drawing on its work on commodities, BIOTRADE and the International Task Force on Harmonization and Equivalence in Organic

Agriculture, created jointly with the FAO and the International Federation of Organic Agriculture Movements (IFOAM).

EGS AND TECHNOLOGY

67. One of the key interests of developing countries in liberalization of EGS is enhanced access to and effective use of environmentally sound technologies (ESTs). It is however important to take a holistic view of the transfer of ESTs, linking it to investment and access to other sources of funding, licensing of intellectual property rights, availability of skilled staff and other services, such as engineering and construction, as well as support through development co-operation and MEAs. Small and medium sized enterprises, both in developing and developed countries, play a key role in technological development, including cleaner technologies. All these factors underline the importance of policy coherence, both at the national level and international level.

68. Experts have identified three areas, for which transfer and effective use of ESTs would be of particular importance in the next few years: (i) enhancing energy and material efficiency (this includes saving devices and technologies and the use of renewable energy and materials, including biodegradable material); (ii) responding to stringent environmental requirements in export markets (in particular as regards the management of hazardous metals and chemicals and related traceability requirements); and (iii) addressing escalating urban pollution, such as air- and water-borne pollution.

69. Anticipating the entering into force of the Kyoto Protocol in 2003, some sectors in the environmental industry have increasingly identified significant potential for climate change technologies – i.e. technologies that help reduce greenhouse gas emissions. It is expected that the potential expansion path for climate change technologies should initially occur in developed economies. However, the Kyoto Protocol foresees mechanisms by which developing countries should be assisted - primarily through technology transfer and diffusion as well as through the Clean Development Mechanism.

70. Trade liberalization had to cover a broader range of renewable energy goods than current lists indicate and this should also include devices, products, systems and services related to the production, use and maintenance of renewable energy equipment

71. Experts had divergent views on how to address cleaner production technologies in the context of the EGS negotiations. Some experts referred to the difficulties of defining cleaner technologies and classifying them in the HS. "Clean" is a concept of "relative" environmental performance, subject to change in the course of time. Also, many cleaner production technologies are sector specific.

72. In many cases there appears to be a possibility to classify entire technology systems under a single tariff heading. However, more work is needed to find the appropriate tariff headings or to create new ones. In this regard, a proposal was made for a WTO expert committee/group to review classification issues; product coverage; and non-tariff barriers.

73. However, the difference between end-of-pipe and clean technologies should not be exaggerated. For instance, filters, often mentioned as a prime example of end-of-pipe technologies, are also used in clean processes. The problem of "relative" environmental performance could be overcome: (i) by setting up a proper review mechanism for the list of environmental goods; and (ii) by including entire plants or technologies in the list. Such plants and systems are devoid of the multiple-use and the "relativism in time" problems. They are specifically designed and made for environmental purposes; i.e. a recycling plant remains a recycling plant even if the technology of recycling changes substantially. Examples of entire plants that could be covered are numerous: recycling plants, plants for waste management, sulphuric acid recovery plants, plants for co-generation of heat and power. The same approach could apply to entire technology systems, e.g. oil recovery systems.

74. A technology-based approach to the liberalization of trade in EGS could be considered. Such an approach would encompass: (1) traditional environmental technologies; (2) integrated environmental technologies, (3) energy saving devices and technologies; (4) technologies based on renewable energy sources.

75. Many environmental problems, particularly in developing countries, do not require state-of-the-art and proprietary technology; they could rather be addressed through developing management skills, combined with appropriate technology. Second and third best solutions are often not only an efficient, but also an effective way of overcoming environmental and resource management problems. In this regard, endogenous technology solutions are sometimes seen as providing a better match to local environmental problems and therefore merit more attention.

SYSTEMIC ISSUES

76. GATS is an agreement which is still very much in the making. There are a lot of open questions, particularly in the area of rules. E.g. a case has to be made, from a technical point of view, for emergency safeguards. For the moment the WTO Members seem to be trying to design an instrument that has not been fully defined.

77. As regards subsidies, not only have the WTO members not been able to develop disciplines, but also there is no transparency. An exercise in transparency was tried, but only 4 members have responded to the questionnaire. Members negotiate without knowing what subsidies exist and are naturally concerned about opening their markets because they will be absorbing distortions originating in domestic or export subsidies provided by other Members.

78. Discussions on government procurement are still ongoing, and some work has been done on domestic regulations, but more progress is required. Finally, there is no common classification. One major trading partner does not operate within the classification commonly used by other Members. This reduced the legal certainty and may lead to a "roll-back" on commitments made.

79. In the meantime a number of regional integration agreements are being crafted, with a high level of ambition and a negative list on services. Various models are being built, which sometimes lead to agreements on mutual recognition, e.g. in professional services, and chapters on investment, which are also based on a negative list. This puts members of these agreements on one track and creates a "ratcheting effect".

80. It is important to realize though that these regional agreements are essentially "stand-still" exercises. In other words, governments do not make changes to their domestic regulations because of the negotiations, with the exception of countries that have to change their regulatory regimes because of the negotiations on accession to the WTO, as a "price of entry".

81. Environment is a horizontal issue *par excellence*. Public services and private activities cut through the various areas of environmental activities, which are partly public and partly private. And as any other area where there is public interest to tackle, the environmental area cuts across almost every field of the WTO law, which raises questions about the structure of the negotiations.

82. An alternative way to approach the negotiations is to reduce the matter in its vast complexity and redefine the subject of the negotiations in terms of problem areas. Such an approach would obviate the need to define EGS in a more theoretical manner. E.g. if sanitation were to become such an area, the negotiations would have to consider goods and services relevant to this area. Other possible areas are air pollution and the loss of biodiversity, or any other area where developing countries may have a strong interest. A "negotiating package" might include two-three such areas for the ministers to agree at the 5th WTO Ministerial Meeting in Cancun. That would give WTO Members a mandate that is politically balanced.

83. Once a particular sector or sectors are chosen, a number of issues would have to be dealt with. First, reduction or elimination of tariffs on relevant goods would have to be considered as was the case during the Uruguay Round with pharmaceutical, medical and chemical equipment. If (some) members were found to operate excessive standards, there would have to be negotiations on standards. With respect to intellectual property rights (IPRs), Articles VI and VI:2 could be implemented, with developed WTO Members providing incentives to technology transfer. Promoting technology transfer, in practical terms, might raise the question of whether there should be a subsidy programme, which would then lead to negotiations under the Agreement on Subsidies and Countervailing Measures (ASCM). For instance, countries may support, specifically for water and sanitation, the re-introduction of non-actionable subsidies, which is currently being discussed, including the exemption for environmental services. Balancing public services with private input

would require looking into issues relating to government procurement and trade-related investment measures (TRIMs).

84. Arguably, such an approach to dealing with EGS would allow for tailor-made solutions, always with a view to improving the situation in a particular sector, and under the regulatory conditions that they can impose or even negotiate under GATS Article VI. It may eventually lead to an agreement specific to this sector, or it may stay at the level of coordination between different negotiating bodies and agendas. In any case, the CTE special session would have a unique role to play in terms of communicating these various agendas to other negotiating bodies.

85. Liberalization efforts in the WTO should be considered in connection with possibilities to finance these efforts. Besides, there are constraints on the supply side, to which the WTO is ill equipped to respond. No institutional linkages have been established between the negotiations and all the different fora that deal with development finance and assistance. Rather than working along the lines of the past, there is need to find new modalities, channel the problems institutionally to ensure that liberalization efforts at the WTO are commercially, financially and technically viable.

86. Several experts highlighted the importance of Multilateral Environmental Agreements (MEAs) for fostering EGS markets. MEAs can harmonize EGS markets and related policies. They can contribute to better policy coherence, both at national and international level and, through packages of supportive measures, can facilitate access, transfer and effective use of ESTs. The Montreal Protocol was referred to as one of the most successful accords in this regard.

87. The liberalization of trade in EGS is not going to be automatic just because they can be defined as environmental. Any progress on EGS will depend on progress on other negotiating agendas. Meetings such as this expert group may help bring to the surface the needs of various countries, better define public policies and negotiating objectives and help the negotiations along.

STRENGTHENING CAPACITIES IN DEVELOPING COUNTRIES

88. Many experts emphasized the need for capacity building and expressed appreciation for UNCTAD's efforts to assist developing countries in issues related to EGS, including through the promotion of policy dialogues and studies. Several experts presented their national experiences based on activities carried out under the project on *Building Capacity for Improved Policy Making and Negotiations on Key Trade and Environment Issues*, including a regional meeting held in Cuba (March 2003) and national workshops in Managua (June 2003) and Panama (June 2003). Similarly, the results of a seminar on liberalization in EGS held in New Delhi (May 2003) under the project on *Strategies and Preparedness for Trade and Globalization in India* (including a range of papers) were made available to the expert meeting. Both projects are funded by the UK Department for International Development.

89. The UNCTAD secretariat has addressed issues relating to EGS in WTO regional seminars and events held in conjunction with these seminars under the UNEP-UNCTAD Capacity Building Task Force on Trade, Environment and Development (CBTF).

RECOMMENDATIONS

90. Discussions among experts lead to the following recommendations to be pursued at appropriate levels.

National level

90. Several recommendations made at the meeting referred to possible action at the national level.

- Development of a list of environmental goods that reflects the country's sustainable development and trade interest;

- Implementation of policies and measures that translate environmental, human health and resource management needs into demand for EGS;
- Coordination among all relevant policy contexts to ensure an integrated approach to the development of the various EGS sectors and trade liberalization;
- Detailed knowledge of regulations is key to negotiations. National trade negotiators therefore need to know what regulators know and *vice versa*;
- There is need to sequence regulatory consolidation and liberalization.

International community

91. Several issues raised at the expert meeting would require action by the international community.
- There needs to be more work on developing consensus on the classification of environmental services.
 - Greater importance should be given to developing practical approaches to compiling a list of environmental goods and related criteria for negotiations purposes.
 - It is important to choose the right forums for advancing the various segments of the EGS agenda.
 - Greater policy coherence is required between provisions on EGS in bilateral and regional trade agreements and the multilateral trading system as well as with policies of international financial institutions and development assistance bodies on EGS.
 - Greater coherence will also be required between the various areas of ongoing WTO negotiations and discussions, notably in the areas of non-agricultural and agricultural products, services, TBT, subsidies and countervailing measures, TRIPS, TRIMs and government procurement.
 - There is a need to promote coherence with instruments of relevant MEAs.
 - More in-depth discussion is required on the relationship between transfer of environmentally sound technologies and trade liberalization of EGS.

UNCTAD

92. There are a number of ways in which UNCTAD could assist developing countries and countries in transition in the area of EGS:
- Provide assistance to developing countries in organizing national policy dialogues and undertaking analytical and empirical studies, including the development of methodologies, with a view to clarifying issues related to the liberalization of trade in environmental services.
 - Assist, on request, developing countries in compiling lists of environmental goods that reflect their trade, environmental and developmental priorities.
 - Submit a report to the CTE Special Session on key issues of interest to developing countries in the context of paragraph 31 (iii) of the Doha Ministerial Declaration.
 - Contribute to the clarification of issues related to the transfer of environmentally sound technologies and trade in EGS.
 - Continue to assist interested developing countries in issues related to EGS and/or the promotion of exports of EPPs through appropriate capacity-building activities such as CBTF, the project on Improved Policy Making and Negotiation on Key Trade and Environment Issues and the BIOTRADE Initiative.

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