

SUSTAINING LIFE AND HUMAN WELL-BEING ON EARTH THROUGH CONVENTION ON BIOLOGICAL DIVERSITY

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I. INTRODUCTION

Life arose on this planet about 3.7 billion years ago. Each species here today is the product of hundreds of millions of years of evolutionary process. Life is wonderful because it is diverse and complex. Life exists in many forms: plant range from grass to giant trees and animals from tiny worms and insects to elephants and whales; life is found everywhere, from the depths of oceans to the tops of mountains and from arid deserts to tropical rainforests. From a purely utilitarian view, life is represented in forms that can be both benign (e.g. periwinkle, which yields a life-saving drug) and malignant (e.g. curare, a deadly poison). It is this wide range that makes up biodiversity or biological diversity, which is defined as “the variability among living organisms from all sources, including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems”.¹

This variation occurs at several levels—those of genes, species, and ecosystems. Species diversity refers to the variety of species within a region; genetic diversity refers to the variation of genes within species. The complexes of species, interacting together and with the physical environment they inhabit, create the diversity of ecosystems found around the planet.² Genes, species, and ecosystems are all components of biological diversity. These components, which constitute the totality of biological resources of the Earth, or of a given region, are of fundamental importance to human beings from the ecological and economic as well as aesthetic points of view.³

The interdependence and co-existence of various life forms maintain the balance of nature. The rich biodiversity of any habitat is a gift to man by

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¹ Article 2, U.N. Convention on Biological Diversity.

² Donna G. Craig Nicholas A. Robinson Koh Kheng-Lian, CAPACITY BUILDING FOR ENVIRONMENT LAW IN THE ASIA AND PACIFIC REGION, Vol.-II, (Asia Development Bank, 2002) at 607.

³ See <http://www.biodiv.org/doc/publications/guide.asp?id=web> visited on 21st February, 2005.

Mother Nature and is based on optimal sustainable use of its life-support system. Each species is of potential value to humans. So are healthy ecosystems. The global collection of genes, species, habitats and ecosystems is a resource that provides for human needs now, and is essential for human survival in the future. Each species is unique and has a right to exist. Each species is worthy of respect regardless of its worth to human beings. This was recognised in the 'World Charter for Nature', adopted by the United Nations in 1982. Each species and ecosystem adds to the richness and beauty of the Earth. Once a species becomes extinct, it is gone forever. A natural system once destroyed is impossible to recreate. The value people attribute to the aesthetic function of nature is partly reflected in the number of people who visit areas of natural beauty.

Regulatory mechanisms for the conservation of biological resources and the uninterrupted provision of the services they render to human beings are not new; rules concerning the taking of animals and the collection of plants are as old as the human communities using them; those rules, however, evolved in parallel to the knowledge and understanding of the complexity of relationships and processes which exist within nature. Thus, nationally, the evolution has been toward creating regulatory mechanisms that approach their specific aims (e.g., the use of a particular population of plants or animals) in the context of ecological unit management. The rationale for internationally agreed regulatory mechanisms has also evolved, originally only based on the need to cooperate bilaterally, regionally or globally whenever unilateral measures are not sufficient to achieve the conservation of specific populations or ecosystems either because: the species or ecosystems concerned are outside any area under national jurisdiction; or they are distributed across national boundaries (shared resources); or they are threatened by factors that originate in other states (transboundary threats).⁴

It is based on this rationale that a number of early treaties on terrestrial and aquatic resources uses have been concluded; only exceptionally did this rationale justify action at global level, for regulating such activities as fishing on the high seas or international trade in endangered species.⁵ It is only relatively late that the need for concerted global action has been recognized, first in two specific instances: for one ecosystem, particularly as a habitat type e.g. the Convention on Wetlands of International Importance, Especially as Waterfowl Habitat, held at Ramsar, 1971,⁶ and for sites with exceptional

⁴ *Supra* n. 2.

⁵ *Ibid.*

⁶ 11 INTERNATIONAL LEGAL MATERIALS, 1972 at 963. The convention entered into force on 21st December, 1975. India acceded the Convention on 1st October, 1981.

global values e.g. the Convention for the Protection of the World Cultural and Natural Heritage concluded at the general conference of the UNESCO, Paris in 1972.⁷ These two texts marked an essential step in the evolution of international biodiversity law, as they recognized a common interest of the international community as a whole in the unilateral, but concerted, conservation of specific components of biological diversity, dispersed throughout the world.

The way was paved for the recognition that biological diversity as a whole is a common concern of humanity, and that inspite of - or, more logically, because of - the sovereign rights of states over its constituent components, they have a duty to cooperate in achieving the conservation of biological diversity, as well as an individual responsibility to conserve and use sustainably the biodiversity components on which they exercise such rights. This was done with the adoption of the 1992 Convention on Biological Diversity.⁸ The Biodiversity Convention covers a vast and complex area of concern and makes a landmark beginning in international efforts to protect and conserve the astounding biological diversity of the world. The Convention can be hailed as a landmark from several points of view. It is the first time that biodiversity, as such, is comprehensively addressed, and the first time that genetic diversity is specifically covered in a binding global treaty. It is also the first time that the conservation of biodiversity is recognized as the common concern of humankind. By including issues of access and use of genetic resources, as well as technology transfer and biosafety, the Convention demonstrates a will to address all aspects of biodiversity. By creating a mechanism to provide funds to developing countries to help them implement the Convention, the need for new and additional resources to flow from North to South is also addressed.

The Convention is of particular interest to developing countries like India, where the greatest biodiversity is to be found as it provides a legal framework by which they could benefit from the exploitation of their biological resources. Conservation of biological diversity is essentially vital to the future of mankind because it can maintain sound and healthy environment, and meet the needs of present and future generations too. An attempt has been made in this paper to highlight the nature and value and of biodiversity components

⁷ 11 INTERNATIONAL LEGAL MATERIALS, 1972 at 1358. The convention entered into force on 17th December 1975. India signed the Convention on 16th November 1972.

⁸ 31 INTERNATIONAL LEGAL MATERIALS, 1992 at 818. The Convention entered into force on 29 December 1993. India signed the Convention on 5th June 1992 and ratified on 18th February 1994.

for sustaining life on this planet and need for the protection, conservation and sustainable use of biological resources and also the legislative efforts made by the Biodiversity Convention to preserve this biological wealth for humankind.

II. THE NATURE AND VALUE OF BIODIVERSITY COMPONENTS

While extinction of some species and evolution of new ones are a part of the natural process of evolution, these two processes occurred at a roughly equal rate over most of the history of life on Earth. But the rate of extinction has outstripped the rate of speciation (the evolution of new species) at an alarming rate. This rapid loss of biodiversity has become a major cause of concern. But if biodiversity is being lost, so what? Why should we worry? It is a definite cause of concern because biodiversity, in all its form, is important for the health of our planet and of human society.

Earth's plants, animals and microorganisms—interacting with one another and with the physical environment in ecosystems—form the foundation of sustainable development⁹. Biotic resources from this wealth of life support human livelihoods and aspirations and make it possible to adapt to changing needs and environments. The steady erosion of the diversity of genes, species, and ecosystems taking place today will undermine progress toward a sustainable society. Indeed, the continuing loss of biodiversity is a telling measure of the imbalance between human needs and wants and nature's capacity.

Sustainable development is a process in which development can be sustained for generations. It means improving the quality of human life while at the same time living in harmony with nature and maintaining the carrying

⁹ Sustainable Development is modern fashionable phrase that is freely and frequently used in academic, legal, social, political, scientific and even business circles. The critics of the phrase aver that it does not offer any precise, succinct and final meaning of universal acceptance. It seems to convey different import to different people. An environmentalist would interpret it as ample heritage for future generations. A legal scholar would describe it as balanced synthesis of environmental and developmental imperatives. An economist would view it as economic growth which can be sustained for generations. A social ecologist would look upon it as sustained use of forests. A businessman who harvests and sells timber, may look upon it as sustained projects. In the West, somewhat jocularly, the multinational companies reckon sustainable development as sustained growth or sustained profits. Politicians find their vote bank in the phrase and adopt it in election campaign; see Gurdip Singh, *Legal Aspects of Sustainable Development*, 1 NATIONAL CAPITAL LAW JOURNAL, 1996 at 93.

capacity of life supporting ecosystem. Development means increasing the society's ability to meet human needs. Economic growth is an important component but cannot be a goal in itself. The real aim must be to improve the quality of human existence to ensure people to enjoy long, healthy and fulfilling lives. Sustainable development focuses at integration of developmental and environmental imperatives.¹⁰ This is an improvement on the previously existing notion of 'sustainable use', which had a restricted meaning in that it focused on adoption of standards governing the rate of use or exploitation of specific natural resources rather than on their preservation for future generations. To be sustainable, development must possess both economic and ecological sustainability. The concept of sustainable development indicates the way in which development planning should be approached.

The human race had 850 million members when it entered the industrial age, sharing earth with life forms nearly as diverse as the planet has ever possessed. Today, with population nearly six times as large and resource consumption proportionately far greater, both the limits of nature and the price of overstepping them are becoming clear. A turning point is upon us. We can continue to deteriorate the environment to meet immediate needs, at the cost of long-term benefits, or we can conserve life's precious diversity and use it in a sustainable manner. We can deliver to the next generations a world rich in possibilities or one impoverished of life; undoubtedly social and economic development will succeed only if we do the first.

Species evolve to fill particular niches (role in an ecosystem) or habitats. Many species depend on each other in intricate ways for survival. Specific life forms present in a particular habitat help in providing conditions for other life forms to live in that environment. Destroying one species can lead to further extinctions or changes. The primary indirect value of biodiversity lies in the services provided by the ecosystem and *taxa* (distinct group of organisms) by maintaining an intricate network of life forms. From both wild and domesticated components of biodiversity, humanity derives all of its food and many medicines and industrial products. Economic benefits from wild species alone make up an estimated 4.5 percent of the Gross Domestic in United States—worth Rs. 87 billion annually in the late 1970s.¹¹ Fisheries, largely based on wild species, contributed about 100 million tons of food in 1989. Indeed, wild species are dietary mainstays in much of the world. Timber, ornamental plants, oils, gums, and many fibers also come from the wild. The

¹⁰ Gurdip Singh, ENVIRONMENTAL LAW: INTERNATIONAL AND NATIONAL PERSPECTIVES (2005) at 210.

¹¹ *Supra* n. 2 at 610.

current economic value of domesticated species is even greater. Agriculture accounts for 32 percent of GDP in low-income developing countries and 12 percent in middle-income countries.¹² Trade in agricultural products amounted to Rs. 3 trillion in 1989.¹³

The value of variety of species is particularly apparent in agriculture. For generations, people have raised a wide range of crops and livestock to stabilize and enhance productivity. The wisdom of these techniques—including their contributions to watershed protection, soil fertility maintenance, and receptivity to integrated pest management strategies—is being reaffirmed today as farmers around the world turn to alternative low-input production systems. The genetic diversity found within individual crops is also of tremendous value. Genetic diversity provides an edge in the constant evolutionary battle between crops and livestock and the pests and diseases that prey on them. In age-old systems, several genetically distinct varieties of crops are planted together as a hedge against crop failure. Breeders and farmers also draw on the genetic diversity of crops and livestock to increase yields and to respond to changing environmental conditions. The opportunities provided by genetic engineering—which allows the transfer of genes among species—will further increase the opportunities genetic diversity provides for enhancing agricultural productivity.¹⁴

The components of biodiversity are also important to human health. Once, nearly all medicines came from plants and animals, and even today they remain vital. Traditional medicine forms the basis of primary health care for about 80 percent of people in developing countries, more than 3.4 billion people in all.¹⁵ About 20,000 species of plants are used for medicinal purposes

¹² *Id.* See also Tacconi L., *Biodiversity and Ecological Economics: Participation, Values and Resource Management*, EARTHSCAN (2001) at 14.

¹³ *Global Biodiversity Strategy: Guidelines to Save, Study and Use Earth's Biotic Wealth Sustainably and Equitably* in WRI/IUCN/UNEP, 1992 at 1–5.

¹⁴ A wild relative of rice collected in India provided a “resistance gene” that now protects high-yielding rice varieties in South and Southeast Asia from their nemesis, the brown plant-hopper. Plant breeding is to thank for half of the gains in agricultural yields in the United States from 1930 to 1980: an estimated \$1 billion annually has been added to the value of US agricultural output by the widened genetic base. A wild tomato, found only in the Galápagos Islands, can grow in seawater and possesses jointless fruitstalks—a trait that has been bred into domesticated tomatoes to make them easy to harvest mechanically; see Glowka L. and Balakrishna P. (eds.), *Access to Genetic Resources and Benefit-Sharing* in IUCN-REGIONAL BIODIVERSITY PROGRAM, Asia (2001) at 11-16.

¹⁵ See, <http://www.biodiv.org/doc/publications/guide.asp?id=changing>, visited on 27th March, 2005.

in these countries. More than 5,100 species are used in Chinese traditional medicine alone, and people in northwestern Amazonia have tapped some 2,000 species. Traditional medicine is now encouraged by the World Health Organization, and in many countries—including industrialized countries—its use is expanding rapidly. Nearly 2,500 plant species in India have been used for medicinal purposes and the demand for drug plant material has tripled in the last decade.¹⁶

Traditional indigenous system of medicine in India has relied heavily on the rich biodiversity of the region. Three traditional systems of medicine are widely prevalent in the country - *Ayurveda*, *Siddha* and *Unani*. The *Ayurvedic* system subscribes to the view that there is no plant on the Earth which is not a medicine. The story goes that Brahma ordered the sage Jivaka to find a tree or a herb which had no medicinal property. Jivaka wandered for eleven long years in search of such a plant but could not find one. When he returned and informed Brahma of his failure, much to his surprise Brahma recognized him as a great physician! *Ayurveda* has given to the world the drug reserpine used as a tranquilizer and for the treatment of hypertension, anxiety and schizophrenia. Reserpine is extracted from the forest shrub *Rauwolfia serpentine*. As for modern pharmaceuticals, one-fourth of all prescriptions dispensed in India contain active ingredients extracted from plants, and over 3,000 antibiotics—including penicillin and tetracycline—are derived from microorganisms. Cyclosporine, developed from a soil fungus, revolutionized heart and kidney transplant surgery by suppressing the immune reaction. Aspirin from the plant *Filipendula ulmaria* and quinine from the bark of *Cinchona* tree and many other drugs that are now synthesized were first discovered in the wild. In addition, plants contain complex chemical structure which may be impossible to synthesize in a laboratory and which might provide important clues for new medicines. Compounds extracted from plants, microbes, and animals were involved in developing all of the 20 best-selling drugs in United States, drugs whose combined sales approached Rs. 6 billion in 1988.¹⁷

Biodiversity in India, particularly, is important for its religious, spiritual and other cultural uses. Many plants and animals have ritualistic significance. Among auspicious flowers offered in temples are *Hibiscus* offered to the goddess *Kali* and *Datura* flowers to Siva. In some parts of India such as Gujarat, *Sami* (*Prosopis spicigera*) is used in sacrificial fires. Various plant and animal species are considered sacred on account of their association with

¹⁶ *Ibid.*

¹⁷ See <http://www.biodiversity.nl/opinion08.htm>, visited on 29th March, 2005.

different deities. Some animal species are termed *vahanas* or vehicles of deities and are hence venerated. Important among these are the bull for *Siva*, the rat for *Ganesh* and the lion for *Durga*. Entire ecosystems have also been utilized for cultural and spiritual purposes. Sacred value was attached to patches of forest believed to be the abode of gods and ancestors, and utilized only for prayer and related rituals. A network of such sacred groves is still in evidence in some parts of India.

III. BIODIVERSITY UNDER THREAT

Although extinction is a natural process, there is much evidence that human beings have become a major force in the premature extinction of species. As the human population and resource consumption increase over the next coming years and we take over more and more of the planet's surface and more of the earth's net primary productivity, we may cause the extinction of up to a quarter of the earth's current species.¹⁸ If this happens it will constitute a sixth mass extinction, caused by us.¹⁹

For thousands of years we have been developing a vast array of domesticated plants and animals important for food. But this treasure house is shrinking as modern commercial agriculture focuses on relatively few crop varieties. And, about 30% of breeds of the main farm animal species are currently at high risk of extinction. When most people think of the dangers besetting the natural world, they think of the threat to other creatures. Declines in the numbers of such charismatic animals as pandas, tigers, elephants, whales, and various species of birds, have drawn world attention to the problem of species at risk. Species have been disappearing at 50-100 times the natural rate, and this is predicted to rise dramatically.²⁰ Based on current trends, an estimated 34,000 plant and 5,200 animal species - including one in eight of the world's bird species - face extinction.²¹ Forests are home too much of the known terrestrial biodiversity, but about 45 per cent of the Earth's original forests are gone, cleared mostly during the past century.²² Despite some regrowth, the world's total forests are still shrinking rapidly, particularly in the tropics. Up to 10 per cent of coral reefs - among the richest ecosystems - have been destroyed, and one third of the remainder face collapse over the

¹⁸ G. Tyler Miller, *LIVING IN THE ENVIRONMENT: PRINCIPLES, CONNECTION AND SOLUTION* (2002) at 113.

¹⁹ *Ibid.*

²⁰ See Web site: <http://www.terin.org/biodiv/threats.htm>; visited on 22nd April, 2005.

²¹ *Supra* n. 17.

²² See <http://www.biodiv.org/gbo/default.asp>, visited on 21st May, 2005.

next 10 to 20 years.²³ Coastal mangroves, a vital nursery habitat for countless species, are also vulnerable, with half already gone.

Further, global atmospheric changes, such as ozone depletion and climate change, only add to the stress. A thinner ozone layer lets more ultraviolet radiation reach the Earth's surface where it damages living tissue. Global warming is already changing habitats and the distribution of species. Scientists warn that even a one-degree increase in the average global temperature, if it comes rapidly, will push many species over the brink. Our food production systems could also be seriously disrupted. The loss of biodiversity often reduces the productivity of ecosystems, thereby shrinking nature's basket of goods and services, from which we constantly draw. 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.

The biodiversity loss also hurts us in other ways. Our cultural identity is deeply rooted in our biological environment. Plants and animals are symbols of our world, preserved in flags, sculptures, and other images that define us and our societies. We draw inspiration just from looking at nature's beauty and power. While loss of species has always occurred as a natural phenomenon, the pace of extinction has accelerated dramatically as a result of human activity. Ecosystems are being fragmented or eliminated, and innumerable species are in decline or already extinct. We are creating the greatest extinction crisis since the natural disaster that wiped out the dinosaurs 65 million years ago. These extinctions are irreversible and, given our dependence on food crops, medicines and other biological resources, pose a threat to our own well-being. It is reckless if not downright dangerous to keep chipping away at our life support system. It is unethical to drive other forms of life to extinction, and thereby deprive present and future generations of options for their survival and development.

²³ *Ibid.* In the United States, the destruction of estuarine ecosystems between 1954 and 1978 cost over \$200 million annually in revenues lost from commercial and sport fisheries alone. Expensive engineering was needed to defend against storms as substitutes for the natural defenses provided by coastal wetlands; see, Oviedo G., Larsen P.B. and Maffi L., *INDIGENOUS AND TRADITIONAL PEOPLES OF THE WORLD AND ECOREGION CONSERVATION*, (WWF International, 2000) at 11-14.

IV. INTERNATIONAL LEGAL REGIME

Under the impetus of the Man and Biosphere Conference (UNESCO, 1968), and the Stockholm Conference on the Human Environment, the value of species and ecosystems— and generally the natural environment—became increasingly recognized. The need for cooperation and concerted unilateral action was formally recognized in soft law instruments, starting with the Stockholm Declaration (1972), and followed by the World Charter for Nature (1982) and the Rio Declaration (1992). The negotiation of binding international instruments on specific issues accompanied this process. Four major global conventions were adopted in the period 1972-1992. They are: (i) Convention on Wetlands of International Importance, Ramsar, 1971; (ii) Convention for the Protection of the World Cultural and Natural Heritage, Paris, 1972; (iii) Convention on International Trade in Endangered Species, Washington, 1973; (iv) Convention on the Conservation of Migratory Species of Wild Animals, Bonn, 1979.

In 1987, the World Commission on Environment and Development (the Brundtland Commission) concluded that economic development must become less ecologically destructive.²⁴ In its landmark report, 'Our Common Future', it said that: "Humanity has the ability to make development sustainable—to ensure that it meets needs of the present without compromising the ability of future generations to meet their own needs".²⁵ It also called for "a new era of environmentally sound economic development".²⁶

A. Convention on Biological Diversity

The Convention on Biological Diversity was adopted in Nairobi on May 22, 1992. Later, on June 5, 1992, at the UN Conference on Environment and Development in Rio de Janeiro, a record number of over 150 States signed it. Approximately 18 months later, on December 29, 1993, the Convention entered into force. The treaty is a landmark in the environment and development field, as it takes for the first time a comprehensive rather than a sectoral approach to conservation of the Earth's biodiversity and sustainable use of biological resources. It recognizes the vital point made in the World Conservation Strategy (1980), Caring for the Earth (1991), the Global Biodiversity Strategy (1992) and many other international documents that both biodiversity and biological resources should be conserved for reasons of ethics, economic benefit and indeed human survival. It implicitly accepts the

²⁴ World Commission on Environment and Development, *OUR COMMON FUTURE* (1987) at 92-93.

²⁵ *Ibid.*

²⁶ *Ibid.*

telling point that the environmental impact which future generations may most regret about present time is the loss of biodiversity, in part because most of it—for example loss of species—cannot be reversed.

The fact that biological diversity is unevenly distributed around the globe is also recognized in the Convention. The North, biologically poorer, has depleted its biodiversity reserves over time, but such reserves are still found in the biologically sound South. If biodiversity is to be conserved, this imposes a heavier burden on the South, at a time when the use of biological resources is of paramount importance for developing countries in achieving development. The Convention recognizes that this burden, in turn, can only be alleviated by additional contributions (not only financial) from the industrialized North and through increased partnership between both developed and developing countries. The Convention on Biological Diversity affirms that conservation of biodiversity is a common concern of humankind and reaffirms that nations have sovereign rights over their own biological resources.²⁷ The treaty states as major objectives the conservation of biological diversity and sustainable use of its components; fair and equitable sharing of the benefits arising out from the use of genetic resources; and appropriate transfer of relevant technologies. The agreement covers all ecosystems, species, and genetic resources. It links traditional conservation efforts to the economic goal of using biological resources sustainably. It sets principles for the fair and equitable sharing of the benefits arising from the use of genetic resources, notably those destined for commercial use.²⁸ It also covers the rapidly expanding field of biotechnology, addressing technology development and transfer, benefit-sharing and biosafety.²⁹

The Convention reminds decision-makers that natural resources are not infinite and sets out a new philosophy for the 21st century, that of sustainable use. While past conservation efforts were aimed at protecting particular species and habitats, the Convention recognizes that ecosystems, species and genes must be used for the benefit of human beings. However, this should be done in a way and at a rate that does not lead to the long-term decline of biological diversity. The Convention also offers decision-makers guidance based on the precautionary principle³⁰ that where there is a threat of significant reduction

²⁷ Article 3, Convention on Biological Diversity.

²⁸ Article 15, *id.*

²⁹ Article 19, *id.*

³⁰ Principal 15 of Rio Declaration contains Precautionary Principle as follows:

“In order to protect the environment, the precautionary approach shall be ideally applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measure to prevent environmental degradation.

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.

The Convention as an international treaty, identifies a common problem, sets overall goals and policies and general obligations, and organizes technical and financial cooperation.³¹ However, the responsibility for achieving its goals rests largely with the countries themselves. Private companies, landowners, fishermen, and farmers take most of the actions that affect biodiversity. Governments need to provide the critical role of leadership, particularly by setting rules that guide the use of natural resources, and by protecting biodiversity where they have direct control over the land and water. Under the Convention, governments undertake to conserve and sustainably use biodiversity. They are required to develop national biodiversity strategies and action plans, and to integrate these into broader national plans for environment and development. This is particularly important for such sectors as forestry, agriculture, fisheries, energy, transportation and urban planning. The conservation of each country's biological diversity can be achieved in various ways. "In-situ" conservation - the primary means of conservation - focuses on conserving genes, species, and ecosystems in their natural surroundings, for example by establishing protected areas, rehabilitating degraded ecosystems, and adopting legislation to protect threatened species.³² "Ex-situ" conservation uses zoos, botanical gardens and gene banks to conserve species.³³ Promoting the sustainable use of biodiversity will be of growing importance for maintaining biodiversity in the years and decades to come. Under the Convention, the "ecosystem approach to the conservation and sustainable use of biodiversity" is being used as a framework for action, in which all the goods and services provided by the biodiversity in ecosystems are considered. The Convention is promoting activities to ensure that everyone benefits from such goods and services in an equitable way.

Other treaty commitments include: identifying and monitoring the important components of biological diversity that need to be conserved and used sustainably; respecting, preserving and maintaining traditional knowledge of the sustainable use of biological diversity with the involvement of indigenous peoples and local communities; preventing the introduction of, controlling and eradicating alien species that could threaten ecosystems, habitats or species; controlling the risks posed by organisms modified by biotechnology; promoting public participation, particularly when it comes to

³¹ Article 20, U.N. Convention on Biological Diversity.

³² Article 8, *id.*

³³ Article 9, *id.*

assessing the environmental impacts of development projects that threaten biodiversity; educating people and raising awareness about the importance of bio diversity and the need to conserve it; reporting on how each country is meeting its biodiversity goals. Importantly, the Convention is legally binding; countries that join it are obliged to implement its provisions.

B. The Biosafety Protocol

The Biosafety Protocol is an agreement which is designed to regulate international trade, handling and uses of any Living Modified Organisms (LMOs) 'that may have adverse effects on the conservation and sustainable use of biological diversity, taking also into account risks to human health'.³⁴ LMOs — often known as genetically modified organisms (GMOs) — form the basis of a range of products and agricultural commodities. Common LMOs include agricultural crops that have been genetically modified for greater productivity or for resistance to pests or diseases. Processed products containing dead modified organisms or non-living modified organisms components include certain vaccines, drugs, food additives and many processed, canned, and preserved foods.³⁵ They can also include corn and soybean derivatives used in many foods and nonfoods, cornstarch used for cardboard and adhesives, fuel ethanol for gasoline, vitamins, and yeast-based foods such as beer and bread.³⁶

Biotechnology is being promoted as a better way to grow crops and produce medicines, but it has raised concerns about potential side effects on human health and the environment, including risks to biodiversity.³⁷ In some countries, genetically altered agricultural products have been sold without much debate, while in others, there have been vocal protests against their use, particularly when they are sold without being identified as genetically modified.³⁸ Further, Article 19(3) of the Convention requires consideration

³⁴ Article 1, Cartagena Protocol on Biosafety.

³⁵ See <http://www.biodiv.org/biosafety/faqs.asp>, visited on 29th March, 2005.

³⁶ *Ibid.*

³⁷ In recent years, advances in biotechnology techniques have enabled us to cross the species barrier by transferring genes from one species to another. We now have transgenic plants, such as tomatoes and strawberries that have been modified using a gene from a cold water fish to protect the plants from frost. Some varieties of potato and corn have received genes from a bacterium that enables them to produce their own insecticide, thus reducing the need to spray chemical insecticides. Other plants have been modified to tolerate herbicides sprayed to kill weeds, see Spinney L., BIOTECHNOLOGY IN CROPS: ISSUES FOR THE DEVELOPING WORLD, a Report compiled for Oxfam Great Britain (May 1998).

³⁸ See www.Oxfam.org.uk/policy/papers/gmfoods/gmfoods.htm, visited on 4th April, 2005.

to be given to a protocol on the safe transfer, handling and use of any LMO resulting from biotechnology that may have an adverse effect on the conservation and sustainable use of biodiversity.

In response to these concerns, governments negotiated a subsidiary agreement to the Convention on Biodiversity to address the potential risks posed by cross-border trade and accidental releases of LMOs. Adopted in January 2000, the Cartagena Protocol on Biosafety allows governments to signal whether or not they are willing to accept imports of agricultural commodities that include LMOs by communicating their decision to the world community via a Biosafety Clearing House, a mechanism set up to facilitate the exchange of information on and experience with LMOs.³⁹ In addition, commodities that may contain LMOs are to be clearly labeled as such when being exported.⁴⁰ Under the protocol stricter Advanced Informed Agreement (AIA) procedures will apply to seeds, live fish, and other LMOs that are to be intentionally introduced into the environment.⁴¹ In these cases, the exporter must provide detailed information to each importing country in advance of the first shipment, and the importer must then authorize the shipment. The aim is to ensure that recipient countries have both the opportunity and the capacity to assess risks involving the products of modern biotechnology. The Protocol will enter into force after 50 governments have ratified it.⁴² This is the first Protocol under the Convention on Biological Diversity. Other protocols may be introduced as implementation efforts proceed.

IV. IMPLEMENTATION PROCESS

The main thrust of implementation is at the national level. Each Party has much to do, considering the spectrum of actions Parties have to undertake and the wide range of policies they have to review. The success of national action, seen from a global perspective, will depend on the will of both the developed and developing country parties to meet their obligations.⁴³ The level of implementation and enforcement will be the ultimate test of whether the compromise achieved during the Convention negotiation was a true success

³⁹ Article 20, Cartagena Protocol on Biosafety, see also Burhenne Guilmin F., *The Biosafety Protocol is Adopted in Montreal* in ENVIRONMENTAL POLICY AND LAW, 2000 at 4.

⁴⁰ Article 18, *id.*

⁴¹ Articles 7-10, *id.*

⁴² Article 37, *id.*

⁴³ Glowka L., Burhenne-Guilmin F. and Synge H., in collaboration with McNeely J. and Guendling L., A GUIDE TO THE CONVENTION ON BIOLOGICAL DIVERSITY, IUCN (1994) at 2.

or an illusion.⁴⁴ At the international level, the machinery provided for in the Convention to steer and assist its implementation has to be set in motion.

The Convention has created a global forum—actually a series of meetings—where governments, non-governmental organizations, academicians, the private sector, and other interested groups or individuals share ideas and compare strategies. The Convention's ultimate authority is the Conference of the Parties (COP), consisting of all governments (and regional economic integration organizations) that have ratified the treaty.⁴⁵ This governing body reviews progress under the Convention, identifies new priorities, and sets work plans for members. The COP can also make amendments to the Convention, create expert advisory bodies, review progress reports by member nations, and collaborate with other international organizations and agreements.⁴⁶ The COP can rely on expertise and support from several other bodies that are established by the Convention:⁴⁷

- (a) The Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA). The SBSTTA is a committee composed of experts from member governments competent in relevant fields. It plays a key role in making recommendations to the COP on scientific and technical issues.
- (b) The Clearing House Mechanism. This Internet-based network promotes technical and scientific cooperation and the exchange of information.
- (c) The Secretariat. Based in Montreal, it is linked to United Nations Environment Programme. Its main functions are to organize meetings, draft documents, assist member governments in the implementation of the programme of work, coordinate with other international organizations, and collect and disseminate information. In addition, the COP establishes ad-hoc committees or mechanisms as it sees fit. For example, it created a Working Group on Biosafety that met from 1996 to 1999 and a Working Group on the knowledge of indigenous and local communities.

The COP has launched a number of thematic programmes covering the biodiversity of inland waters, forests, marine and coastal areas, drylands, and agricultural lands. Cross-cutting issues are also addressed on matters such as the control of alien invasive species, strengthening the capacity of member countries in taxonomy, and the development of indicators of biodiversity loss.

⁴⁴ *Ibid.*

⁴⁵ Article 23, U.N. Convention on Biological Diversity.

⁴⁶ *Ibid.*

⁴⁷ *Ibid.*

The Convention's members regularly share ideas on best practices and policies for the conservation and sustainable use of biodiversity with an ecosystem approach. They look at how to deal with biodiversity concerns during development planning, how to promote transboundary cooperation, and how to involve indigenous peoples and local communities in ecosystem management. In both the interim and operational phase, it is important to draw from available expertise, as well as to build on existing activities. A number of international governmental and nongovernmental organizations have worked on biodiversity issues for decades and it is essential to harness their knowledge and expertise in support of the implementation process. UNEP, FAO, UNESCO, and IUCN have much to contribute, as have the World Resources Institute (WRI) and other international organizations with a sectoral focus.⁴⁸ Initiatives such as the 'Global Biodiversity Strategy' will enable Parties to make implementation decisions with the best background information to hand. Of equal importance is to link these implementation efforts to existing programs, including those which are emerging from the implementation of Agenda 21, such as the UNDP-sponsored Capacity 21. These initiatives should not simply exist parallel to the implementation of the Convention, but should play an integral part in the process and vice versa.

In the same vein, the relationship between the Convention on Biological Diversity and other conventions in the field should be reconsidered and links established to enable effective cooperation and coordination. The original reason for promoting a convention on biological diversity—to fill in the gaps of the existing fragmentary regime while building upon the existing conventions—should not be lost from sight at this stage. There are a considerable number of global and regional instruments directly relevant to biodiversity and both their achievements and potential must be taken into account and integrated to the maximum extent possible in the process of implementation. The problems inherent in trying to effectively link existing treaties in a particular field are difficult. Imaginative steps are required if the overall goal of the Convention, which is to lead to a truly comprehensive and integrated regime, is to be realized.

When the Convention was adopted, developing countries emphasized that their ability to take national actions to achieve global biodiversity benefits would depend on financial and technical assistance. Thus, bilateral and multilateral support for capacity building and for investing in projects and programmes is essential for enabling developing countries to meet the Convention's objectives. Convention-related activities by developing countries

⁴⁸ *Supra* n. 43.

are eligible for support from the financial mechanism of the Convention i.e. the Global Environment Facility (GEF). GEF projects, supported by the United Nations Environment Programme (UNEP), the United Nations Development Programme (UNDP) and the World Bank, help forge international cooperation and finance actions to address four critical threats to the global environment: biodiversity loss, climate change, depletion of the ozone layer and degradation of international waters. By the end of 2000, the GEF had contributed nearly \$ 1 billion for biodiversity projects in more than 120 countries.⁴⁹

Finally, at both the national and international level, nongovernmental organizations have an important role to play in the implementation of Convention. This was specifically recognized in preambular paragraph 14 which stresses "the importance of ... the nongovernmental sector for the conservation of biological diversity and the sustainable use of its components." The growth of NGO interest for the Convention, in both developed and developing countries, bodes well for the convention's implementation, and it is to be hoped that Parties will take full advantage of the knowledge, skills and commitment of NGOs in their country, as well as regionally and globally, to help them implement the Convention.

V. INDIA'S COMMITMENT

The Biological Diversity Act has been passed by the Indian Parliament in 2002 to preserve biological wealth of the country. The Act was formulated after India became signatory to the Convention on Biological Diversity. The draft legislation was developed through an intensive consultation process involving all stakeholders such as the Central Government, State Governments, institutions of local self-government, scientific and technical institutions, experts, non-governmental organizations, industry, etc.⁵⁰ The Act responds to a number of new, emerging concerns: firstly, the result of new developments in technology, in particular, biotechnology and information technology, and, secondly, the ongoing degradation of the environment, inevitably accompanied by an erosion of biological diversity.

Like the CBD, the Biological Diversity Act, 2002 aims to achieve three things: conservation of biodiversity, sustainable use of biological resources, and equitable sharing of benefits arising from such use. To achieve these, the Act contains several important clauses which provide, *inter alia*: (i) prohibits

⁴⁹ See <http://www.bnhs.org/bio/documents/biodiversity.pdf>, visited on 21st February, 2005.

⁵⁰ Anon., PUBLICATION OF THE BIOLOGICAL DIVERSITY ACT, 2002 NO. 18 OF 2003 (Ministry of Law and Justice, Govt. of India, New Delhi, 2003).

transfer of Indian genetic material outside the country, without specific approval of the Indian Government through a due process; (ii) stipulates that anyone wanting to take a patent or other intellectual property right (IPR) over such material, or over related knowledge, will have to seek permission in advance; (iii) provides for the levying of appropriate fees and royalties on such transfers and IPRs; (iv) regulates access to such material by Indian nationals also, to ensure that there is some control over over-exploitation (e.g. of medicinal plants), and that there is some sharing of benefits to all concerned parties; however, it provides some relaxation in the case of research; (v) provides for measures to conserve and sustainably use biological resources, including habitat and species protection, conservation in gene banks, environmental impact assessments of all projects which could harm biodiversity, and so on; (vi) empowers local communities to have a say in the use of resources and knowledge within their jurisdiction, and to enter into negotiations with parties who want to use these resources and knowledge; (vii) provides for the development of an appropriate legislation or administrative steps, including registration, to protect indigenous and community knowledge; (viii) empowers governments to declare Biodiversity Heritage Sites, as areas for special measures for conservation and sustainable use of biological resources, as also notify threatened species to control their collection and use; (ix) stipulates that risks associated with biotechnology (including the use of genetically modified organisms), will be regulated or controlled through appropriate means.

The Ministry of Environment and Forests has notified the Biological Diversity Rules in April, 2004 as part of implementation process of the Biological Diversity Act, 2004. This law essentially provides for a system to regulate access, use and benefit sharing vis-à-vis biological resources. Following this, as envisaged in the Act, a National Biodiversity Authority has been set up in Chennai. The process of setting up of State Biodiversity Boards is already underway in many states governments.

VI. CONCLUSIONS

It is the combination of life forms and their interactions with each other and with the rest of the environment that has made Earth a uniquely habitable place for human beings. Biodiversity provides a large number of goods and services that sustain our lives. By consuming ever more of nature's resources, we have gained more abundant food and better shelter, sanitation, and health care, but these gains are often accompanied by increasing environmental degradation that may be followed by declines in local economies and the societies they supported. Economic development is essential to meeting human

needs and to eliminating the poverty that affects so many people around the world. The sustainable use of nature is essential for the long-term success of development strategies. A major challenge for the 21st century will be making the conservation and sustainable use of biodiversity a compelling basis for development policies, business decisions, and consumer desires.⁵¹

The Convention on Biological Diversity and its underlying concepts can be difficult to communicate to politicians and to the general public.⁵² Nearly a decade after the Convention first acknowledged the lack of information and knowledge regarding biological diversity; it remains an issue that few people understand. There is little public discussion of how to make sustainable use of biodiversity part of economic development. The greatest crunch in sustainable development decisions is the short-versus the long-term time frame. Sadly, it often still pays to exploit the environment now by harvesting as much as possible and as fast as possible because economic rules do little to protect long-term interests. Truly, sustainable development requires countries to redefine their policies on land use, food, water, energy, employment, development, conservation, economics, and trade. Biodiversity protection and sustainable use requires the participation of ministries responsible for such areas as agriculture, forestry, fisheries, energy, tourism, trade and finance. The challenge facing governments, businesses, and citizens is to forge transition strategies leading to long-term sustainable development. It means negotiating trade-offs even as people are clamoring for more land and businesses are pressing for concessions to expand their harvests. The longer we wait the fewer options we will have.

In addition, many endangered species survive in zoos and botanical gardens, and key ecosystems are preserved through the adoption of protective measures. However, these are stopgap actions. The long-term viability of species and ecosystems depends on their being free to evolve in natural conditions. This means how to use biological resources in a way that minimizes their depletion. The challenge is to find economic policies that motivate conservation and sustainable use by creating financial incentives for those who would otherwise over-use or damage the resource. Can we save the world's ecosystems, and with them the species we value and the other millions of species, some of which may produce the foods and medicines of tomorrow? The answer will lie in our ability to bring our demands into line with nature's ability to produce what we need and to safely absorb what we throw away.

⁵¹ See <http://www.biodiv.org/doc/publications/guide.asp?id>, visited on 4th April, 2005.

⁵² *Ibid.*