15. BIOLOGICAL DIVERSITY

I. Introduction

1. All life on earth is part of one great, interdependent system. It interacts with and depends on the non-living components of the planet such as atmosphere, oceans, freshwaters, rocks and soils.

2. Biological diversity is the variety of life in all its forms, levels and combinations. It represents the variability within and among all ecosystems, species and genetic material. Biodiversity is thus an attribute to life, in contrast to "biological resources," which are tangible biotic components of ecosystems. The breadth of the concept reflects the interrelatedness of genes, species and ecosystems. Biodiversity forms the web of life of which human beings are an integral part and upon which they so fully depend.

3. The term biodiversity covers several interrelated aspects. Generally, biodiversity is understood in terms of the wide variety of plants, animals and micro organisms. Biodiversity, however, also includes genetic differences within each species such as, between varieties of plants and breeds of animals. Chromosomes, genes, and DNA, the building blocks of life, determine the uniqueness of each individual and each species. Yet another aspect of biodiversity is the variety of ecosystems such as those that occur in deserts, forests, wetlands, mountains, lakes, rivers, and agricultural landscapes. In each ecosystem, living creatures, including humans, form a community, interacting with one another and with the air, water, and soil around them.

4. Scientists estimate that the number of species, including insects and microorganisms is about 12 million. This diversity of species has emerged through genetic mutation and expansion into new niches over the past 4.5 billion years. Only towards the end of this period did more complex organisms and further significant specification occur. These events are still to be studied but it appears that they have generated the range and dimensions of today's biodiversity. It is thought to be unlikely that further specification will occur, which supports the belief that biodiversity in present times is at its maximum. Therefore, biodiversity must be regarded as a non-renewable resource, whose potential loss would be irreplaceable and could never be reproduced through modern technologies. Biodiversity is therefore valuable not only for the sake of variety itself but also as an output of a four billion years old process of evolution. As a result, biodiversity has fine-tuned resilience to physical conditions and the ability to adapt to changing circumstances. It thus acts as a buffer against future dangers to life supporting ecosystems.

II. International Framework

The Problem

5. The human race had 850 million members when it entered the industrial age sharing the planet with a biodiversity as large as the planet has ever possessed. Today, the world population is nearly eight times as large; and resource consumption and utilisation of biological resources is far greater. Due to human activities, species and ecosystems are more threatened than ever before in recorded history. The losses are taking place in tropical forests, which host 50% to 90% of identified life species, but also in rivers, lakes, deserts and temperate forests, on mountains and islands. (For marine biodiversity, see chapter 17).

6. While the extinction of species and their habitats and the destruction of ecosystems are an ecological tragedy, they also have profound implications for economic and social developments because of the goods and services they provide. Estimates are that at least 40% of the world's economy and 80% of the needs of people in developing countries are derived from biological resources. The loss of the diversity of life diminishes the chances for medical discoveries, economic development and adaptive responses to challenges such as climate change.

7. "Goods and services" provided by ecosystems include:

   - Food, fuel and fibre;
   - Shelter and building materials;
   - Purification of air and water;
   - Detoxification and decomposition of wastes;
   - Stabilization and moderation of the Earth's climate;
   - Moderation of floods, droughts, temperature extremes and the forces of wind;
   - Generation and renewal of soil fertility, including nutrient cycling;
   - Pollination of plants, including many crops;
   - Control of pests and diseases;
   - Maintenance of genetic resources as key inputs to crop varieties and livestock breeds, medicines and other products;
   - Cultural and aesthetic benefits; and
   - Ability to adapt to change.

8. The loss of biodiversity often reduces the productivity of ecosystems, thereby shrinking nature's basket of goods and services. It destabilizes ecosystems, and weakens their ability to deal with natural disasters such as floods, droughts and hurricanes, and with human-caused stresses, such as pollution and climate change. Already, we are spending huge sums in response to flood and storm damage exacerbated by deforestation. Such damage is expected to increase due to global warming.

9. The reduction in biodiversity also hurts in other ways. Cultural identity is deeply rooted in the biological environment. Plants and animals are symbols of the human's world, preserved in flags, sculptures and other images that define humans and human societies. Biodiversity represents a very high economic and social value for local communities and indigenous peoples, who depend on their environment for food, medicines and shelter. Indigenous cultures are often deeply rooted in the belief that the spiritual world resides in nature. This worldview implies a deep respect for the natural world and provides guidance on its use. Thus, degradation of the environment and national biodiversity severely threatens the lifestyles and cultural heritage of indigenous and local communities.

10. Early international treaties addressed specific aspects and components of biodiversity. At the global level, the Convention concerning the Protection of the World Cultural and Natural Heritage, 1972 ("WHC") covers internationally important natural and cultural sites. The specific threat of trade in endangered species is addressed by the 1973 Convention on International Trade in Endangered Species of Wild Fauna and Flora. A specific ecosystem type, namely wetlands, is protected through the 1971 Convention on Wetlands of International Importance Especially as Waterfowl Habitat ("Ramsar Convention"), and a category of species, migratory species, is protected through the 1979 Convention on the Conservation of Migratory Species of Wild Animals . In addition, there are various regional conventions on the conservation of aspects of nature and natural resources such as the 1979 Convention on the Conservation of European Wildlife and Natural Habitats; the 1976 Convention on the Conservation of Nature in the South Pacific; the 1968 African Convention on the Conservation of Nature and Natural Resources (since revised in 2003); the 1982 Protocol concerning Mediterranean Specially Protected Areas; the 1985 ASEAN Agreement on the Conservation of Nature and Natural Resources; and the 1986 Convention on the Protection of the Natural Resources and Environment of the South Pacific. However, in the late 1980s and early 1990s, it became apparent, that all these conventions together could not ensure global conservation of biodiversity. Their sectoral and regional nature resulted in considerable gaps in coverage. A more comprehensive and global approach was deemed necessary to address the continuing loss of biological diversity. These concerns led to the adoption of the Convention on Biological Diversity. This Manual has, in several chapters, discussed different aspects of the above named instruments, for example, chapters 14 and 17.

11. This chapter will first deal with the framework of the Convention on Biological Diversity including access to genetic resources and benefit sharing, and subsequently, discuss the interrelation between the Convention and other relevant international legal regimes, such as the Agreement on Trade Related Aspects of Intellectual Property Rights of the World Trade Organization.

1. The Convention on Biological Diversity

12. The Convention on Biological Diversity ("CBD" or "Convention") was adopted in 1992, and subsequently opened for signature in Rio de Janeiro during the 1992 United Nations Conference on Environment and Development. The adoption of the Convention represented a major breakthrough after lengthy negotiations over more than three years, under the auspices of UNEP whose Governing Council initiated the process in 1989, building upon preparatory work undertaken by IUCN/World Conservation Union.

13. During the negotiations, developing countries envisaged the proposed convention as an opportunity to gain access to technology, financial resources and markets and to promote sustainable economic development. They proposed the establishment of a special system of intellectual property rights, a mechanism for compensating them for access to and the utilization of genetic resources provided by their countries, and mechanisms that would facilitate their access to biotechnology developed through the utilization of these genetic resources. A group of industrial countries was strongly opposed to many of these proposals. They argued that loosening intellectual property rights would threaten and constrain the development of biotechnology and undermine the protection of innovations. The final text of the Convention included many of the proposals made by the developing countries but omitted several substantive proposals on which no agreement could be reached.

14. Issues that could not be agreed upon included the precautionary principle, which is now only referred to in the Preamble, a consolidated intellectual property rights regime, liability and redress for damage to biodiversity and a compilation of global lists of protected areas and species.

15. The Convention is the first international treaty to take a holistic, ecosystem-based approach to the conservation and sustainable use of biological diversity. It is a framework instrument laying down broad goals, key objectives and general principles which are to be operationalized through concrete measures and actions at the national level on the basis of guidance, *inter alia*, provided by the decisions of the Conference of the Parties ("COP") to the Convention. The Preamble sets out the ethical and socio-economic underpinnings of the Convention. These include the intrinsic, ecological and anthropocentric value of biological diversity and its components; the status of biological diversity as a common concern of humankind; the current rate of biodiversity loss due to human activities; and the imperatives of intra- and inter-generational equity.

16. The Convention stipulates in article 1 its three main objectives:

    - The conservation of biological diversity;
    - The sustainable use of the components of biological diversity; and
    - The fair and equitable sharing of the benefits arising out of the utilization of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding.

17. The second and third objectives are a clear departure from preceding international biodiversity-related agreements, which were predominantly concerned with conservation. An important aspect of the negotiation of the Convention was the realization that biodiversity rich countries needed to exploit their biological resources for development purposes as well as benefit from the commercial utilization of their genetic resources. Articles 6 to 21 of the Convention set goals, establish general principles, and define measures and mechanisms necessary for the realization of the three objectives.

Major Components

a) General Principles and Concepts

18. The Convention establishes a number of general principles in its preamble and operative provisions. Chapter 3 above discusses some of the general principles outlined below. These principles are calculated to guide and inform action at the national and international levels.

19. Both the preamble and article 3 of the Convention affirm the sovereign right of states over their own biological resources. This provision was a direct reaction to the attempt by developed countries to subsume biodiversity under the common heritage of mankind principle which had been applied to mineral resources in the deep seabed beyond national jurisdiction under the 1982 United Nations Convention on the Law of the Sea ("UNCLOS"). This would have had serious implications regarding the ownership of biological resources within the national jurisdiction of states. However, while affirming national sovereignty over resources, the preamble also underlines the responsibility of states to conserve and sustainably use their biological diversity.

20. Article 3 of the Convention provides that states have the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or of areas beyond the limits of national jurisdiction. The general principle of international law that states are under an obligation to protect, within their own territory, the rights of other states to territorial integrity and inviolability has been progressively extended over the years through state practice and judicial decisions to cover transboundary environmental harm. The general obligation upon states with respect to transboundary environmental harm was reaffirmed in principle 2 of the 1992 Rio Declaration where it is asserted that "States have ... the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or of areas beyond the limits of national jurisdiction." It is this principle that has been restated in article 3 of the Convention. By virtue of this provision, the international responsibility of a state will consequently be engaged in those cases where activities within its jurisdiction or control causes damage to the biological diversity of another state or of areas beyond the limits of national jurisdiction.

21. The preamble affirms that the conservation of biological diversity is a "common concern of humankind." In contrast to the "common heritage of mankind" doctrine, this concept has less implications. States have sovereign rights over their biological resources. However, given the universal value of biological diversity, the global community has certain responsibilities regarding its stewardship.

22. The preamble states that the contracting parties to the Convention are determined to conserve and sustainably use biological diversity for the benefit of present and future generations. The principle of inter-generational equity was first authoritatively articulated in principle 2 of the 1972 Stockholm Declaration and has been reaffirmed in principle 3 of the 1992 Rio Declaration. Equity within and between generations in the use of biological resources is an important underlying postulate of Convention and is implicit in a number of provisions dealing with the rights of local and indigenous communities, access to genetic resources and benefit-sharing, and conservation and sustainable use of biological diversity.

23. There are considerable scientific uncertainties regarding environmental consequences of human production and consumption activities. This uncertainty arises because of gaps in scientific knowledge with respect to the nature and the linkages within the ecosystem and the interplay between ecological factors and socio-economic activities. The precautionary principle articulated in article 15 of the 1992 Rio Declaration demands action in cases of significant risk even where complete scientific evidence regarding probable environmental consequences may be lacking. The preamble to Convention consequently provides that "...where there is a threat of significant reduction or loss of biological diversity, lack of full scientific certainty should not be used as a reason for postponing measures to avoid or minimize such a threat."

b) Measures for Conservation and Sustainable Use

24. In article 6, the Convention provides that parties shall develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity and endeavour to integrate the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies. National Biodiversity Strategies and Action Plans ("NBSAPS") have been developed by over 100 countries since the adoption of the Convention and have become the primary tool at the national level for its implementation. Indeed, a central strategic goal of the Strategic Plan of the Convention adopted by the COP at its sixth meeting is to ensure that NBSAPS and the integration of biodiversity concerns into relevant sectors serve as an effective framework for the implementation of the objectives of Convention.

25. Identification of components of biological diversity and monitoring their conservation status is an important first step in the establishment of measures for conservation and sustainable use. Article 7 of the Convention, therefore, requires parties to identify components of biodiversity important for conservation and sustainable use and to monitor the components so identified, paying particular attention to those requiring urgent conservation measures and those with potential for sustainable use. In addition, parties are required to identify and monitor processes and activities, which may have significant adverse impacts on conservation and sustainable use of biodiversity.

26. Annex I to the Convention contains indicative lists for the identification and monitoring of ecosystems, species, communities and genes and genomes of social, scientific and economic importance.

27. Articles 8 and 9 set out the main conservation commitments under the Convention. Parties are required to meet specific goals relating to *in-situ* and *ex-situ* conservation. "*In-situ* conservation" is defined in article 2 as the conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings. The *in-situ* conservation commitments outlined in article 8 include, among others, the following:

- The establishment of a system of protected areas;
- The development of guidelines for the selection, establishment and management of protected areas;
- The regulation or management of biological resources important for the conservation of biological diversity within or outside protected areas, with a view to ensuring their conservation and sustainable use;
- The promotion of the protection of ecosystems, natural habitats and the maintenance of viable populations of species in natural surroundings;
- Promotion of environmentally sound and sustainable development in areas adjacent to protected areas with a view to furthering the protection of these areas;
- The rehabilitation and restoration of degraded ecosystems and the recovery of threatened species;

- Management and control of risks associated with living modified organisms resulting from biotechnology;
- Prevention, control and eradication of alien invasive species;
- The respect, preservation and maintenance of traditional biodiversity-related knowledge; and,
- The development of appropriate legislative and regulatory frameworks.

28. *Ex-situ* conservation is defined as the conservation of components of biological diversity outside their natural habitats. Article 9 specifies the main *ex-situ* conservation commitments, including:

- Adoption of measures for *ex-situ* conservation of components of biological diversity, preferably in the country of origin of such components;
- Establishment and maintenance of facilities for *ex-situ* conservation of and research on plants, animals and microorganisms;
- Adoption of measures for the recovery and rehabilitation of threatened species and for their reintroduction into their natural habitats;
- Regulation and management of collection of biological resources from natural habitats for *ex-situ* conservation; and,
- Cooperation in the provision of financial and other support for *ex-situ* conservation.

29. Sustainable use is defined in article 2 of the Convention as "...the use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations." The main sustainable use commitments are outlined in article 10, including:

- Integrating consideration of the conservation and sustainable use of biological resources into national decision-making;
- Adopting measures relating to the use of biological resources to avoid or minimize adverse impacts on biological diversity;
- Protecting and encouraging customary use of biological resources in accordance with traditional cultural practices that are compatible with conservation or sustainable use requirements;
- Supporting local populations in developing and implementing remedial action in degraded areas where biological diversity has been reduced; and
- Encouraging cooperation between governmental authorities and its private sector in developing methods for sustainable use of biological resources.

c) Access to Genetic Resources and Benefit Sharing

30. The third objective of the Convention, the fair and equitable sharing of benefits arising from the use of genetic resources, is of particular importance to developing countries. They hold most of the world's biological diversity but feel that, in general, do not obtain a fair share of the benefits derived from the use of their resources for the development of products such a high-yielding crop varieties, pharmaceuticals and cosmetics. Such a system reduces the incentive for the world's biologically richer but economically poorer countries to conserve and sustainably use their resources for the ultimate benefit of mankind.

31. The issue of Access and Benefit-Sharing ("ABS") was one of the central themes during the negotiations of the Convention whose substantive provisions on ABS are contained in article 15 (access to genetic resources); article 16, paragraph 3 (access to and transfer of technology that makes use of genetic resources); and article 19, paragraph 1 (participation on biotechnological research on genetic resources) and paragraph 2 (access to results and benefits from biotechnologies). These provisions address both providers and users of genetic resources and also outline the basic goals and elements of an ABS regime under the Convention.

32. Article 15 of the Convention addresses the terms and conditions for access to genetic resources and benefit sharing. The provisions of the Convention apply only to genetic resources, which are provided by parties that are countries of origin of such resources or by parties that have acquired the genetic resources in accordance with the Convention. In effect, these provisions do not apply to genetic resources acquired prior to the entry into force of the Convention.

33. Article 15 recognizes the sovereign rights of states over their natural resources and provides that the authority to determine access to genetic resources rests with the national governments and is subject to national legislation. It also establishes a number of principles and the conditions governing access to genetic resources and benefit-sharing. These are:

- Parties shall endeavour to create conditions to facilitate access to genetic resources and shall not impose restrictions that run counter to the objectives of the Convention;
- Access, where granted, shall be on mutually agreed terms;
- Access to genetic resources shall be subject to the prior informed consent of the contracting party providing such resources;
- Scientific research on genetic resources

provided by other contracting parties shall be undertaken with the full participation of such parties and, where possible, in the territory of such parties; and

- Parties shall take legislative, administrative or policy measures to ensure the fair and equitable sharing of the results of research and development and the benefits arising from the commercial and other utilization of genetic resources with the contracting party providing such resources; and benefit-sharing shall be on mutually agreed terms.

34. Article 19 of the Convention provides for participation in biotechnological research by countries providing genetic resources and the sharing of benefits arising from the utilization of genetic resources in such research and development. It also contemplates the negotiation of and adoption of a protocol that sets out appropriate procedures, including, in particular, advance informed agreement in the field of safe transfer, handling and use of any Living Modified Organisms ("LMOs") resulting from biotechnology that may have adverse effect on the conservation and sustainable use of biological diversity. The Cartagena Protocol on Biosafety was subsequently adopted in January 2000.

35. Although the Convention entered into force in 1993, it was not until 1999 that work began in earnest to further develop and operationalize its general principles and broad objectives. COP-5 established the "Ad Hoc Open-Ended Working Group on Access and Benefit-Sharing" to develop guidelines and other approaches concerning access to genetic resources and benefit-sharing. The "Bonn Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits arising out of their Utilization" ("Bonn Guidelines") were adopted by COP-6 in 2002. The policy choice made by COP-6 to develop international guidelines for ABS was a pragmatic step. Legislative and policy developments in most countries are largely in their embryonic stages. International guidelines would, therefore, greatly assist governments in developing effective national and regional ABS regimes. Also, the political sensitivity of the issue and the lack of political consensus on a number of outstanding items had an influence on any global ambition for the development of a legally binding instrument at that stage. It should be noted, however, that the development of a number of multilateral environmental agreements has been preceded by the adoption of international non-binding regimes.

36. Indeed, COP-7 mandated the Working Group to elaborate and negotiate an international regime on access to genetic resources and benefit-sharing with the aim of adopting an instrument/instruments to effectively implement the provisions in articles 15 and 8(j) of the Convention and its three objectives.

The Bonn Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits arising out of their Utilization

37. The 2002 Bonn Guidelines establish detailed procedures to facilitate access to genetic resources and the fair and equitable sharing of benefits on the basis of the 'prior informed consent' of the country providing genetic resources and on 'mutually agreed terms'. The Guidelines provide guidance to parties in the development of benefit sharing regimes and arrangements while promoting capacity building, transfer of technology and the provision of financial resources.

38. Although compliance with the Guidelines is voluntary, they provide the first widely accepted criteria for national licensing of access to genetic resources and the sharing of benefits arising from the utilization of genetic resources. The Guidelines should assist parties, governments and other stakeholders in developing an overall access and benefit-sharing strategy, and in identifying the steps involved in the process of obtaining access to genetic resources and benefit-sharing. More specifically, the Guidelines are meant to assist parties, governments and other stakeholders when establishing legislative, administrative or policy measures on access and benefit-sharing and/or when negotiating contractual arrangements for access and benefit-sharing. The Guidelines are structured as follows:

- Section I on General Provisions covers key features, use of terms, scope, relationship with relevant international regimes and the objectives of the guidelines;
- Section II deals with the role of the national focal point and competent national authority(ies), and responsibilities of parties and stakeholders that are users and providers of genetic resources;
- Section III addresses the participation of stakeholders in the development and implementation of access and benefit-sharing arrangements;
- Section IV covers steps in the process of access and benefit-sharing, including prior informed consent and mutually agreed terms;
- Section V covers other provisions, such as incentives, accountability, monitoring and reporting, verification, dispute settlement and remedies;

- Appendix I contains suggested elements for Material Transfer Agreements; and
- Appendix II provides an illustrative list of monetary and non-monetary benefits.

39. A few issues covered by the Guidelines are still outstanding and may require further clarification. They include the use of terms, the scope of guidelines with respect to products and derivatives and stakeholder involvement.

40. Some of the key features of the Guidelines that will contribute towards the effective implementation by parties, governments and other stakeholders of the relevant provisions of the Convention related to access to genetic resources and benefit-sharing include:

- The definition of the roles and responsibilities of national authorities and of users and providers in the implementation of ABS arrangements: for example, competent national authorities are responsible for granting access in accordance with national legislative, administrative or policy measures and for advising on the requirements for obtaining prior informed consent.
- The participation of stakeholders in the development and implementation of ABS arrangements: the Guidelines recognize that the involvement of relevant stakeholders is essential to ensure the adequate development and implementation of access and benefit-sharing arrangements. However, in view of the diversity of stakeholders and their diverging interests, the nature and level of involvement of different stakeholders remains an issue that will require further clarification and development at the national level.
- The identification of steps in the access and benefit-sharing process: the guidelines re-emphasize the obligation to seek Prior Informed Consent ("PIC") established under article 15 of the Convention. In addition, however, the Guidelines have endeavoured to clarify and define the necessary steps in the ABS process that would facilitate compliance with this basic obligation, and identified the basic principles and elements of PIC, the national entities granting PIC, the procedures for obtaining PIC, and other elements of PIC to be taken into consideration when establishing access and benefit-sharing arrangements.
- The identification of basic requirements for mutually agreed terms: the Guidelines describe the basic requirements and elements of mutually agreed terms and benefit-sharing, to be considered as guiding parameters in contractual agreements and benefit-sharing arrangements.
- The identification and establishment of measures for the implementation of the Guidelines and ABS arrangements: the Guidelines address the issue of the type of incentives necessary to ensure effective implementation by parties, Governments and other stakeholders. Other issues of particular concern to provider countries with respect to implementation, such as mechanisms to promote the accountability of all stakeholders, national monitoring and reporting of access and benefit-sharing arrangements, means for verification of compliance with the relevant provisions of the Convention, the settlement of disputes and remedies in cases of violation of national measures implementing the relevant provisions of the Convention are also addressed.

d) Access to and Transfer of Technology

41. Access to and transfer of technology is considered in the Convention, as is the case with other post-Rio multilateral environmental agreements, as one of the critical elements for its effective implementation. The Convention expressly recognizes the role that technology transfer and cooperation can play in the realization of its three objectives and is conceived as part of the positive measures to facilitate the effective implementation of the Convention. Issues relating to technology transfer and cooperation are addressed in articles 16, 18 and 19 of the Convention. In addition, issues regarding training and research considered so essential to establishing national capacities to absorb technologies are addressed in article 12 of the Convention.

42. The basic obligation of all parties regarding access to and transfer of technology is set out in article 16(1), which provides that each contracting party "...undertakes…to provide and/or facilitate access for and transfer to other Contracting Parties of technologies that are relevant to the conservation and sustainable use of biological diversity or make use of genetic resources and do not cause significant damage to the environment." The obligation established has a number of important aspects. First, its scope is limited to the categories of technologies specified: that is, technologies relevant to the conservation and sustainable use of biological diversity or that make use of genetic resources. Second, the wording of the paragraph provides flexibility in the manner in which parties can implement it depending on each concrete situation. Parties can "provide and/or facilitate"

access for and transfer of technologies to other parties. This is a necessary and important latitude since for technologies subject to intellectual property rights, parties would have very limited leverage on the private sector to affect transfer. In this regard, therefore, parties can only facilitate transfers through such measures as providing appropriate incentives to the private sector. On the other hand, for technologies in the public domain, a party could directly provide access for and transfer to another party.

43. There are a number of other conditions regarding technology transfer established under article 16. First, under article 16(2), "Access to and transfer of technology...to developing countries shall be provided and/or facilitated under fair and most favourable terms, including on concessional and preferential terms where mutually agreed, and, where necessary, in accordance with the financial mechanism established by Articles 20 and 21..." It would appear that the Convention requires developed country parties to ensure that the terms under which developing country parties' access technologies are fair and most favourable. This would seem to suggest that access to and transfer of technology would be on terms other than those established by the international technology market. How this is to be ensured by parties in cases of proprietary technology, that is, technologies subject to intellectual property rights, is an issue that will need to be further addressed by the COP. However, the paragraph makes an important linkage with the Convention's financial mechanism: it is clear that the resources available through the mechanism could be used to facilitate access to and transfer of proprietary technology to developing countries.

44. Second, in the case of technology subject to patents and other intellectual property rights, access and transfer shall be provided on terms that recognize and are consistent with the adequate and effective protection of intellectual property rights (article 16(2)). In effect, access to and transfer of proprietary technology is made subject to the existence of adequate and effective protection of intellectual property rights. This provision would seem to require that recipient countries have in place adequate and effective domestic intellectual property rights regimes. To what extent strong national intellectual property rights regimes facilitate the transfer of technology is an issue that is currently subject to intense international debate.

45. Third, parties are required to "...take legislative, administrative or policy measures...with the aim that Contracting Parties, in particular those that are developing countries, which provide genetic resources, are provided access to and transfer of technology which makes use of those resources, on mutually agreed terms, including technology protected by patents and other intellectual property rights, where necessary, through the provisions of Articles 20 and 21 and in accordance with international law (article 16(3))..." The obligation is imposed on user-countries to establish an enabling legal and policy environment for access to and transfer of such technology to countries, which provide genetic resources. This is important to ensure the effective implementation of the third objective of the Convention relating to the fair and equitable sharing of benefits arising from the utilization of genetic resources.

46. Last, parties are required to "...take legislative, administrative or policy measures...with the aim that the private sector facilitates access to, joint development and transfer of technology...for the benefit of both governmental institutions and the private sector of developing countries..." (article 16(4)). The vast amount of global technology is owned by the private sector of developed countries. Developed country parties are therefore required to play a facilitative role through legislative and policy development that would act as an incentive to their private sector actors to provide access to and transfer of technology to developing countries.

47. There are a number of other provisions in the Convention that are relevant to technology transfer. Article 18 on technical and scientific cooperation requires parties to promote international cooperation in the field of conservation and sustainable use of biological diversity and to develop methods of cooperation for the development and use of technologies, including indigenous and traditional technologies and to promote the establishment of joint research programmes and joint ventures for the development of technologies relevant to the objectives of the Convention. Article 19 on biotechnology requires parties to establish "...legislative, administrative or policy measures to provide for the effective participation in biotechnological research activities by the Contracting Parties, especially developing countries, which provide the genetic resources for such research..." and to "...take practicable measures to promote and advance priority access on a fair and equitable basis by Contracting Parties, especially developing countries, to the results and benefits arising from biotechnologies based upon genetic resources provided..."