"We are at a crossroads in the history of human civilization. Our actions in the next few years will determine whether we take a road toward a chaotic future characterized by over-exploitation and abuse of our biological resources, or take the opposite road toward maintaining great biological diversity and using biological resources sustainably. The future well-being of human civilization hangs in the balance." (UNEP, IUCN & WRI.)

ENHANCING BIOLOGICAL DIVERSITY: A STUDY OF THE DEVELOPMENT OF INTERNATIONAL LAW RELATING TO THE CONSERVATION OF GLOBAL BIOLOGICAL DIVERSITY

BY
GAKERI JACKOB KARIUKI

A THESIS SUBMITTED IN PART - FULFILMENT OF THE REQUIREMENTS OF MASTER OF LAWS DEGREE IN THE UNIVERSITY OF NAIROBI

Submined for examination on December 13th

NAIROBI DECEMBER 1991

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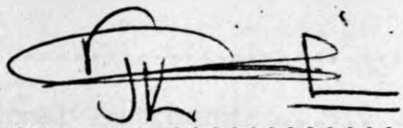
DECLARATION

I GAKERI JACKOB KARIUKI do hereby declare that this Thesis is my original work and has not been and is not currently being submitted for a degree in any other University.



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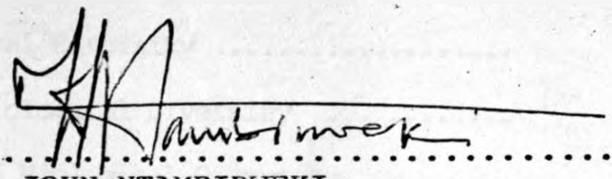

Signed.....

JOHN NTAMBIRWEKI
LECTURER
FACULTY OF LAW
UNIVERSITY OF NAIROBI

Signed.....

DR. S. LAL
SENIOR LECTURER
FACULTY OF LAW
UNIVERSITY OF NAIROBI

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ACKNOWLEDGEMENTS

I am greatly indebted to the following persons, Mr. John Ntambirweki and Dr. S. Lal, both of the Faculty of Law for dilligently supervising the writing of this thesis. But for their invaluable criticisms and suggestions this work would not have been what it is. I would like to associate them with all positive aspects of this work.

To the Dean, Faculty of Law, members of staff and the postgraduate students I am grateful for moral support and goodwill.

Finally, special thanks go to Nelias Thiaka who sat before the computer for many hours to give this piece of work its shape.

ABSTRACT

Among the many environmental challenges that humankind continue to grapple with this century is loss of components of biological diversity. There is scientific proof that the planet is loosing its biological wealth at an unprecedented rate. Development activities and the steady increase in human population have played an instrumental role in the impoverishment of biological diversity. But what makes the challenge posed by loss of components of biological diversity unique is that it impoverishes the human race as a whole.

However, the international community has not watched the silent ritual take its toll. On the contrary, it has over the years striven to conserve components of this global resource through various legal mechanisms and strategies.

This study attemps a comprehensive examination of the nature, character and extent of existing international legal mechanisms and strategies in the realm of biodiversity conservation. Specificallly, the study seeks to decipher the principal normative approaches with a view to assessing their adequacy, consistency and effects. It also addresses current developments and the future of biological diversity. It is posited that an international legal regime would greatly enhance conservation of components of biological diversity on a global scale.

ill equiped to enhance conservation of components of biological diversity. In particular, although there has been alot of law making activity in the realm of protecting biological diversity and the marine environment from pollution, it is evident that marine pollution remains a problem. There has been no global attempt to combat marine pollution from land-based sources but commendable efforts have been made to curb depletion of the stratospheric ozone layer during the next century. The international community has started addressing the problems of the pollution of air and their possible effects on global biological diversity through the proposed convention on global warning and possible climate change.

Chapter Four shows that the international community now realizes and acknowledges the magnitude of the challenge posed by loss of components of biological diversity and is actively involved in making the necessary amends through the development of a global convention on the issue. It is evident that in order to conserve components of biological diversity the convention should be based on the widest consensus of the international community. It is demonstrated that several contentious issues must be reconciled before a meaningful instrument can be ready for signature by June 1992. The picture which emerges is that whereas developing countries must commit themselves to conserve dwindling stocks of the planets biological diversity within their jurisdiction, developed countries should commit themselves to provide the necessary outlay of funds. It is also clear that to address

components of biological diversity effectively and on a global scale the proposed convention must be a comprehensive package. In this chapter proposals are made on the basis of the on-going negotiations as at June 1991 on the proposed global convention which would ensure an equitable package.

Finally, it is posited that whereas a global instrument would be a powerful catalyst to inspire and guide attempts to conserve dwindling stocks of the planets biological diversity, fundamental challenges facing developing countries, that is to say, poverty, and underdevelopment should also be addressed. Our thesis is that it is only by dismantling barriers to development that biological genocide could be averted.

Our research methodology was library oriented and thanks to the resourceful UNEP Library which enabled us obtain the most up-to-date material for the study. The data enabled us satisfy most of our hypotheses, that is to say, the current upsurge in global attempts to conserve components of biological diversity is a manisfestation of the realization and acknowledgement by the international community of the finiteness of biospheric resources and looming disaster that unchecked loss of biological diversity could have on the survival and development of humankind.

ABBREVIATIONS

BMU	Blue Whale Unit.
CCAMLR	Convention on Conservation of Antarctic Marine Living Resources, 1980.
CFCs	Chlorofluorocarbons.
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora, 1973.
FAO	Food and Agriculture Organization.
GATT	General Agreement on Tariffs and Trade
GESAMP	Joint Group of Experts on the Scientific Aspects of Marine Environment.
IMCO	Inter-Governmental Maritime Consultative Organization.
IMO	International Maritime Organization.
IUCN	International Union for Conservation of Nature and Natural Resources.
MAB	Man and Biosphere Programme.
OECD	Organization for Economic Co-operation and Development.
UNESCO	United Nations Education Scientific and Cultural Organization.
UNEP	United Nations Environment Programme
UNGA	United Nations General Assembly.
UNIDO	United Nations Industrial Development Organization.
WCED	World Commission on Environment and Development.
WHO	World Health Organization.
WRI	World Research Institute
WWF	World Wide Fund for Nature.

TABLE OF CASES

MUNICIPAL

1. Donoghue V. Stevenson (1932) A.C. 562

2. Lauritzen V. Larsen 345 US 571 854 (1953)

INTERNATIONAL

1. Australlia V. France (1974) I.C.J. 253

2. Corful Channel (United Kingdom V. Albania) (1949) I.C.J. 253

3. Trail Smelter Arbitration (United States V. Canada) 3 UNRIAA 1905 (1949)

TABLE OF INTERNATIONAL INSTRUMENTS

Especially as Waterfowl Habitats, 1971.

Convention Relating to Civil Liability in the Field of Maritime Carriage of Nuclear material, 1971.

International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1971.

Convention for the Prevention of Marine Pollution by Dumping from ships and Aircraft, 1972.

Convention for the Conservation of Antarctic Seals, 1972.

Convention for the Protection of the World Cultural and Natural Heritage, 1972.

Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (as amended in 1972).

Convention on International Trade in Endangered species of Wild Faunal and Flora, 1973.

International Convention for the Prevention of Pollution from Ships, 1973.

Convention on the Protection of the Marine Environment of the Baltic Sea Area, 1974.

Convention for the Prevention of Marine Pollution from Land-based Sources, 1974.

Convention for the Protection of the Mediterranean Sea Against Pollution, 1976.

Protocol for the Prevention of Pollution of the Mediterranean sea by Dumping from Ships and Aircraft, 1976.

Convention on Conservation of North Pacific Fur Seals, 1976.

Convention on Conservation of Nature in the South Pacific, 1976.

Kuwait Regional Convention for Co-operation on the Protection of the Marine Environment from Pollution, 1978.

Convention on the conservation of Migratory species of Wild Animals, 1979.

Convention on the Conservation of European Wildlife and Natural Habitats, 1979.

Convention on Long-Range Transboundary Air Pollution, 1979.

Convention on Conservation of Antarctic Marine Living Resources, 1980.

Protocol for the Protection of the Mediterranean sea Against Pollution from Land-based Sources, 1980.

Convention for Co-operation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region, 1981.

Convention for the Protection of the Marine Environment Coastal Area of South East Pacific 1981.

United Nations Convention on the Law of the Sea, 1982.

Protocol Concerning Mediterranean Specially Protected Areas, 1982.

Regional Convention for the Conservation of the Red Sea and Gulf of Aden Environment, 1982.

Convention for the Protection and Development of the Marine Environment of the Wider Caribean Region, 1983.

Protocol for the Protection of the South-East Pacific Against pollution from Land-based Sources, 1983.

Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region, 1985.

Protocol Concerning Protected Areas and Wild Fauna and Flora in the Eastern African Region, 1985.

Convention for the Protection of the Natural Resources and Environment of the South Pacific Region, 1986.

Protocol for the Prevention of Pollution of the South Pacific Region, 1986.

Protocol for the Conservation and Management of Protected Marine and Coastal Area in the South East Pacific, 1989.

Protocol Concerning Protected Areas and Wildlife Conservation for the Protection and Development of the Marine Environment of the Wider Carribean Region, 1990.

CHAPTER 1

1.0. ENHANCING BIOLOGICAL DIVERSITY: A CASE FOR THE CONSERVATION OF GLOBAL BIOLOGICAL DIVERSITY.

1.1 INTRODUCTION

The prevailing style of development in many developing countries is characterised by heavy dependence on nature and its resources.[1] In the majority of cases, the economy is dependent entirely upon the exploitation of natural resources. To such countries, living natural resources are part and parcel of their national wealth. Most developing countries are in the midst of an environmental and natural resources crisis which is undermining their efforts towards sustained economic growth. The fundamental problems constitute dependency on expensive energy inputs, loss of forested zones and land deterioration, all of which culminate in the improverishment of biological diversity.[2] Because the unstable economies of these states are largely dependent upon the use of natural resources, widespread deterioration of the renewable resource base has serious implications for the future particularly when viewed in the context of the rapidly expanding population and the complex economic interdependence between states. Thus, the vulnerability of the economic mainstream of these states literally dictate that conservation of nature and its resources be made on integral part of their development strategies.

Although the United Nations Conference on the Human Environment Stockholm, 1972, ushered an era of conservation consciousness and envigorated efforts towards conservation generally and biological diversity in particular as reflected in principle 4,[3] a lot of work it appears, remains undone in this field. There is evidential proof that floral and faunal species and micro-organisms are disappearing at an alarming rate. The planet is experiencing the greatest mass impoverishment in 66 million years since the dinosaurs and about 80% of the planets life expired.[4] Known and unknown species together with their varieties are fast disappearing. Habitats and ecosystems rich biologically and promising in material benefit are similarly threatened.[5] Habitat modification in particular has contributed to impoverishment of the planets biological diversity enormously. The destruction of unique habitats means the destruction of all species that rely on that habitat for survival. Loss of entire species population and the extinction of races and variations within specific species exacerbates the problem of biological diversity impoverishment. Although species extinction is a continous natural process,[5] human activities have lately accelerated the rate of extinction exponentially. The countdown to extinction for many floral and faunal species is quickening and the treadmill of environmental degradation is taking an unimaginable toll.

Impoverishment of the planet's biological diversity poses a serious threat not only to the survival of mankind but also to

his advancement and the sustainability of economic livelihood and prosperity, which largely depend on the utilization of biological resources and ecological processes and take advantage of properties of plants, animals, fungi and micro-organisms for food, clothing, medicine, various services, shelter and industrial materials.

There is no doubt that one of the most important environmental challenges facing mankind concerns the unprecendented loss and degradation of the planets biological diversity which constitute the very basis of life support systems. Undeniably, biodiversity is an indispensable component of the biosphere.

The central theme of this study can be posed: How has the international community used international law as a mechanism to counter the challenge posed by loss of global biological diversity? What are the future prospects? We seek to discover the character and nature of the existing regime and the extent to which it has enhanced conservation of biological diversity. Thus, we intend to delve into the mechanisms and strategies under existing legal arrangements in the realm of biological diversity conservation. The relevance and adequacy of existing approaches will be discussed.

In addition, the study analyses and assesses both strengths and weaknesses of the various conservation measures and strategies. A consideration as to whether time is ripe for a change in the

global approach towards biodiversity conservation will afford us an opportunity to assess the propriety of current moves towards biodiversity conservation within a wholistic context. We intend to assess the developments as at June 1st, 1991.

Although the study is centrally concerned with international law respecting conservation of biological diversity, we intend in the first instance to demonstrate man's position within the biosphere, his contribution in the loss of biological diversity and then attempt a rationale for the conservation of global biological diversity. The latter part involves a systematic and critical assessment of imperatives or factors for biological diversity conservation. This, it is hoped will afford us an opportunity to comprehend the evolutionary pattern of the international legal regime.

We chose to study the development of international law on account that although the planet has been partitioned into geographically sovereign and independent states, for numerous reasons, essentially, the globe is a unity, biologically and ecologically indivisible and hence the indivisibility of conservation efforts. It is the central theme of this study that a concerted international legal regime is a principal necessity for the enhancement of conservation of global biological diversity. We think that for a stable environmental world order, a unified view of international law is necessary for the entire biosphere. A correct approach towards conservation of biological

diversity would enable humankind to see itself in relationship to other beings and the environment.

MAN AND NATURE

> "... all the resources of the earth space community are knit together in a maze of intimate ecological interdependence embracing all such features of the material environment as air, climate, topography, soil, geological structure, minerals water, natural vegetation and animal life".[7]

Humankind is but one thread within the web of life. It is an integral part of nature and not independent of it. Apart from being the foundation of all life on earth, nature is the supplier of all the basic needs of humankind. Both civilization and development of mankind are rooted in nature. Human survival is dependent upon the maintenance of uninterrupted functioning of natural systems which ensure the supply of energy and nutrients.[8] The numerous interdependencies and relationships between systems, sub-systems and biological processes in the biosphere necessitate maintenance of integrity of the biosphere for continuity of life.

Biologically and ecologically, the biosphere is one interdependent unit. The biosphere is the living and life supporting system in the outer part of the earth. It is the

planets life-zone. In this unity, all living things have inter-relationships and adapt to the local environment. Laws of nature operate in this unity and maintain natures balance of the earth.[9]

Valentyne Writes:

> "The earth's environment - the complex web of life - support systems shrouding our planet - is the only known haven of life. The flux of forces within that environment including the sun's warmth, the water cycle and the interaction of natural resources - sustain all life on earth".[10]

The sun is the external driving force of the biosphere. Its heat energy makes most biochemical reactions possible and its light energy enables green plants to manufacture food. In addition, it facilitates the shifting of non-living matter from one place to another as a result of currents created by variations in the amount of heat received. The various assemblies - ocean, forest, marsh, deserts e.t.c. consist of plants, animals, micro-organisms and non-living material that interact intimately and frequently with each other.

Biologically, mankind is at the top of a fragile natural structure. His survival is dependent upon maintenance of integrity of this structure. Human life will be in jeorpardy should this tapestry of life be broken.[11] The chain of life begins with microscopic plants and animals. Larger plants provide food and shelter for many species of fauna and flora.

rastic Changes in their composition or distribution could have rofound effect on all forms of life whose abundance and iversity are important for the natural legacy. But the web of nterdependence does not end there. Only green plants can ransform carbon dioxide and water into carbohydrates through notosynthesis. The carbohydrate is used as a source of energy y other living species including man. In addition, much of the xygen in the earths atmosphere, which is necessary for the urvival of many species, is a by-product of this photosynthetic ctivity. Finally, when animals and plants die, they are ecomposed by micro-organisms and nutrients are released into the oil and the cycle is repeated. From the foregoing description, t is clear that all other organisms are directly or indirectly ependent on green plants for survival.[12] It also emerges that rganisms in a given environment are directly or indirectly ependent upon its organic and inorganic natural sorroundings.

nder natural conditions, the balance of forces that give rise to ife-giving environment would continue largely undisturbed so ong as the sun continued to shine. However, mankind has now the apacity to alter this critical balance profoundly.

e have already alluded to the startling rate at which known and nknown floral and faunal species are being decimated. Many riters agree that this extinction spasm is unprecedented in istory. Mostafa Tolba writes:-

"Darwins great age of discovery has succumbed to a great era of extinction. If he were alive today, Darwin would most likely focus his work not on the origins, but rather on the obituary of species".[13]

Factors responsible for this deplorable state of affairs will be considered at a later stage, suffice it here to indicate that loss of biological diversity has global implications. Firstly, being an indispensable part of nature, the latter would be incomplete without it. Loss of biological diversity denies the tapestry of natural interdependency critical elements. Secondly, conservation of many floral and faunal species transcend national and regional boundaries. Thirdly, plant and animal species that originate from one country are likely to be more productive in a suitable foreign environment. In addition, most modern agro-ecosystems are based on introduced domesticates and genetic materials and are thus ultimately dependent upon other states for the necessary biotic resource. Finally, pharmaceutical and industrial raw materials harboured within biotas in one state may be used for the benefit of mankind world wide.[14] To demonstrate the global character of the challenge, Thomas Lovejoy contends that, it would not be absurd to adopt the view that the ability to harvest wheat in Kansas is linked to the success in tropical forest conservation.[15]

Although mankind did not weave the web of life and is a biological entity in relation to other beings and the environment,[16] he is the most precious and is graced with high

intelligence that catapults him into a position of dominance over all other creatures and the environment. Arguably, he cannot be equated to these species.[17] It is posited that biological diversity should only be conserved to enhance the survival, development and enjoyment by man of life at the present and in future.

It cannot be doubted that the post-Stockholm Conference era has witnessed increased concern about proper management of environmental quality and natural resources both in developed and developing countries. Whereas environmental problems since 1972 are not new, their magnitude and scope is. The astronomically increasing population, ill-considered and destructive development strategies which do not take into account the natural resource base and the use of inappropriate and potentially dangerous technologies has led to the emergence of a new agenda in environmental concerns.[18]

Since the environmental challenge facing mankind today is one of survival, the cardinal principle is the protection of nature and life support systems. In line with this approach, reigning imperatives are mainly concerned with life support systems of the biosphere.[19] It is only by concentrating on these tenets that human survival and development can be assured.

From all appearances, it is incontrovertible that conservation of the planets biological diversity - the immense variety and

abundance of plant and animal life and the maintenance or restoration of habitats and ecosystems upon which species survival depends is imperative.

CONCEPT OF BIOLOGICAL DIVERSITY

The term biological diversity or simply biodiversity denotes the wealth of life forms found on earth; millions of different plants, animals and micro-organisms, the genes they contain and the intricate ecosystems they form.[20] It is an umbrella term for the degree of nature's variety including both the numbers and frequency of species, ecosystems or genes in a given assemblage.[21] In short, it is the variety and variability among organisms and the ecological complexes in which they occur.[22] But life on earth contains much more greater variety than can be measured by species alone. Each species contains its own variety such as different races or breeds and differences among individual species also join to form communities and these inturn combine in ecosystems. Thus, the broad term biological diversity encompasses three related concepts, that it to say, species diversity, genetic diversity and ecosystem diversity. There is a general consensus that these three facets constitute biological diversity.[23] Species diversity refers to the variety of living organisms on earth and has been variously estimated to be between 5 and 30 million.[24] Genetic diversity is a concept of the variability within a species as measured by the variation in

genes within a particular species, variety, sub-species or breed. The genetic diversity exhibited by organisms facilitates the production of new breeds of crop plant and domestic animals and in the wild allows species to adapt to changing climatic and environmental conditions. Ecosystem diversity relates to the variety of habitats, biotic communities and ecological processes in the biosphere. An ecosystem comprises communities of plants, animals and the non-living elements of their environment namely air, water, soil and minerals. Functional relationships within and among the communities and their environment are complex but are mechanisms of major ecological processes, such as, the water cycle, soil formation, nutrient cycling and energy flow. These processes provide the sustenance required by living communities and hence the interdependence. What emerges is that conservation of ecosystems and habitats on the one hand and species and their gene pools on the other are inseparable.

PRESENT STATE OF BIOLOGICAL DIVERSITY

> "There is evidence we have embarked on the greatest mass extinction in 65 million years. There is evidence we have entered the sixth catastrophe in our planets history. It is estimated a million or more species are at serious risk of extinction in the next 20 to 30 years".[25]

Although planet earth is the only place known to support human life in the universe, human activities have progressively made it less fit for his survival.[26] In developing countries particularly, natural and human-induced vagaries have compelled rural communities to destroy the means of their survival. The indiscriminate clearing of forests and grasslands for agriculture and fuel, draining wetlands and use of dung as fuel depriving soils necessary nutrients bear this testimony. Overgrazing and other agricultural malpractices contribute to the erosion of fertile soils and ultimately lead to environmental degradation and loss of biological diversity. The rapidly increasing population has and continue to play an instrumental role in environmental degradation.

Habitats, ecosystems, floral and faunal species are disappearing at an astronomic rate.[27] As a result of the widespread environmental destruction, some 25,000 plant species and more than 1,000 species and sub-species of mammals, birds, amphibians, reptiles and fish are threatened with extinction.[28]

In its evolution, the planet has experienced mass extinctions followed by recoveries.[29] The last major extinction occured during the crastaceous period about 66 million years ago. Since the average duration of species is about five million years, the whole spectrum of species has changed many times. On average, it would appear that about 90 species became extinct every 100 years.[30] Present day composition of life on earth is the result

of selective elimination of some species and the advancement of others. Undeniably therefore, loss of species has always been part and parcel of the planets evolutionary process.[31]

Loss of biological diversity occurs when areas are paved over for urban development or ploughed under for conversion to farming land. It occurs when forests are soused with acid precipitation or when toxic chemicals are dumped into lakes, rivers and streams. Over-exploitation of commercially viable organisms and the introduction of alien species also contribute to loss of biological diversity.[32]

The international community is in agreement that biological diversity is being decimated at a startling rate.[33] The pace of destruction is unrelenting and accelerating. Evidence has it that about 400 species have become extinct in the last 400 years.[34] Extinction has become a silent ritual for many of nature's achievements. An untold variety of species has disappeared and the pace of destruction is quickening in many areas. The worst purges are taking place in the tropical rain forest and as a result, stocks of the planet's biological diversity are fast dwindling. The planet is in the throes of an episode of biodiversity impoverishment of perhaps unprecedented magnitude.

The dissipation of species represents more than merely the loss of a biological entity, it heralds a change in the selectional

environment of surviving species.[35] This is particularly the case in circumstances where the extinct species interacted with many of its neighbours. Indiscriminate clearing of tropical forests has raised the rate of extinction enormously. Although a lot remains unknown about these forests, studies have revealed that they stagger with biological diversity.[36] It is important to note that the total global forested area is fast declining. Between 1981 and 1985 for example, the United Nations Food and Agriculture Organization (FAO) estimated that 4.4 million hectares per year of tropical rain forest were logged over though not completely cleared. During the same period, about 3.8 million hectares of open forest were transformed into permanently cleared land.[37] At this pace of decimation, it is estimated that by the end of the first quarter of the 21st century, the only large blocks of undamaged forest outside protected areas will be in the Brazillian part of the Amazon, interior of Guyana and the Zaire basin.[38] Beyond these zones, other areas will have been disturbed, destroyed and a large proportion of the biological diversity they support will have been lost. It is estimated that by the year 2050, upto 60,000 plant species will become extinct or nearly extinct.[39] Though admittedly hoarse, these estimates indicate the unprecedented and unrelenting loss of biological diversity. The rate is about 25,000 times greater than natural extinction rates.[40]

According to Myers,[41] about 1000 animal forms have been documented and recognized as being under the threat of

extinction, such include the blue whale, tiger, cheetah, giant panda e.t.c. Although this figure appears shocking, thousands of faunal and floral species neither identified nor documented are threatened or have already become extinct. This is why it is estimated that at least 90% of all life that ever existed on the planet has disappeared.[42] The difference between past and present losses is that unlike past losses which occured through natural processes, humanity is itself responsible for the present biological holocaust.

Between 1600 and 1900, it is estimated that humanity exterminated about 75[43] known species of animals and birds. Little appears to be known about the number of reptiles, amphibians, fish, inveterbrates, and plants that disappeared during the same period. Since 1900, it is estimated that man has exterminated another 75 known species of mammals and birds.[44] Extinction rates have soared since the middle of the 20th century due to human pressure on natural environments.

In a nutshell, mankind faces an imminent elimination of a good share of the planet's spectrum of species that have shared common earth with him for millenia but are now being denied space. This extinction spasm will amount to an irreversible loss of valuable resources. In our view, although innumerable environmental problems have beset the planet, the fallout of species remains the most conspicous because it impoverishes humanity. Species die with all their genetic composition and hence any medicinal or

industrial resources they may have contained. Loss of biological diversity will obviously undermine many sectors of human endeavour. It narrows human scope to respond to new problems and opportunities.

THE DISTRIBUTION OF BIOLOGICAL DIVERSITY

> "Biological diversity is out there in nature, everywhere you look an enormous corncopia of wild and cultivated species diverse in form and function and usefulness beyond the widest imagination".[45]

The upshot of the above passage is, it would appear, biological diversity occurs everywhere. But, although it occurs even in the middle of deserts, the frozen tudra and sulphur springs, it is not evenly spread and is greater in some areas than in others.

Species come in all shapes and sizes. The largest (the giant sequoia) is estimated to be 6265 metric tonnes.[46] They have different life spans and survive under varied conditions. By mid 1960, it was estimated that the planet supported about 4,100 known species of mammals, 8,700 birds, 6,300 reptiles, 3,000 amphibians, 23,000 fishes, roughly 800,000 insects and over 300,000 green plants, fungi together with several thousand micro-organisms such as bacteria and viruses.[47]

"The most biologically diverse areas are found in the tropics."[48]

Tropical forests harbour the bulk of the planet's biological diversity. They feature a broad range of ecological regions and species communities. Within the tropics certain areas contain exceptionally high biodiversity due to special climatic or geographical conditions or the very long periods of climatic and physical stability.

In terms of regional distribution, tropical America is estimated to contain about 90,000 species, while tropical Asia, Pacific and Australia contain about 35,000 species. Africa South of the Sahara is estimated to harbour about 30,000 species. Northern temperate zones, North America, Africa and Asia contain about 50,000 species. Temperate to arid zones of Autralia and Newzealand harbour about 15,000 species, the Cape region of South Africa, 10,000, while temperate South America harbours about 10,000 species, making a total of 240,000 flowering plants which added to a further 60,000 species believed to exist brings the total to 300,000 species.[49] In addition, oceans, coastal areas and fresh waters team with biodiversity. From the forgoing, it is evident that the tropics contain about 2/3 of all higher plants on the planet. It also harbours a large number of lower plants (Mosses, Lichens, liverworths and fungi).

In terms of species diversity, the Amazon is the most diverse region. A huge tributary of River Amazon, the Rio Negro, is estimated to contain 700 species of fish, more than four and a half times the number of species contained in all European rivers

combined.[50] In a single hectare of the Amazonian forest, it is estimated that one could find up to 300 varieties of trees. This compares unfavourably with North American forests which harbour fewer than 400 species.[51]

1:6 CAUSES OF IMPOVERISHMENT

To apppreciate how the international community has used international law to counter the challenge posed by loss of biological diversity, it is imperative to discuss the identified causes of the loss. Although loss of biological diversity is part of the evolutionary process, not only have the rates of loss increased exponentially but threats to biological diversity have progressively grown alarmingly. The evolutionary process throws off old species for new ones. Those capable of adapting to new climatic and environmental conditions emerge anew with their genetic material diversified and enriched. However, those unable to adapt to changed conditions having become so specialized in their life styles become extinct. They fade away and are together with their genetic material lost for ever. A number of factors contribute to the loss of biological diversity.

1:6:1 Natural Causes

> "Extinction has been a fact of life since life first emerged. The present few million species are the modern day survivors of the estimated half-billion species that have ever existed. Almost all past extinctions have occured by natural processes."[52]

It is estimated that about 100 and 250 million species existed on the planet.[53] Present estimates between 5 and 30 million species represent between 5 and 12 per cent of all species that ever existed. It is evident that long before man entered the scene, species were continuously being lost. Species have and continue to disappear because of changes in climatic and environmental conditions or because other species evolved which were better adapted to overtake the niche of the original occupant. The planet has undergone gradual climatic changes which coupled with glacial advances and inundation by seas have led to environmental alteration which eliminates or adversely modifies habitats upon which particular life forms rely for survival. Evidence that biological diversity has continuously been lost through natural processes is illustrative of the fact that extinction is a biological reality and has been an integral part of the evolutionary process. Unlike other causes, natural extinction is slow and allows the evolution of other species.[54] But natural causes of species decline and extirpation are miniscule in importance compared to human related causes.

1:6:2 Anthropogenic Causes

> "Human activity is having catastrophic impacts on biotas, habitats and entire ecosystem. To destroy a unique habitat means to sentence to death all species that rely on that habitat for survival."[55]

Mankind is today primarily responsible for the loss of biological diversity and his contribution in this regard is unlikely to diminish in the forseable future. His activities have been instrumental in the destruction, modification and disruption of habitats which lead to environmental degradation and loss of biological diversity. Whereas extinction of old species and the evolution of new ones is a natural sequence, the activities of man, it must be admitted, have greatly and unnaturally accelerated extinction rates. Massive, abrupt species extinction and consequent biodiversity impoverishment is not normal.

Although natural factors were for many years the main determinants of the number of species, their population size and the extent of their communities, the scenario has dramatically changed and fluctuations in floral and faunal species are exceedingly influenced by human activities. Man has supplanted all other factors and is today the principal biological exterminator. Mankind has in fact earned itself the dubious distinction of being the only species on Earth to have ever outstripped nature in the process of extinguishing unique forms

of life and ecosystems.

The principal anthropogenic causes of loss of biological diversity are habitat destruction and over-exploitation. Whereas over-exploitation is more important in cases of species used by man, habitat destruction or fragmentation is much more important and has a greater impact on potential, rather than currently exploited genetic resources. This is particularly the case with regard to a great array of species whose potential value to man has yet to be assessed.

Anthropogenic factors responsible for habitat destruction and modification are numerous. The growth of population by leaps and bounds in developing countries spells adverse and far reaching consequences on biological diversity. Rapid growth in human population with its accompanying technological advances exert enourmous stress on the natural environment. The satisfaction of basic needs necessitate the clearing of forested zones and other natural vegetation, levelling of hills or draining of wetlands. All these activites affect biological diversity adversely. In fact, whatever method is employed to render these areas useful to man, the survival of some species or habitat is threatened. Habitat destruction remain the principal factor in biodiversity impoverishment. The unmitigated destruction of tropical forests in the Amazon, Western African and South East Asia is illustrative of this fact. It is estimated that forests are being cleared at the rate of one square mile every 10 minutes or

nearly an acre per second.[56] At this rate, virtually all tropical forests will disappear during the next century. Like tropical forests, coral reefs and abyssal plains of the oceans teaming with biodiversity are similarly threatened. The far reaching effects of habitat destruction on biodiversity result from the alteration of key habitat and ecosystem characteristics. It affects both abundance and diversity of species.

Whether a species survives or becomes extinct depends on what happens to its environment and its own genetic composition.[57] Large populations with more variations occupying a large area have higher chances of survival than small populations. Common species too are likely to survive than rare ones.

Over-exploitation is a function of human needs. Commercial harvesting too has been a major threat to many marine species. It has significantly contributed to the loss of biological diversity.[58] A wide spectrum of wild mammals, birds, reptiles, amphibians, fish, trees, flowering plants and fungi have been and continue to be over-exploited. Impliedly, although habitat conservation is the sine qua non[59] to biodiversity conservation, it would appear that it is not an end in itself. Exploitation should also be controlled. Industrial, food and other domestic demands contribute to the over-exploitation of biological resources enormously.[60] Trees and shrubs are over-exploited to satisfy human demand for fuel and building material. The demand for ornamental articles also contributes to the endangerment and

extinction of certain species.[61]

Another aspect of exploitation which could lead to loss of biological diversity is botanical uniformity, a course which mankind appear to have embarked on. Beyond doubt, such uniformity brings with it vulnerability to diseases, pests and climatic or environmental changes. For example, where once thousands of varieties of rice were used in South East Asia, by 1989 only one variety of hybrid rice, IR-36 extended accross about 60% of rice lands in the region.[62] Whereas as many as 30,000 varieties of rice flourished in India a decade ago, agronomists estimate that no more than a dozen varieties will dominate three quarters of the country in future.[63] Botanical uniformity enhances the chances of extinction because it is tantamount to "placing one's eggs in a single basket."

1:6:3 Introduction of Alien Species

Deliberate or accidental introduction of species into a new territory has also contributed to loss of biological diversity. Alien species contribute to loss of biological diversity because they threaten natural flora and fauna by predation, competition or altering natural habitats. Exotic species could also transmit parasites, or diseases to indigenous species.[64] Herbivorous mammals for example, have a propensity to degrade and destroy habitats of native species. In the same vein, pigs, goats and

rabbits are good habitat destroyers. With regard to predation, birds, reptiles, smaller mammals and fish are all especially prone to predation by introduced predators. Small carnivores introduced could deplete small native veterbrates.[65] Fish too can deplete other sea organisms. Introduced species of plants have virtually replaced native species in many areas. In some African lakes, which have remarkably high levels of endemism for example, introduced species of fish have threatened most native species with extinction.[66] The introduction or re-introduction of genetically modified species could also lead to loss of biological diversity.

1:6:4 Pollution of the Environment

During the last 200 years, pollution of the environment due to social and economic activities have almost irreversibly changed world ecosystems. Environmental pollution is either aquatic, atmospheric or terrestrial; air, water and soil are polluted. Pollutants include industrial waste such as sulphur dioxide, polychlorinated biphenyls (PCBs), Pesticide residues, such as DDT and other chlorinated hydrocarbons, raw human sewerage, excess fertilizers carried off the land by rainfall and nuclear waste. Extreme pollution occurs, for example, when chemicals pumped into water use up all the oxygen making the habitat completely sterile. Both air and water pollution stress ecosystems and this could reduce populations of sensitive species. Water pollution

is particularly important because of its effect on genetic resources. Aquatic food chains concentrate poison more rapidly than terrestrial ones, and this may contribute to the extinction of species.[67] Marine plants are especially affected by eutrophication (presence of too much nutrients in water) which could lead to the growth of blanket weed which deprives other organisms light. Oil spills pose a danger to seabirds, marine plants and to some extent marine mammals. Oil slicks for example, are lethal to seaducks and auks, sticky oil inactivates them and many have perished on the Baltic and North seas.[68]

Excessive use of agro-chemicals and the release of many compounds of heavy metals and other toxic substances, have caused ecological imbalance in water bodies, wetlands and land areas with detrimental effects on animal and plant species.[69] Acid rain is a product of air pollution and has adversely affected coniferous trees, lake and river waters, particularly in developed countries.[70] Acid rain has resulted in the loss of a number of fish species in Northern European Lakes. The Altantic Salmon and the Rainbow Tout have disappeared as a result of direct or indirect poisoning by acid rain.[71] Suffocation due to inadequate oxygen and food deprivation is another cause of death.

Other Causes

1:6:5 Climatic Changes

The expected climatic change and global warming could have catastrophic impacts on the planet's biological diversity. Climatic change will hasten the destruction of forests, draining of wetlands, overgrazing and land degradation. In the long-run these activities could lead to loss of biological diversity.[72]

In the past, the planet's climatic history was largely governed by natural influences. However, through his activities, man is now able to influence not only local and regional, but also global climatic conditions and in quite drastic and possibly irreversible ways. The major cause of human-induced climatic change is the enhancement of green house effect in the lower atmosphere through increased concentrations of carbon dioxide and other green house gases. The chain reaction of the global geophysical experiment leads on from increasing concentrations of greenhouse gases to an increased absorption of longwave radiation (the green house effect) and to enhanced warming.[73] This will in turn produce a great variety of regional and seasonal variation in climatic events, for example, drought, flood and storms which given the ever increasing global population, could aggravate the already existing shortage of water, food and energy supply. Should the present rates of global warming persist, it is estimated that atmospheric

temperature will rise substantially, with amplification towards the poles.[74] This will affect both weather patterns and water supplies detrimentally. Agriculture in arid areas will be more difficult. High temperatures could lead to the death of forests, destruction of crucial wetland habitats and the disruption of coastal ecosystems.

According to recent research findings at the University of East Anglia in Britain, global warming has resulted in the rise of global surface temperature by 1/2^{o}C this century.[75] Further evidence has it that if greenhouse gases continue to be emitted at the present levels, mean temperature is likely to rise by between 1.5 and 4.5^{o}C over the next 40-50 yeears.[76] In fact, the four hottest years ever recorded in human history were recorded during the decade of the 1980s.[77] Searing heat, prolonged drought and significantly lower crop yields are now becoming a familiar phenomenon in some areas.[78] It is estimated that global warming is likely to raise sea level by as much as one metre.[79] Because a large proportion of the earths population live on coastal areas, many are likely to face increased flooding and tropical storms. Scramble for higher areas could increase pressure on many habitats, species, tax food production and complicate the problem of over-crowding even further.

Evidently,global warming and consequent climatic changes could have negative and far reaching effects on biological diversity. In addition, except carbon dioxide, other greenhouse gases have

been implicated in the depletion of the planets stratospheric ozone layer. It is submitted that measures to conserve biological diversity should also address global warming and ozone depletion.

1:7 RATIONALE FOR CONSERVING BIOLOGICAL DIVERSITY

Background

> "Plant and animal biological resources provide the material basis of human life. 80% of the food consumed by man is derived from twenty kinds of plants and animals. The genetic variation within each species that contributes to its gene pool is a very important attribute easily exhausted by unwise monoclanal over-exploitation. The genetic variation provides requisite raw materials for sustaining and improving farm production, forestry, animal husbandry, fisheries e.t.c. Conservation of the full range of genetic variation... is essential for sustained human progress and for mans continued development and utilization of biological resources."[80]

The central theme in this part can be posed: Why should humanity be concerned about the threat of destruction it posses to other species? Put differently, why should mankind preserve and nurture surviving species and ecosystems? We shall attempt a coherent, complete and internally consistent case for the

conservation of biological diversity.

The most obvious way to argue a case for biological diversity is to demonstrate its present and future benefits to mankind, whether this benefit is direct or indirect. From the foregoing, it is explicitly clear that our analysis is grounded on the anthropocentric approach.[81]

Conservation of biological diversity is and will continue to be a vital issue for the international community during the 1990s and beyond. Loss of biological diversity is an ecological hazard in that it heralds the loss of species valuable to the survival and development of mankind and could lead to genetic uniformity which breeds ecological vulnerability.[82]

Much of the current rhetoric on the urgency and desirability to conserve biological diversity comes not from those with ecological concern, but from those whose aim could be described as "commercialised conservation."[83] Commercialised conservation measures biological diversity in monetary terms and justifies its conservation in terms of present and future commercial returns. It fails to recognize that biological diversity has an inherent ecological value which is unmeasurable in monetary terms. However, their contribution cannot be played down. Ecological conservationists have only supplemented these efforts.

The catastrophic consequences of persistent loss of biological

diversity can be summarised in the following words.

> "... crop yields will be more difficult to maintain in the face of climatic changes, soil erosion, loss of dependable water supplies, decline in pollinators and assualt by pests. Conversion of productive land to wasteland will accelerate deserts which continue their seemingly inexorable expercussions. Air pollution will increase and local climate will become harsher."[84]

It would mean that the present generation will pass a sorry heritage to future ones, a biosphere with less productive land, less biodiversity, less room for manouvre, few options and a large human population among other undesirable consequences.

Commenting on why mankind should conserve biological diversity, Richard Fitter writes:

> "Everyday of our lives, every man, woman and child in the world depends on living plants and animals for vital parts of their welfare. It is not just a matter of convenience or of personal whim that animals and plants should continue to exist. It is a matter of life and death. Plants and animals both wild and domesticated are the living units of the ecosystems in which all human beings live."[85]

The upshot of the above passage is, it would appear, some fundamental imperatives underlie conservation of biological diversity.

Conservationists argue that reasons for conserving biological diversity are either economic or non-economic, prundential or ethical, utilitarian or non-utilitarian. There exists among writers and conservationists great diversity of positions with regard to the principal objectives for conserving biological diversity. To the ecologically minded conservationist, biodiversity in its natural communities represent an opportunity to advance human understanding of nature, evolution of behaviour and in understanding man himself.[86] To others, biological diversity is not different from other resources and the purpose of conservation is to assure a continous supply of goods and services derived from them and maximize those goods produce or gene pool for enhancing future agricultural products or increasing new medicine.[87] Others emphasize the non-commercial utilization of at least some biological diversity believing that the principal object of conservation is to provide recreational pleasures of chase and conquest in sporting and fishing.[88] However, most writers use all these arguments in their attempt to justify biodiversity conservation.[89] Without exhausting the range of positions assumed by writers, others still perceive biodiversity as fellow beings who are objects of awe, inspiration, beauty and respect.[90]

In the face of such disparate views, consensus on a number of rationales has often been elusive. But as we intend to demonstrate in the sub-sections that follow, it is possible to identify certain shared convictions that give substance to the

principle of sustainable use which ought to govern the relationship between mankind and biodiversity.

It is generally agreed that species and ecosytems should be conserved for the following reasons,

i) maintenance of ecological balance,
ii) biotechnological research,
iii) agricultural development,
iv) medicine and pharmaceuticals,
v) genetic resources and scientific research and
vi) aesthetic value.

Although biological diversity plays a considerable role in supporting species and natural systems and therefore supporting moral and non-consumptive values of man, as we seek to demonstrate, there exist adequate reasons for conserving biological diversity based on human demand values. It is submitted that there are **inter alia** compelling ecological, economic, scientific and aesthetic reasons for conserving biological diversity. Economically, floral and faunal species and ecosystems are undeveloped resources, that is to say, they have significant economic potential which is currently undiscovered, undervalued, or under-utilized.[91]

The picture that emerges is that conservation of the planet's biological diversity is central to the maintenance and

improvement of agriculture, forestry, ranching, medicine, industry and tourism. Incontrovertibly, biological diversity feeds, doctors, and clothes mankind, supplies fuel and industrial materials and maintains ecological balance and stability.

From the foregoing description, it is obvious that biological diversity plays a pivotal role in the survival of mankind and should be conserved for the good of the entire human race. We shall discuss the individual items catalogued above.

1:7:1 Maintenance of Ecological Balance

> "The 5-10 million species of plants and animals and perhaps is 30 million (including micro-organisms) found on the earth are working components of ecosystems whose services are essential to our existence. They provide oxygen and remove air pollutants, recycle nutrients, maintain moderate climates, regulate fresh water supplies and water quality, control pests and diseases, create fertile soils and carry out a myriad of other functions indispensable to life."[92]

The biosphere is the living and life supporting system in the outer part of the earth. It is the home of the natural wealth of the planet, a product of 4 billion years of evolution.[93]

Continuity of life on earth rests on the integrity of the biosphere. As it is a closed system, the biosphere is characterised by interdependencies between natural systems and biological processes. Living creatures are united with each other and with their non-living soroundings. Being part of the biosphere, biological diversity plays a fundamental role in the maintenance of ecological balance and stability. Although it is not the numerical superiority of species within an ecosystem which determines ecological balance and stability, diversity and stability have evolutionary relationships. High environmental stability most likely leads to higher community stability and higher species diversity. Ultimately, the issue boils down to how much diversity fosters stability.[94] This ushers in the argument relating to marginal and absolute loss of species. Generally, although it is only when a sizeable proportion of a species population is lost that ecological balance is likely to be upset, the magnitude of the effect depends on the status of the specific species within the ecosystem.

Biological diversity is actively involved in the operation of innumerable processes within the biosphere. Processes such as photosynthesis, carbon and nitrogen cycles are facilitated by biological diversity.

Maintenance of ecological balance and stability is the single most important rationale for conserving biological diversity. Biological diversity facilitates the operation of the biosphere.

If unchecked, global loss of biological diversity could have catastrophic effects because most species being lost contribute more to the workings of the global ecosystem.[95] Loss of indicator species greatly undermines the baseline to monitor the natural environment.

Since it is certain that thousands of species will be lost before the close of the century, the issue is what species the planet can comfortably afford to loose without any significant risk. Time is past when humankind could achieve much by running "hither and you with backets of water".[96] The underlying consideration is to maintain and enhance conservation of biological diversity to facilitate biospheric operations. Species and ecosystems interact in countless processes making the biosphere a self-regulating system ensuring continuity of life. Undeniably, when humanity allows loss of biological diversity, it is in essence sawing off the branch that it is perched on.

1:7:2 Biotechnology

"The importance of biological diversity to the future of biotechnology cannot be over-emphasized."[97] Biotechnology has been defined as the application of biological systems and organisms to scientific, industrial, agricultural and environmental processes.[98] The relationship between biological diversity and biotechnology is mutually dependent. Biological

diversity is the foundation from which biotechnology develops.

Genetic material contained in domesticated varieties of crops, plants and animals and their wild relatives is essential for breeding programmes by which genes are incorporated into commercial lines for the continued improvement of yields, nutritional quality, flavour, pest and disease resistance and responsitivity to different soils and climates.[99] Biotechnology facilitates the development of new and improved methods of preservation of genetic resources and speeds the evaluation of germplasm for specific traits for the development of new and union varieties.

Since biological diversity constitute the genepool of domestic and wild species, it facilitates the development of industries related to the use of genetic materials. In fact, its conservation is critical because as wide a genetic base as possible is necessary to facilitate biotechnology. Conservation of biological diversity maintains the genetic variability of plant and animal species thereby enhancing genepools and facilitating biotechnological advancement.

Biotechnology remains the key to the utilization of organisms for food and industrial purposes. It is the basis of agricultural advancement in as far as the development of new cultivars which increase production output, improve quality of nutrition and strengthen resistance to disease and pest is concerned. In a

nutshell, biotechnology facilitates sustainable utilization of biological diversity.

1:7:3 **Agriculture (Food)**

> "The way ahead is plain. The visions of agriculture can be fulfilled by biological diversity, but only if the disastrous reduction of the habitats containing the reservoirs of diversity is checked in time".[100]

Genetic material make up a large proportion of any human meal. Plants and animals contribute markedly to new forms of food production and advances in conventional agriculture. Farm crops, domestic animals and fish which constitute basic food stuffs have all evolved from earlier wild species. In addition, entirely new food plants are now available. The planet is estimated to contain 80,000 edible plants.[101] Out of these, mankind has at one time or another used 30,000 species only. Surprisingly, people have actually been feeding on less than 20 species.[102] "We are essentially using the same limited number of species as have served mankind for centuries."[103]

Human reliance on plant and animal species for food is well documented. In 1987 for example, it was estimated that 80% of the food consumed by mankind derived from 20 kinds of plants and animals.[104] Almost all constituents of typical western or

eastern meals[105] derive from genetic resources, which means that such meals can only be available if their stocks are maintained with adequate genetic diversity in an environment in which they can survive. Reliance on plant and animal species for food however is more pronounced in developing countries.[106] Most foods derive from two families, the grasses (graminiae) and the bovidae.[107] Although most species relied on are domesticated, their wild counter-parts cannot be ignored, firstly because of their role in the diet of peoples in the tropical world, and secondly the need for constant infusion of wild genes to maintain genetic diversity of the cultivated species.

All levels of biological diversity viz, species, genetic and ecosystem contribute to agricultural systems thereby enhancing food production. Ecosystem diversity may influence pest invasions by isolating adjacent crops or by sheltering pests that prey on them. Species diversity is significant because it is the part ultimately consumed. Genetic diversity facilitates abundant harvests in modern agriculture as a result of careful breeding of different crop varieties which combine advantageous genes into a single stock plant. About 40-60% of improved crop production is attributable to breeding.[108]

Biodiversity also offers potential sources of human food for the future. The Yeneb nut bush (Cordeauxia edulis) and the Wax Gourd (Benin casa hispida) are good examples.[109]

What emerges is that for purposes of increasing food production and expanding the base of edible plant and animal species, inter alia, biological diversity conservation is of paramount importance.

1:7:4 Medicine and pharmaceuticals

> "Everytime a square mile of Amazonian rainforest is cleared, a possible cancer cure... maybe lost for ever... many presently unexploited plant and animal species have obvious potential."[110]

From the earliest times the contribution of plants and animals to medicine has been enormous. For many years, man has used extracts from wild floral and faunal species for medicinal purposes.[111] These species are also used directly in the production of medicine and as starting materials in drug synthesis. Mankind appear to be no where near being able to dispense with either wild or cultivted genetic resources in medicine. About 70% of all plants known to have anti-cancer properties grow in moist tropical forests,[112] the most threatened of all habitats. The World Health Organization (WHO) estimate that 80% of the people in developing countries rely on traditional medicine for treatment.[113] Professor Schultes, for example, has identified about 1,300 plant species used for medicinal purposes by the forest people of Amazonia.[114]

Plant and animal species contribute a wide range of drugs and

pharmaceuticals, including, analgesics, (painkillers), antibiotics, heart drugs, anti-leukemia agents, enzymes, hormones and anti-coagulants.[115] Although current pharmaceutical research is busy synthesizing substances produced by plants and animals, biodiversity offers even greater future applications, because most drugs available today are the result of investigating only a tiny fraction of the worlds species.[116] This illustrates how unwise man would be if he allowed floral and faunal species to become extinct before their potential was discovered.

The catalogue of important drugs derived from plants is long.[117] However, dependency on plants for medicinal purposes vary from region to region.[118]

Although plants have contributed most to medicine and are therefore best documented, medical products from many animal species are also important. Over 500 marine organisms yield chemicals with anti-cancer potential.[119] Land animals have contributed few compounds to medicine.

In addition, faunal species make an important contribution to medicine as models for research.[120] Use of animals in biomedical research is important to medicine. It has led to the discovery of new drugs. Although animals (both marine and terrestrial) contribute to medicine, plant species constitute the main source. Approximately, 119 pure chemical substances extracted from higher plants are used in medicine throughout the world.[121]

We have attempted to demonstrate the fundamental role that floral and faunal species continue to play in the realm of human health. But, it must be emphasized that only a small proportion of the species have been investigated for possible usefulness in medicine.

Therefore, as humankind ponders the challenges posed by loss of biological diversity, it ought to know that loss of species takes away with it a pharmacopeia of unknown size and value.

1:7:5 Genetic Resources and Scientific Research

Genetic materials are characteristics transmitted from one generation to another and are of actual or potential use to man. These characteristics could be disease resistance, pharmacological activity, environmental adaptation or the capacity of a timber tree to grow tall and straight.[122] The underlying imperative is to have as wide as possible, the genetic base.

Genetic diversity has acquired considerable prominence since the era of biotechnology set in. Biotechnology puts an even greater premium on identifying, managing and conserving genetic resources. But everytime a population or species become extinct the unique genetic information it contains is irretrievably lost. Genetic material is needed to achieve continued improvements in

yields, nutritional quality and pest control. However, man might not discover the unknown potential of many species because many wild relatives and domesticated species are already extinct.

Numerous instances demonstrate how easily diseases can almost eliminate floral and faunal species materially or aesthetically valuable to man. Since man remains largely unaware of what fresh epidemics may develop, it is imperative to conserve the maximum potential to resist such unforseables by maintaining the widest genetic base. Unless there is a wide gene pool to fall back on, mankind will always be at a disadvantage. But the benefits accruing from genetic resources cannot be obtained in the absence of scientific understanding of the species, their individual characteristics and relationship with other species among other things.[123] Floral and faunal genetic material is used in the research for drugs and other products, surgical techniques and rotheses and in genetic research. Because of their similarity to man in certain aspects, primates and fruitflies have facilitated basic scientific research.[124] It cannot be doubted that the use of primates in biomedical research and testing has significantly contributed in the advancement of human health and disease control. About 30 primates are currently being used.[125] By way of conclusion, it is important to note that biological diversity has greatly contributed to human understanding of nature and processes which he can use to satisfy immediate needs. Undoubtedly, it appears necessary to conserve comprehensive ecological systems in an undisturbed state.

1:7:6 Aesthetics

> "Aesthetic and other amenity value thrive on diversity. Humans seek varied experience to avoid boredom... Aesthetic experience of nature and wild species supplement and complement the aesthetic value attached to human art objects. The experience of nature contributes to diversity of experience generally."[126]

Biological diversity adds to the diversity and texture of life's fabric on the planet. The aesthetic justification for biodiversity conservation is that many species of plants and animals and habitats are irreplaceable sources of wonder, inspiration and joy, because of their beauty, intriguing appearance, variety of fascinating behaviour.[127] Human enjoyment of the natural environment created by biological diversity is evident.[128] Many people derive enrichment and vicarious satisfaction from reading and learning about species and ecosystems. Few people visit deserts or other areas devoid of wildlife for enjoyment and mental refreshment. In our view, the attraction of visiting a wilderness area, spending a day in the country side or strolling in a park lies in the diversity of plant and animal species that these areas offer. Full enjoyment of nature demands contrasting elements. There is satisfaction in the knowledge that certain creatures exist somewhere on the planet. Although even the most keen conservationist might not loose much sleep if the blue whale, for example, became extinct,

many people will inevitably feel that the planet has lost part of its life.

Features such as the floral diversity of the Alphine or Rocky mountains, the miraculous coral gardens of tropical atolls such as Maldive islands and the pink ribbon of millions of flamingoes lining the shores of Lake Nakuru, are great tourist attraction sites. These spectacles form the basis of an important slice of the international tourist industry in countries like Zimbabwe, Kenya and Rwanda.[129] Persons who cannot travel to sight flora and fauna in their natural habitat visit zoos, botanical gardens, parks and other collections of captive animals designed purely for pleasure. These sites provide both enjoyment and a better understanding of the natural world. "Are our descendants to be denied these pleasures?"[130] We are convinced that they ought not.

1:8 Summary

> "... As long as certain bits of the cake are not consumed and consumption of the rest of it is kept within certain limits, the cake will renew itself and provide for continuing consumption."[131]

We have attempted to demonstrate the interdependencies within the biosphere, the distribution of biological diversity and the

principal causes of its impoverishment. Finally, we rounded up the chapter with an attempt to advance a case for the conservation of biodiversity. There is no doubt that biological diversity is central to the survival and development of mankind and should be conserved.

The notion of conservation entails the use of resources in such a way that vital stocks are maintained and their benefits enjoyed by succeeding generations.[132] Conservation does not mean non use but wise use which contributes to sustainable development.[133] Progress towards conservation has been lamentably slow, understandably so because it had for a long time been perceived as an aspect peripheral to humankind's continuing quest for social and economic welfare.

During the last few centuries of technological advancement, widespread industrialisation and rapid human population increase, loss of biological diversity has increased tremedously.[134] Rapid destruction of the planet's most diverse ecosystems especially in the tropics threaten the bulk of global biodiversity. Through his activities, man has caused the planet's capacity to hold more people dwindle. For many years he continues to treat the planet like a rented car running it so hard and recklessly that it is falling apart. The planet has reached a turning point at which depending on what the present generation does, matters may be resolved for better or for worse.

Certainly, a significant proportion of the diversity of life on earth will be lost during the next few decades and this could have serious, negative and far-reaching consequences. There is an environmental crisis and unless a concerted international action is taken immediately, there will inevitably be a further decline in the planet's capacity to support its population. Since only the present generation can take effective action, it must be deeply involved. The international community must acknowledge that its future is shared. These words were recently echoed by Mostafa Tolba, the Executive Director, UNEP. Said he, "Nations of the world may not have a common past but they certainly have a common future..."[135]

If life-giving environment is to be conserved and the quality of life improved, then the theme of the Stockholm conference on the human environment, Stockholm, 1972, should be recalled. The international community must take the initiative and institute mechanism to stem further loss of biological diversity. The fate of the entire human race is in the hands of the present generation. It should take effective measures to minimize the projected loss of biological diversity. But how is this to be achieved particularly in developing countries where competition between meeting basic needs of the burgeoning population and maintaining biological diversity exist? Although "it is simply no good telling landless people in the tropics on the edge of starvation today that they should protect rather than destroy the forests in order to save the biological diversity of

tomorrow",[136] it would appear that this is inescapable in the shortrun.

Developing countries face genuine challenges in dealing with biological diversity. It is difficult for them to focus on longterm environmental needs while immediate needs are grave and pressing. These states are mainly pre-occupied with the immediate needs of the burgeoning population, food, fuel, means of earning foreign exchange to buy essential products and pay existing mounting debts. The rapidly increasing population remains the principal threat to biological diversity in developing countries. What then should be done to conserve the remaining stocks?

Given that the removal of every species from the global pool weakens the total ecosystem that supports man, and other life, the present generation should concern itself with maintaining the natural balance, that is to say, the need to protect and enhance productivity of species, habitats and ecosystems to maintain global biodiversity.

The best approach to conservation is the so called "ecological approach". This approach takes the need for long-term environmental preservation and balance as the centre point. Limits for the extraction of resources are dictated not by market forces but by the carrying capacity of the ecology.

Equally important in enhancing conservation of biological diversity is the need to address fundamental problems facing developing countries, viz, poverty, and underdevelopment. Addressing these challenges demand institution of appropriate mechanisms to facilitate the transfer of resources, technology and technical assistance from developed nations to enhance economic development. Unless these problems are addressed, their insistence that developing countries fulfil their conservation obligations is of no avail.

Secondly, since the fundamental problems facing developing countries are to a large extent biological in origin, namely, population pressure, habitat destruction, disease, inadequate food and shelter, it is submitted that these problems could be reduced by making biological diversity a source of economic wealth. It is one of the least exploited yet important biospheric resources. Whereas knowledge of biological diversity might not encourage conservation, incentives and motivation to use it sustainably could. Policy makers on the other hand should establish a linkage between economic development and conservation with a view to enhancing conservation. In addition, social and economic systems should incorporate aspects of biodiversity conservation. The need to integrate conservation into the development planning process cannot, therefore, be over-emphasized.

Finally, since conservation needs transcend the limited scope of individual states and are therefore transnational, the challenge requires a vision larger than national boundaries. The international community should through articulation of legal conceptions, acknowledge that biological diversity is a global resource towards the conservation of which all have a responsibility. The ecological truth that the globe is an ecological unity to which all countries of the world are bound and the maintenance of whose integrity all are jointly and severally responsible should inform all conservation strategies.

Having come to the conclusion that conservation of the planet's biological diversity is a biospheric imperative and therefore a responsibility of the international community, we intend to demonstrate, in chapter two and three, how the international community has striven to enhance conservation of biological diversity through various legal mechanisms and strategies.

16. CHIEF, SEATTLE in a letter addressed to President Franklin Pierce, 1855.

17. This argument is supported by the theological approach embodied in Genesis. Chapter 1 of Genesis is emphatic that God created man on the last day and left him incharge of the rest of Gods creation, viz, fish, birds and all animals domestic and wild large and small.

18. IUCN, UNEP, WWF The World Conservation Strategy 1980 p. 2

19. ibid P. 2

20. HAILS, CHRIS (Ed) The Importance of Biological Diversity Statement by World-Wide Fund for Nature, 1990 p. 5.

21. UNEP The Conservation of Biological Diversity: Report of an Ad hoc Group of Experts to the Executive Director. UNEP/BIO:Div. 1/inf.1 Nairobi 29-31 August 1988 Annex I.P.3

22. FURTADO, JOS I. Biological Diversity: Global Conservation needs and costs. UNEP/BIO.Div 3/inf.1 June 12th, 1990 p.3

23. HAILS, CHRIS op. cit. p. 3

24. ibid P. 3

25. TOLBA, Supra P. 725

26. FITTER,RICHARD: Wildlife for Man: How and Why Should We Conserve our Species? Collins and Sons Ltd, London, 1986 p. 22

27. ibid P. 24

28. GREN, LUCAS and SYNGE, HUGH The IUCN Plant Red Data Book IUCN Gland, 1978 p. 8

29. FURTADO ,JOS I Loc. cit. p.3

30. ZISWILLER, V. Extinct and Vanishing Animals (Revised English Edition) F & P Bunnell Transl, 1967 p. 56

31. FITTER, RICHARD Op. cit. p. 24

32. EHRLICH, PAUL R., and EHRLICH, ANNE H., Earth Melthue Press, London, 1987, P.149

33. TOLBA, MOSTAFA K."To Preserve Natures Brightest Torches" Speech to the Second Session of the Ad hoc Working Group of Experts on Biological Diversity. Geneva 19-23 Feb, 1990 p. 1-2.

34. TOLBA, Supra p. 726

35. FITTER, RICHARD Supra p.40

36. HAILS, CRIS Op. cit. p.14

37. ibid P. 12

38. ibid P. 10

39. ibid P. 10

40. ibid P. 10

41. NORMAN MYERS The Sinking Ark: A New look at the problem of Dissappearing Species, Pergamon Press, Oxford, 1979 p. 10

42. NORTON, BRYAN Op. cit. p.139

43. MYERS, NORMAN Op. cit. p.4

44. ibid p. 4

45. WILSON E.O., FRABCUS, M. PETER (Eds) Biodiversity, National Academy Press Washington D. C. 1988. P. 98

46. ibid P. 14

47. ibid P. 15

48. SAWYER, JAQUILINE "Biodiversity: A conservation Imperative" (1989) 8 The New Road P.4

49. PLANCE, G. T. "Floristic Inventory of the Tropics: Where do we stand?" (1977) 64 Animals of the Missouri Botannical Gardens. 659-84.

50. SAWYER, JAQUILINE Loc. cit. p.8

51. ibid P. 8

52. NORMAN, MYERS Supra p. 3

53. ibid P. 3

54. FAWCETT, CHARLES W. "Vanishing Wildlife and Federal Protective Laws" (1971) Ecology Law Quarterly. p.521 at 523.

55. TOLBA, Supra p. 727

56. RAVEN, PETER H. "The Politics of Preserving Biological Diversity". (1990) 40 (10) Bioscience: 769 at 771.

57. MOORE, N. W. The Bird of Time: The Science and Politics of Nature Conservation. Cambridge University Press, Cambridge, 1988 p. 6

58. These include the American Bison, Quagga, Passenger Pigeon Dodo and the great Auk.

59. MOORE, N. W. Op cit. p. 121

60. This has led to the extinction of pilchards off Namibia, Altantic bluefin, serious depletion of Tunas, seals and fisheries off Georges Bank, New England and off the Peru Coast.

61. TOLBA, Supra p. 726

63. ibid P. 726

64. NORTON, BRYAN Supra p. 32

65. For example, the large mouth bass introduced by anglers into lake Aliltan, Guatemala ate the chicks of the endangered giant grebe.

66. Introduction of the Nile Perch into Lake Victoria has almost exterminated cichild species.

67. FITTER, RICHARD Supra p. 107

68. ibid p. 124

69. See, Generally Excerpt from the 1991 State of The Environment Report: Chapter III UNEP/BIO.Div./WG2/2/inf. 1 Nairobi 15.2.91

70. ibid p. 5

71. UNEP State of the Environment 1983 p.17 - 18

72. See, HINRICHSEN, DON "Fighting the Greenhouse Effect" (1990) 68 WWF News. p 4-5 p.4

73. ibid P. 4

74. See, SAWYER, JACQUILINE "The Greenhouse effect: An Environmental Experiment"

75. BBC World Service News Bulletin 1800 hrs March 4th, 1991.

76. See, MINTZER, M. IRVING "A Matter of Degrees: Energy Policy and the Greenhouse Effect" (1989) 17 (6) Environmental Policy and Law. p.247.

77. TOLBA, Supra p. 727

78. North Americas grain belt is the best illustration.

79. HINRICHSEN, DON: Loc. cit. p. 4

80. JIANMING,JIN "Protecting Biological Resources to sustain human progress" (1987) 16 (No.5) Ambio.262 at 262.

81. For a lucid discussion of this approach, see MORTON, BRYAN G. op. cit. p.138

82. The monoclanal production of most of the worlds food and cashcrops, for example, coffee, wheat, rubber, rice and palm oil narrows the genetic base and enhances chances of extinction in case of a catastrophy.

83. See generally (1985) 20 (No.2) Ecologist.

84. WILSON, EO Op. cit. p. 125

85. FITTER, RICHARD Supra p. 11

86. CAHN, R. An Environmental Agenda for the future, Agenda press Washington D.C. 1985 p. 82.

87. See Generally Op. cit. Note 5.

88. CAHN, R. Op. cit. p. 12

89. See, PRESCOTT-ALLEN C, PRESCOTT-ALLEN R: The first Resource. Yale University Press, New Haven, 1986, MORTON, BRYAN G. Why Preserve Natural Variety? Princeton University Press, New Jersey, 1987. MYERS, NORMAN: The sinking Ark: A New Look at the Problem of Disappearing Species. Pergamon Press Oxford, 1979, OLDFIELD, MARGERY L. The Value of Conserving Genetic Diversity. Sineaur Associates Inc. Publishers Massachussets, 1984, ROBERT ALLENS: How to save the World: Strategy for Conservation Kogan Page London 1980, FITTER, RICHARD Wildlife for Man: How and why should we conserve our species? Collins and Sons Ltd,London, 1986, WEISS, EDITH B. "The Planetary Trust: Conservation and Intergenerational Equity". (1984) 2 (No.1) Ecology Law Quarterly. p.495.

90. CAHN, R. Supra p. 14

91. LEDEC, GEORGE, and GOODLAND, ROBERT Wild Lands: Their Protection and Management in Economic Development. World Bank, Washington D. C. p. 27.

92. VALENTYNE, J. R. Loc. cit. p. 1

93. HAILS, CRIS Op. cit. p. 1

94. NORMAN, MYERS Supra p. 50-51

95. The indiscriminate clearing of tropical rainforests in many developing countries in illustrative of this point.

96. EHRLICH and EHRLICH Op. cit. p. 24

97. UNEP: Biotechnology: Concepts and Issues for consideration in preparation of a framework legal instrument for the conservation of Biological Diversity. Doc.UNEP/BIO.div 3/inf 5 Geneva 9-13 July 1990 p.2

98. This definition was given by UNIDO/WHO/UNEP working Group on Biotechnology safety.

99. FITTER, RICHARD Supra p.29

100. HAILS, CHRIS Supra p. 22

101. NORMAN, MYERS Supra p. 57

102. FITTER, RICHARD Supra p. 14

103. NORMAN MYERS Supra p. 58

104. SAWYER, JAQUILINE Loc. cit. p.4

105. A typical "Western" meal might draw on nearly a dozen plants and two or three animal families and so would a typical "Eastern" meal.

106. In their present stage in development these countries cannot but continue to rely heavily on floral and faunal species for food. It is estimated that about 80% of the diet of an ordinary African come from 79 species of wild plants while the remaining is made up from bush meat.

107. In addition, the suridae yields pork, bacon and lard.

108. HAILS, CHRIS Supra p. 20

109. Yeheb nut bush grows well in arid areas and produce edible prolific seed pods. The was gourd grows in the Asian tropics. Another potential source of human food is the South East Asian Winged bean "a supermarket in stock".

110. EHRLICH and EHRLICH Supra p.135

111. HAILS, CHRIS Supra p. 15

112. FITTER, RICHARD Supra p. 25

113. HAILS, CHRIS Supra p. 15

114. ibid p. 15

115. NORMAN, MYERS Supra p. 15

116. Estimates have it that man has so far studied 1.4 million species only.

117. These include, culcticine derived from Gloriosa superba, Quinine from Anchona, Vineristine and viriblastine from Catharanthus, I-Dopa from Mucuna pruneus, reserpine from Raurolfia, Vincamine from Vincar minor, Xanthotoxin from amminjus, Asiaticoside from Centella Asiatica, Antipasmodics from Dubolsia, Cathartics from Cessia Ulcer treatments from Glycyntiza globra, anti-diarrheals from berberis aristata e.t.c.

118. In South East Asia for example about 6,500 plant species are used by traditional healers while in India the figure is about 2,500. In China over 5,000 plants have been catalogued of which 1,700 are in common use.

119. HAILS, CHRIS Supra p. 15

120. MAUGH, T. H. "Leprosy Vaccine Trials to begin soon" Science 215 p. 1083 - 1086.

121. FARNSWORTH, N. R. Screening plants for medicine 1988 P.83-97.

122. OECD: The state of the Environment Paris, 1985 p. 140

123. NORTON, BRYAN Supra p. 14

124. While primates are undoubtedly similar to human, fruitflies have short life cycles and large chromosomes in their salivary glands.

125. HAILS, CHRIS Supra p. 3

126. NORTON, BRYAN Supra p. 117

127. JIANMING, JIN Loc. cit. p. 14

128. Large numbers of people from North America, Europe and other parts of the globe roam the world annually in search of wildlife spending thousands of dollars to catch a grimps of a rhino, elephant or tiger.

129. The Tourist industry in these countries is based in its entirety on the wildlife resource.

130. JIANMING, JIN Supra p. 1

131. PRESCOTT-ALLEN, C. and PRESCOTT-ALLEN R., The First Resource: Wild Species in the North American Economy Yale University Press New Haven 1986 p. 16

132. ibid P. 9

133. See, generally, Op. cit. Note 18

134. FAWCETT, CHARLES W. Loc. cit. p. 525

135. TOLBA, MOSTAFA K. "Transfer of Technology and the Financing of Global Environmental Problems: the Role of Users Fees:" A note to the meeting on Informal Consultations on Financial Mechanisms. UNEP/OZL fin 1/2 Nairobi 22 - 4 Jan 1990

136. SAWYER Loc. cit. p. 4

137. WILSON, E.O. Supra p. 10

138. SAWYER Loc. cit. p. 4

139. FURTADO, JOS I. Loc. cit. p. 4

CHAPTER II

2:0 EXISTING LAW ON THE CONSERVATION OF SPECIES, HABITATS AND ECOSYSTEMS

That components of the planets biological diversity should be conserved for the sake of present and future generations of humankind need not be gainsaid. There is now a general consensus at the international level that continuing deterioration of the state of the environment and serious degradation of life-support systems should be stemmed. It is pursuant to this realization that the international community has negotiated treaties, protocols and embarked on programmes, action plans and adopted measures to combat impoverishment of biodiversity.

In this chapter, we seek to establish whether in their totality these arrangements and strategies are adequate to enhance conservation of components biodiversity on a global scale. Essentially, we seek to demonstrate how the international community has used law to contain the challenge posed by loss of biodiversity. The nature and character of existing conservation mechanisms and strategies together with their strengths and weaknesses will be examined. However, on account of the large number of both global and regional conventions in this field, our analysis assumes a thematic approach. This approach is intended to demonstrate firstly, that the germ of biodiversity conservation is not a modern invention, and secondly, that

although the international community has continuously responded to the challenge posed by loss of components of biodiversity, it has done so neither comprehensively nor systematically.

It is contended that although some existing regimes provide potentially effective mechanisms for the conservation of some individual species and habitats, there exist inter alia inadequacies in the law itself and lack of financial and administrative support for their implementation thus limiting their utility as biodiversity conservation tools. It is further contended that effective conservation of the planet's biodiversity calls for emphasis beyond a single species or habitat.

The chapter is divided into eight parts. The first part is a brief introduction to the chapter. The second part analyses existing arrangements relating to conservation of habitats and ecosystems. The third part considers regimes relating to conservation of species and genera. The fourth part is devoted to measures designed to promote ex-situ conservation of species and genera. The fifth part is a review of attempts to conserve components of biological diversity of the marine environment. The sixth part evaluates existing financial arrangements, while the seventh part assesses the contribution of international co-operation in the conservation of biological diversity. The last part is a summary to the chapter.

BACKGROUND

Impoverishment of the planets biological diversity is a culmination of disjunction and disequilibrium among social, economic, political, cultural and environmental factors. It is a microcosm of broader problems and is intimately tied with the problems of deteriorating resources, water, land and ecological systems in general.[1]

Indisputably therefore, to seek an understanding of the linkages and to achieve a balance among population, resources, environment and development is a necessary and harmonitive point of reference.

Although the idea that conservation was an aspect peripheral to the satisfaction of human needs held sway for many years,[2] it has now given way to the more rational perception of its role in the social and economic development of mankind. This is because biological resources are effectively conserved by using them for the benefit of local communities within limits of natural growth and regeneration.[3] Incontrovertibly therefore, conservation is not antithetical to development but complementary to it. Recognition of this complementarity is essential in seeking to satisfy human needs.

Equally important is the realization that since underdevelopment, poverty and environmental degradation are closely interelated, biodiversity conservation should be perceived as an integral part

of the development planning process. Though poverty remains the norm in many developing countries, and much as the success in conserving biodiversity will ultimately depend on widespread economic development and land-use planning, economic development need not reach minimum levels before specific action to protect species and habitats can be taken.

In principle, mankind as a whole benefits from species, habitats and ecosystems. Modern agriculture and medicine served by genetic resources, for example, benefit the entire human community. On the other hand, the technological expertise harboured by developed nations enable humankind to make use of genetic resources around the world.

From the foregoing facts, it can be surmised that the international community has no choice but to collectively adopt measures to curb biodiversity impoverishment. In very broad terms, conservation of biological diversity would entail consensus and commitment at the highest political level, an effective legal machinery backed by an elaborate and efficient institutional framework and a sustainable financial mechanism. The specific conservation strategies are nonetheless numerous.[4]

Biological diversity became an environmental buzz word during the 1980s when biologists and other scientists warned that human activities were causing a cascading loss of the planets floral and faunal species.[5] The idea of a global convention on

biologial diversity was first conceived at Bern in 1913. It was later revisited during the 1949 Lake Success Conference.[6] However, both attempts produced no tangible results. It is in the Stockholm Declaration, 1972, that the basis of a convention on biodiversity was finally written.[7] The basic principles were agreed upon and were further developed in the World Charter for Nature, 1982.[8] The same principles had been laid down elaborately and comprehensively in the famous World Conservation Strategy, 1980.

2:1 International Law and the Conservation of Biological Diversity

International law governs the conduct of states and other international persons. The international law making process entails the formulation and projection of policy as authoritative community expectations.[9] The process takes the form of articulated multilateral and bilateral treaties and the unarticulated customary behaviour of states (in so far as it reflects the general practice of states.) Each of these forms has displayed features of interest to international environmental law.

The most usual medium to establish new international obligations particularly those that are complex and involve elaboration of some detail is the treaty. Treaties or conventions are entered

into by sovereign states and international bodies and contain binding obligations on contracting parties. Treaties have facilitated the introduction of principles into the international legal regime often with minimun possible delay.[10] In addition, radical changes can, and have been introduced into the law. On the whole, treaty law has made significant contribution to the development of international environmental law.

International legal rules and principles relating to conservation of biological diversity are almost in their entirety contained in a plethora of global and regional conventions. This articulation of conceptions of legal principles demonstrate both awareness of global environmental problems and the germ to do something about them. The large number of conventions in this field and the ever increasing number of state parties to them is illustrative of the fact that conservation requirements transcend political cleavages.[11]

Although this study is basically posed to analyse "hard law" relating to conservation of components biological diversity, it must be emphasized that the so called "soft law" has played and continue to play an important role in the development of international conservation law. Documents such as the Stockholm Declaration, 1972, World Conservation Strategy, 1980, World Charter of Nature, 1982 and UNESCOs Man and Biosphere Programme (MAB)launched in 1971, though lacking formal treaty requirements articulate principles that have over the years mustered

international acceptance and adherence. The general acceptability of these principles render credence to the argument that they are an integral part of the evolving customary rules of international law.[12]

The Stockholm Declaration, 1972, for example, epitomizes the international community's concern for the environment. It ushered in the era of globalism in the environmental arena. The famous Stockholm Conference, 1972, adopted 26 principles to inspire and guide the international community in environmental conservation. It represented the first attempt by the international community to establish a set of basic rules in international environmental law. The Declaration represents a watershed in global environmentalism.[13]

The World Charter for Nature, 1982, was solemly proclaimed by the United Nations General Assembly in October, 1982.[14] Although it repeats most principles articulated in the Stockholm Declaration, 1972, in addition, it is based on certain fundamental principles elaborated in the World Conservation Strategy, 1980, which introduced the concept of sustainable development. The charter embodies broad principles directed to all and sundry. It basic premise is that "all forms of life are unique..."[15]

The World Conservation Strategy, 1980, details the fundamentals of environmental conservation in general and biodiversity conservation in particular. It is known for popularising the

concept of sustainable development. Of the three documents, it is the most elaborate and comprehensive. UNESCO's Man and Biosphere Programme (MAB) on the other hand addresses basic issues in environmental conservation.

Because of the large number of resolutions of international organizations relating to conservation of components of biological diversity it becomes necessary to assess their standing. Generally, resolutions of international organizations do not create law unless the constitution of the organization in question so provide. The international court of justice has authoritatively laid it down that Resolutions of the United Nations General Assembly are recommendations. Said Judge H. Lauterpatcht

> But, in general they (resolutions) are in the nature of recommendations and it is the nature of recommendations that, although on proper occasions they provide a legal authorization for members determined to act upon then individually or collectively, they do not create a legal obligation to comply with them.[16]

This argument holds true in other international organizations.

But resolutions of international organizations could have binding force if they interpret and declare existing international law.[17] In such circumstances, the binding quality of the resolution is to be found not in the resolution but in the law embodied.

Secondly, resolutions which attempt to create new law do not become law making in themselves but whether they become law depends on their acceptance and application by states and other international organizations which means they must fulfill the traditional requirement of customary international law making summarized in the Latin maxim opinio juris et necessitatis[18] Undeniably, therefore, resolutions that purport to declare rules of international law but are ignored by states remain hollow. This cannot be said of the Stockholm Declaration, 1972, World Charter for Nature, 1982, and FAOs International Undertaking on Plant Genetic Resources, 1983, which now command universal acceptance and both member states and international organizations acquiesces in them.

Although responsibility of enhancing conservation of biological diversity ultimately lies at the national level, loss of biodiversity is a global phenomenon and calls for attention from humankind as a whole.[19] The international community has taken up the challenge and many global and regional conventions have been concluded. But as we intend to demonstrate, the approach has largely been piece-meal and sectoral in nature. Nevertheless, the Stockholm Declaration, 1972, World Conservation Strategy, 1980, and the World Charter for Nature, 1982, demonstrate that a wholistic and comprehensive approach is possible.[20]

In a bid to counter the challenge posed by loss of components of biodiversity, existing international legal regimes address,

i) measures to protect habitats and ecosystems,

ii) measures to protect species or groups of species from destructive exploitation,

iii) measures to promote ex-situ conservation of species and genera,

iv) measures to conserve biodiversity of the coastal zones and the high seas,

v) financial arrangements and

vi) international co-operation.

vii) measures to protect the biosphere from contamination by pollutants,[21]

Since the central theme of this study is to demonstrate the nature, character and extent of existing international legal arrangements on biodiversity conservation, we shall examine the adequacy of the principal conservation mechanisms and strategies adopted under each category above.

2:2 CONSERVATION OF HABITATS AND ECOSYSTEMS

Environmental degradation, extinction and extirpation of species is having catastrophic effects on habitats and ecosystems.[22] Forested zones and other types of natural vegetation are fast disappearing. The situation is further exacerbated by the fact that habitats and ecosystems biologically rich and promising in material benefits are also threatened. Human activities remain

the principal cause of habitat and ecosystem destruction and degradation.[23] Estimates have it that at the present rate, all forests will have disappeared by the end of the 21st century.[24] The burgeoning population which leads to expansion in agricultural activities in developing countries in particular affects both habitats and ecosystems adversely.

Since habitats and ecosystems are part and parcel of the life support systems, their conservation is central to biodiversity conservation.[25] The international community acknowledges that one of the principal methods to stem habitat and ecosystem destruction and degradation is to control and regulate human activities. In its endeavour to attain this objective, the international community has concluded many treaties which adopt numerous conservation mechanisms and strategies. We shall now embark on an analysis of the principal strategies relating to conservation of habitats and ecosystems. Noteworthy, some of the mechanisms or strategies employed to conserve habitats and ecosystems are equally applicable to the conservation of species and genera.[26]

2:2:1 Protected and Conservation areas

The establishment of protected and conservation areas remain one of the most important biodiversity conservation strategies. It is the oldest and most prevalent. To facilitate conservation of

habitats and ecosystems, existing regimes require contracting parties to establish and maintain protected and conservation areas. The establishment of these areas entail setting aside geographical areas in the form of national parks, national reserves and other nature areas for purposes of protecting natural landscape, geomorphological sites and habitats. Reserves are specifically designed to conserve nature, species, forested zones and aspects of cultural heritage. Protected areas in particular can preserve more species, sub-species and varieties than could off-site protection.

Apart from ensuring survival of species, conservation of habitats and ecosystems through this mechanism facilitates biological and ecological processes of nature, the conservation of representative samples of ecosystems and the protection of rare and fragile ecosystems. The establishment of protected and conservation areas oblige the state concerned to take appropriate measures to enhance conservation. Unlike in conservation areas, to a large extent, no human activity is allowed in protected areas. Although most protected areas in developing countries are public lands, studies have shown that the same strategy is applicable on private land.

This conservation strategy lies at the core of habitat and ecosystem conservation under existing regimes. In fact, most of the remaining forested zones in many developing countries owe it to this mechanism.[27] In addition, terrestrial, fresh water,

coastal or marine habitats can and have been conserved. The mechanism is embodied in both global and regional conventions to protect those ecosystems which are most respresentative of and particularly those which are in any respect peculiar to their territories.[28]

As early as 1933, parties to the Convention Relative to the Preservation of Fauna and Flora in their Natural Habitats, 1933, (which was mainly a regional convention for colonial powers in Africa,) were required to establish National Parks and strict nature reserves in their territories.[29] As opposed to exploitation conventions, which do not as a general rule make provision for the establishment of protected areas, most conservation conventions adopt this as their principal conservation strategy. Contracting parties of the Convention on Nature Protection and Wildlife preservation in the Western Hemisphere, 1940, are obliged to establish national parks, national reserves, nature monuments and strict wilderness reserves.[30] This approach is also popularised by the Convention on the Conservation of European Wildlife and Natural Habitats, 1979, which is essentially a habitat conservation instrument.

The protected and conservation area mechanism is also embodied in the World Conservation strategy, 1980, and the World Charter for Nature, 1982.[31] Similarly, the main objective of the International Network of Biosphere Reserves under UNESCO's Man and Biosphere Programme (MAB) is to conserve for present and

future gnerations the diversity and integrity of species and ecosystems.[32]

Beyond the establishment of protected and conservation areas within national jurisdictional boundaries, international legal regimes have gone a step further and have set aside the Antarctic as an ecosystem "to be used for peaceful purposes only."[33] Although the objective of the Antarctic Treaty, 1959, is basically not conservation, it has provided a framework for tne adoption of other measures to enhance conservation of tne Antarctic ecosystem. The treaty ensures that the ecosystem is spared the vagaries facing others by prohibiting and restricting activities likely to degrade it, for example, large scale mining. During their last meeting in Madrid in June, 1991, contracting parties adopted a blue print document for comprehensive protection of the Antarctic environment. The document guarantees a 50-year ban on mining and oil exploration in the region. The protocol was due for signature on June 23rd, 1991 but the United States declined, contending that the protocol makes the revival of mining virtually impossible after the 50-year ban.[34] This is because under the protocol, removal of the ban would require the support of 75 per cent of all the nations belonging to the treaty at that time. But most important, all the present 26 voting members would have to support the decision. Thus, the new agreement would provide the power of veto for any of these members that might oppose the removal of the ban. Despite criticisms, the United States has shown no signs of ratifying the

Madrid agreement.

Other substantive conservation measures are urged under the Agreed Measures for the Conservation of Antarctica Fauna and Flora, 1964, Convention for the Conservation of Antarctic Seals, 1972, and the Convention on the Conservation of Antarctic Marine Living Resources, 1980.[35] Between 1982 and 1988, the Antarctic Treaty nations negotiated the Convention for the Regulation of Antarctic Mineral Resources Activities (CRAMRA). But environmental pressure groups namely, Greenpeace, the Consteau Society, the Worldwide Fund for Nature (WWF) and the Antarctic and Southern Oceans Coalition (ASCO), led an aggressive drive to raise global public awareness of threats to the Antarctic environment. They demanded a permanent ban on mining, portraying CRAMRA as a miner's charter. The convention sank into the abyss of unenforceability in 1989 when Australia and France withdrew support for it.

The latest protocol banning mining for 50-years is a compromise between conservation committed countries such as Australia and France which lobbied for a total ban and others, for example, Britain and the United States which are committed to immediate exploitation of Antarctics mineral resources. Thus, should the United States fall into line with the Madrid agreement of 1991, Antarctica will be free from the threat of mineral exploration and mining.

From the foregoing, it is arguable that although the Antarctic Treaty, 1959, does not address the issue of proper management of the continent's mineral and Living resources, it has been an important vehicle to critical initiatives in the protection of the Antarctic environment. Parties to this treaty have to some extent rendered humankind the invaluable service of preserving Antarctic in its near - pristine condition.

The protected and conservation areas approach enhances conservation of species thrcugh the protection of natural habitats and ecosystems in which they occur. This promotes in-situ conservation measures and eliminates threats from habitat degradation particularly by human activities. This way, many floral and faunal species together with their varieties and habitats are conserved.

Secondly, protected areas could be extended with ease to protect breeding and resting sites and the entire routes of migratory species.[36] Many countries of the world have taken up the challenge and established protected areas for purposes of conserving forested zones, water catchment areas, marine and terrestrial species of both plants and animals.[37]

But this mechanism has disadvantages too. Firstly, establishing protected areas could in the long-run lead to isolation of sites and the decay of habitats ultimately leading to the disappearance of species.

Secondly, the establishment of protected areas is often perceived as the all and end all apparatus to enhance conservation of both species and habitats. Rarely are additional conservation measures taken. It would appear that the inadequacies of this strategy in as far as the conservation of some species or their varieties is concerned are likely to go unnoticed.[38]

Finally, establishing protected areas entails a reduction in the surface area available for other competing land uses, for example, agriculture. By virtue of this competition, protected areas are always viewed as potential areas of expansion should pressure from other competing uses prove unbearable. This has the effect of reducing the utility of this mechanism as a long-term conservation device.

2:2:2 Integrated Approach

This mechanism perceives development and conservation as complementary. The underlying consideration is to integrate every stage of conservation and development process from the initial setting of policies to their eventual implementation and operation. Under this mechanism, conservation ceases to be an aspect peripheral to the satisfaction of basic human needs. On the contrary, it becomes a central reference point in the decision making process.

The approach entails the adoption of anticipatory and cross-sectoral environmental policies.[39] It ensures that conservation is taken fully into account at the earliest possible stage in any major decision likely to affect the environment. As a biological diversity conservation mechanism, it is embodied in existing international legal regimes. Article XIV of the African Convention on the Conservation of Nature and Natural Resources, 1968, embodies this strategy.[40] Another example is Article IV (2) of the Convention on the Conservation of European Wildlife and Natural Habitats, 1979. The celebrated World Conservation strategy, 1980, addresses this conservation mechanism at length.

The requirement of an environmental impact assessment is part and parcel of the integrated approach. Such assessment identifies would-be environmental consequences of the project, remedial measures and alternative approaches.[41] It also entails public participation in decision making on projects that affect them or the environment in which they live. Both global and regional instruments embody this aspect of the integrated approach.

This strategy has several advantages. In the first instance, communities are able to avoid the high and usually recurring costs of environmental mistakes which could lead to wastage of resources, frustrate development objectives and impair the capacity for development.

Secondly, measures taken at the planning stage are more cost -

effective than those taken to redress damage when it has occurred. In the latter case, restructuring, abandonment or a re-redesign cannot be cost-effective.

Finally, taking environmental considerations at the earliest instance in development planning is undoubtedly profitable to the enterprise concerned and the economy as a whole. It is posited that it is only by integrating conservation into the development planning process that human-induced ecological disasters can be avoided.

Finally, although this conservation strategy demands more money for purposes of research, planning and in adopting precautionary measures and could lead to a delay in effecting the necessary modifications or adjustments, it is more cost-effective and profitable in the long-run. As and when adopted by more countries, it could play a significant role in biodiversity conservation.

2:2:3 Activities Likely to Cause Damage to the Environment

A principal conservation strategy under existing regimes is to require states to refrain from activities likely to affect the environment adversely. Contracting parties of virtually all conservation conventions are under an obligation to refrain from undertakings causing or likely to cause adverse or deleterious

effects on habitats and ecosystems within and beyond national jurisdiction.[42] This obligation is a product of general principles of international law. Its genesis is traceable to the ancient Latin maxim **Sic utere tuo ut alienum non laedas,** which literally means, enjoy your property in such a manner as not to injure that of another.[43] This maxim qualifies the right to use ones property, in that the user is precluded from using it to the detriment of others. The neighbour principle enunciated by Lord Atkin dictum in Donoghue V. Stevenson[44] embodies this maxim. The principle states that when a party directs his mind to do or not to do a thing he must always have in mind persons who are likely to be affected by his acts. or omissions.

The historic evolution of the maxim and its graduation to an internationally accepted principle of law is not in dispute and need not detain us. At the international level, the maxim instituted a limitation upon states use of shared resources, for example, rivers. It was an epitome of the recognition that territorial sovereign rights are generally correlative and interdependent and, therefore, subject to reciprocally operating limitations. Lester writes:

> "The principle sic utere tuo is an epitome of the development of a limitation upon the use of international rivers because during the 19th century, some advocates of state soverignty regarded the use of such waters as unlimited."[45]

The maxim is a generally accepted principle in international river law. The international court of justice epitomized the principle in the following words:

> "Every states obligation not to allow knowingly its territory to be used contrary to the rights of other states."[46]

In the Trail Smelter Arbitration[47] where fumes from a smelter on the Canadian side of the border caused damage to property on the United States side, the principle was applied to hold Canada liable. Under international law therefore, states may not use or permit the use of their territory in such a manner as to cause substantial transboundary environmental damage.

International instruments have adopted the principle and contracting parties are obliged to "control activities detrimental to protected natural resources."[48] The obligation to refrain from and control activities detrimental to the environment generally is an important habitat and ecosystem conservation strategy. It embodies a related duty to prevent, control and reduce all forms of pollution. Since coastal wetlands and river basins are ecosystems susceptible to pollution, this obligation enhances their survival and integrity.

2:2:4 Training, Education and Participation

Effective conservation of biological diversity particularly in developing countries depends ultimately on the development of a conservation ethic. Training, education and actual participation are principal tools in the accopmlishment of this goal. The international community acknowledges this fact and existing regimes have attempted to incorporate these parameters as a conservation strategy.[49]

Since all and sundry should be aware of the need and manner of biodiversity conservation, both formal and informal approaches should be used to facilitate this. Knowledge is likely to generate the requisite attitude and encourage participation.[50]

Existing legal regimes on biodiversity place emphasis on both formal and informal education.[51] However, they do not appear to place adequate emphasis granted the importance of education and training in conservation. In addition, although environmental awareness has grown by leaps and bounds since the 1970s, these imperatives do not appear to have played any recognizable role in global conservation initiatives.

In some developing countries, environmental education is yet to be incorporated into the general school curricula. Where attempts have been made, a large proportion of the citizenry is excluded from the education campaigns.[52] What compounds the

problem even further is the fact that existing arrangements are lacking in effective institutional framework to promote conservation education. Education programmes by bureaus, secretariats and non-governmental organizations (NGOs) are more often than not directed to urban dwellers. Above all, even if all rural communities were made aware of the importance and modalities of conserving habitats and ecosystems, one doubts whether such "theoretical" principles would influence their day to day activities and perception in the face of the vagaries that they continue to grapple with. Environmental awareness campaigns should be directed to all persons with more emphasis on the rural communities.

2:2:5 Introduction of Exotic Species

Subjecting the introduction of exotic species to strict control and regulation is another habitat and ecosystem conservation strategy under existing arrangements. Actual and potential effects of exotic species on indigenous species and habitats are well documented.[53] To counter the would-be consequences, existing regimes require such introduction to be preceded by an environmental impact assessment. Exotic species will only be introduced in those instances where their social, economic and ecological benefits outweigh costs substantially.

This strategy contributes to the conservation of both species and habitats by keeping out predators, competitors, parasites,

diseases and habitat destroyers. It is likely to gain more prominence in future.[54]

Other Mechanisms

Principle 3 of the World Charter for Nature, 1982, urges the international community to conserve "...unique areas ... representative samples of all the different types of ecosystems and habitats..."[55]

2:2:6 Conservation of Habitats and Ecosystems: Convention for the Protection of World Cultural and Natural Heritage, 1972. ("The World Heritage Convention"). Paris, November 23rd 1972

The Convention for the Protection of World Cultural and Natural Heritage, 1972, was adopted by the United Nations Educational Scientific and Cultural Organization (UNESCO's) General Assembly in November, 1972, and came into force in 1975. The preamble to the Convention is unequivocal that "deterioration and disappearance of any item of cultural or natural heritage constitute a harmful impoverishment of the heritage of all the nations of the world."[56]

The objective of the convention is to define cultural and natural areas recognized for their outstanding value and promote co-operation among states to contribute to their conservation. The philosophy behind the convention is that some parts of the planets cultural and natural heritage are so unique and important to humanity that their conservation and protection for the sake of present and future generations is a matter of concern for both individual and the international community.

With regard to habitat and ecosystems conservation purposes, the convention enumerates various elements considered to be part of the natural heritage.[57] The regime establishes a world list of cultural and natural heritage sites. Contracting parties are under a primary obligation to adopt appropriate legal, scientific, technical, financial and administrative measures necessary for identification, conservation, protection, preservation and transmission to future generations of cultural and natural heritage within their territory.[58]

With regard to administration, article VIII establishes the World Heritage Committee, a 21 member committee appointed by the General Assembly every two years. This is the policy and decision making body of the convention. It is responsible for all nominations to the World Heritage list and responds to requests by contracting parties for financial assistance from the fund.

Contracting parties are required to submit inventories of items for inclusion in the World Heritage List.[59] Specialized agencies[60] assess the various national nominations and advices the committee accordingly, which in turn compiles the list of accepted sites. The World Heritage Committee works in close conjuction with a secretariat appointed by UNESCOs Director General.

On the financial front, the convention establishes the World Heritage Fund,[61] a trust fund financed by mandatory and voluntary contributions from contracting parties, private organisations, private bodies, individuals, bequests e.t.c. This fund was deliberately created to enable contracting parties with inadequate resources to participate in the conservation of their cultural and natural heritage meaningfully.

Finally, member states are obliged to notify UNESCO's General Conference on measures taken to implement the convention witnin national jurisdiction.[62]

States parties held their first conference in 1976, and the first World Heritage Committee was appointed. Successive committees have met regularly. During its 1977 meeting, the committee established its rules of procedure and guidelines on the working of the convention ("the operational guidelines").[63] These guidelines form the basis of all decisions relating to implementation of the convention.

During its second session in 1978, the committee inscribed the first twelve items on the World Heritage list. An annual budget of about half million US Dollars was also approved.

The committee held its third session in 1979. It added twenty five properties to the list. In addition, it adopted a procedure for the eventual deletion of items from the list.[64]

During its 1982 session, the committee adopted guidelines and criterion for the inclusion of sites in the World Heritage in Danger.

Strengths and Weaknesses

The World Heritage Convention articulates a unique legal regime. It is of a very broad character and is designed to enhance conservation of cultural and natural heritage. Adoption of the convention, it must be admitted constituted a bold and unprecedented attempt to bring together aspects traditionally considered separate. Its aim is to facilitate international co-operation and assistance through technical and exchange of information in the field of conservation. It is also designed to complement national conservation efforts.

With regard to biodiversity conservation, the legal regime encourages and facilitates conservation of natural sites thus

enhancing protection of habitats, ecosystems and their constituent species and gene pools. The World Heritage List includes several of the planets most diverse habitats and ecosystems.[65]

Finally, the regime establishes a permanent institutional framework and financial support for international co-operation in safe-guarding cultural and natural heritage for humanity. The World Heritage Committee and the World Heritage Fund play a pivotal role in this regard. The fund has previously been used to meet financial requests from less favoured contracting parties in forest management. In 1989, for example, a total of US dollars 1 million had been set aside for such sites. Virtually all sites on the list in developing countries have received assistance from the fund. Others have received extra allocations from governments once accorded world heritage status. The convention has proved a useful tool in identifying and conserving a selected number of the planets most precious forests.

A number of shortcomings reduce the conventions capacity to conserve both habitats and ecosystems. In the first instance, undue emphasis is placed on conserving particular sites in member states. This strategy is prone to the danger that it could lead to isolation of sites and subsequently, loss of habitats, ecosystems and species. It is submitted that the regime pays scant or no regard to the conservation of representative samples of major ecosystems on a systematic basis.

Secondly, by its very nature, the regime appears more inclined towards the conservation of cultural as opposed to natural heritage.[66] In 1984, for example, out of a total of 136 sites only 27 related to natural aspects. By the end of 1988, the number of natural sites stood at 65.[67] There is a clear imbalance between natural and cultural sites on the list. Reasons for this imbalance it would appear are both historical and functional. Firstly, it cannot be doubted that cultural as opposed to natural aspects are more familiar in UNESCO. There is some bias towards cultural aspects. Secondly, prior to the unprecedented merger of the two aspects, UNESCO was working towards a global convention on the protection of monuments, groups of buildings and sites of universal value. Thirdly, for many years after the convention came into force, national interests in many contracting states were dorminated by cultural agencies. It is submitted that continued dormination of the conventions activities by cultural interests has produced a World Heritage List where cultural sites outnumber natural ones in the ratio of about 3:1. Although the idea is not to seek barometric equivalence, for purposes of enhancing habitat and ecosystem conservation, more sites should be included in the list.

Fourthly, the regime does not offer an ideal solution to the challenge of cultural and natural heritage conservation. Firstly, its nomination procedure is too formal and cumbersome. Secondly, it operates on a modest budget. Finally, it is designed to enhance conservation of cultural and natural sites of

"universal value"[68] only. Because the convention does not define the phrase "universal value", literally, it would mean sites of international value. In a nutshell, therefore, the regime is restricted to specific sites only and ignores sites of value to local populations or indispensable to the survival of such populations.

However, these shortcomings notwithstanding, the World Heritage Convention is an evolving mechanism for safequarding outstanding examples of the planets cultural and natural heritage. As of 1990, the convention had 108[69] ratifications making it the single conservation convention with the highest number of ratifications. More countries are likely to become party to the convention in future. The convention forms part of international environmental law concerned with the "common heritage of mankind"[70] a concept associated with an ecological order extending throughout the globe and characterised by states acceptance of the obligation to conserve ecosystems, habitats and species for the good of humanity.

Within its confines, the World Heritage Convention, 1972, has through listing sites boosted tourism and forest conservation in many countries. It has mustered international support and can truly function as an international device for habitat and ecosystem conservation.

We have attempted to demonstrate the principal habitat and

ecosystem conservation strategies and mechanisms under existing regimes. Through global and regional instruments and general principles of international law we attempted to show how they operate, outlining both their strengths and weaknesses. We have demonstrated that some strategies are more popular than others. We have also shown that most of these strategies are equally applicable to species conservation. In a nutshell, it is the cummulative effect of these strategies that counts.

2:3 CONSERVATION OF SPECIES AND GENERA

> "Every form of life is unique warranting respect regardless of its worth to man..."[71]

Ever since life appeared on earth, millions of flora, fauna and micro-organisms have been generated by the evolutionary process. Millions too have been decimated through natural processes. But life continued because enough species were spared. However, a new extinction spasm entirely caused by mankind has replaced natural causes. The fall out of species has become a fundamental environmental concern to humankind today. This is because loss of species is an irreparable loss to humanity.[72] It narrows the genetic base of species and genera making them more vulnerable to extinction. The problem is further exacerbated by the fact that habitats of other species are also threatened. Habitat degradation and/or modification, over-exploitation, introduction of alien species and pollution remain the principal causes of

loss of species and genera.

Existing international legal regimes incorporate mechanisms and strategies to combat extinction of species. We shall consider the various conservation strategies and assess their effectiveness. It must be emphasized that strategies such as protected and conservation areas, introduction of exotic species, the integrated approach and training and education already examined are equally applicable to the conservation of species.

In view of the foregoing, this part will address those mechanisms not considered under the umbrella of habitat and ecosystem conservation.

Regulating Trade in Species or their Products

Regulating trade in species and/or their products is a principal conservation strategy under existing regimes. Under this strategy, trade or movement of species and/or their products is subjected to a licence or permit system. The London Convention, 1933, showed the way.[74]

Although many global and regional instruments[75] contain provisions requiring contracting parties to control and regulate movement of species or their products, only one global convention is specifically designed to regulate trade in species or their

products to enhance conservation of species of flora and fauna, viz, Convention on International Trade in Endangered Species of Wild Fauna and Flora, 1973 (hereinafter referred to as CITES).[76] Being the principal instrument in this field, it is necessary to examine its provisions and operation in greater detail.

2:3:1 Convention on International Trade in Endanered Species of Wild Fauna and Flora, 1973.(CITES)

The convention was adopted on 3rd March, 1973, and came into force on 1st July, 1975. As of 1990, it had 103[77] ratifications and had been amended twice, 1979 and 1984. The objective of the convention is to oversee and regulate international trade in Wild species of fauna and flora or their products. As a device to curb over-exploitation and illegal trade in species and their products, the regime establishes lists of endangered species for which international trade is subjected to a permit system.

The convention establishes three appendices. Listing of species in either of them imposes specific obligations on contracting parties. Appendix I contains species threatened with extinction and are or may be adversely affected by international trade.[78] To qualify for listing in appendix I, it must be demonstrated that the species called into question is threatened with extinction and will be adversely affected by international trade. Rhinos, great apes, great whales and over 600 endangered species

of flora and fauna are listed in appendix I.[79]

To regulate movement of species listed in appendix I the regime requires an export permit from the country of origin or a re-export certificate from the re-exporting country and an import permit from the recipient country.[80] The convention spells out the detailed pre-conditions to be met prior to the issuance of an export or import permit.[81]

The strict licencing procedure is designed to ensure minimal interference with the species.

Appendix II contain species of flora and fauna not yet threatened with extinction but which could become so if trade in them or their products was not regulated, "to avoid utilization incompatible with their survival."[82] Trade in species or products of species listed in appendix II is permitted in as long as the necessary permits or certificates are granted by the competent national authorities. Conditions to be satisfied before the documents are issued are elaborately set out.[83] However, unlike species listed in appendix I, import permits are not required in transactions involving species listed in appendix II.[84] Over 2,300 species of faunal and over 24,000 species of flora are now listed in appendix II.[85]

Appendix III contain species which any country identifies as being subject to regulation within its jurisdiction for the

purpose of preventing or restricting exploitation, and needs international co-operation in controlling trade.[86] Like with species listed in appendices I and II exportation of species listed in appendix III is subject to the permit system.[87] Conditions for the issuance of the permit are clearly spelt out.[88] Importation of species listed in appendix III is also subject to issuance of certificates of origin or export permit.[89]

The convention establishes a conference of the parties,[90] as the main decision making body and a secretariat. Contracting parties are obliged to establish two national bodies, namely, one or more management authorities to issue permits and certificates and a scientific authority.[91] These bodies are critical in enhancing implementation of the convention.

Contracting parties are entittled to make specific reservations with regard to listing of species in any of the appendices.[92] Making a reservation means that the party is not bound by the decision against which reservation was made.

As a remedial measure, parties are required to confiscate smuggled goods and return them to their country of origin.[93] However, attempts to return live species to their countries of origin has often proved disatrous to the species.

Finally, contracting member states are obliged to take

appropriate legislative measures to implement the convention.

Historical Profile

Since the convention came into force in 1975, the number of species of flora and fauna in each appendix has grown by leaps and bounds.[94] The conference of the parties has been meeting every two years and the contracting parties have continously adopted legislation to implement the convention.[95]

2:3:1 The African Elephant Experience

The African elephant debacle is examined here to illustrate the practical aspects of the convention.

In 1976, the African elephant was placed on the least restrictive list, appendix III of the convention. However, it was later transfered to appendix II. How much protection the African elephant needed has been debated since CITES was founded. For many years, the "sustainable use" school of thought held sway.[96] Proponents of this school contended that the best way to save the elephant was to market their tasks to provide economic returns and incentive for their conservation. Though tenable, practice has proved this argument wanting. For the African elephant, the sustainable use theory has disastrously failed. In the last 10

years or so, nearly one million elephants have been slaughtered for illegal ivory trade.[97] High demand for ivory abroad, inadequate funds and personnel to enforce the law, porous borders, corruption and illegal trade have virtually been impossible to control in many African countries. Estimates have it that only 22% of international trade in ivory is legal.[98]

Despite its disastrous consequences, the "sustainable use" school of thought prevailed in the management of African elephants up to 1989. By then, elephant population in some African countries like Kenya, Tanzania and Uganda had fallen by more than half. The year 1989 dawned a new era for the African elephant. Enormous publication on the unprecedented and merciless slaughter of elephants for illegal ivory trade changed the international community's attitude towards conservation of the African elephant. The detail and accuracy of the reports produced the desired effects on many Western countries who within a short time banned ivory imports.[99]

During the 1989 CITES conference of the parties meeting in Switzerland, opponents of international ivory trade led by Tanzania and Kenya and with the support of major western countries managed by a majority of 76 against 11 to pass a resolution transfering the African elephant from appendix II to appendix I.[100] This had the effect of banning the ivory trade with all unreserving countries. Several African and non-African countries where elephant populations were increasing especially

in Southern Africa opposed the transfer and lodged reservations.[101] These countries contended that they should not be penalized for the mistakes of other states. This obviously works against the bann because about 60 countries are non-CITES members and can therefore, lawfully trade with the reserving countries. Many southern African countries are still lobbying to have the African elephant transferred from appendix I to II to enable them reduce their herds of elephants. Tanzania, an ardent supporter of the trade ban has already indicated that it would seek permission to reduce the number of elephants in the country. To countries such as Botswana, Zimbambwe and South Africa, which boast of effective conservation of their elephants, the ivory trade ban of 1989 has affected them detrimentally.

One of the fundamental strengths of the convention is that it has about 103 ratifications. This would mean that although about one-third of the United Nations are non-members, it remains one of the most widely accepted conservation instruments. That it has attracted membership from countries hitherto actively engaged in ivory trade is commendable.

The African elephant experience is illustrative of the fact that with adequate convincing data and political will, global legal regimes could play a pivotal role in enhancing conservation of species.

Weaknesses

In the first instance, the requirement that contracting parties submit national reports on the movement of species listed in the various appendices has almost failed. In the past,the secretariat has not received the required data. In practice, only about one-half of the parties submit annual reports, but even these reports are far from adequate. The World Trade Monitoring Unit estimates that only 52% of all members submitted reports in 1985.[102] The second aspect of this shortcoming is that the data submitted by exporting countries and importing countries hardly correlate.[103] In a nutshell, the secretariat cannot give a true picture of the movement of species listed in either of the appendices. It is therefore exceedingly difficult to assess the impact of the convention.

Secondly, implementation of the convention hedges on the assumption that contracting parties have the necessary resources, qualified and committed enforcement personnel. This has not been borne by facts. Many developing countries continue to grapple with the scourge of illegal trade by reason of inadequate resources, uncommitted and incompetent personnel and lack of equipment. The problem is further compounded by the fact that a permit or certificate system is dependent upon proper supervision and clear appreciation of policy on the part of those enforcing it. But there is no guarantee that those responsible for issuing permits and certificates are always aware of the proper policy

objectives behind the law. Quality of personnel remain in shortage in many government departments in many developing countries.[104]

Thirdly, some exceptions under the convention are susceptible to abuse and expose further weaknesses in the convention. The exceptions provided for depend on what the person concerned intends to do with the species, how the species was raised or grown or the countries involved.[105] These exceptions are designed to facilitate exchange or transportation of wildlife between zoos, museums, research centres and other scientific institutions for non-commercial purposes. Whereas these exceptions are useful, in allowing such institutions share their breeding stocks of rare species, they are very susceptible to abuse. A reknowned conservationist writes:

> "Unscrupulous wildlife dealers call themselves zoos to avoid CITES controls and profit making zoos are known to import animals for purely monetary reasons. Since zoos tend to trade in some of the more endangered wildlife, this exception has serious implications and may need to be refined."[106]

Fourthly, the provision entitling contracting parties to make specific reservation exposes further weaknesses in the regime.[107] Lodging a reservation under the convention means that the party concerned is entitled to act as though it were not a party to the

the contention when dealing with the species in respect of which the reservation was lodged. Contracting parties can lodge reservations when ratifying the convention or within 90 days of listing or transfering of species from one Appendix to another.[108] It, therefore, follows that a party can reserve the right to deal in certain species ab initio. It is submitted that although this provision was included to encourage support for the legal regime by giving each contracting party a chance to protect its trading interests while technically upholding the convention, it weakens the regime. In the words of Simon Lyster,

> "not only can reserving parties trade freely with non-parties but reservation sometimes encourage trade to continue albeit illegally with other parties."[109]

Undoubtedly, this does not augur well with the objectives of the convention.

Finally, the convention tends to lay more emphasis on the protection of animals than plants. Although large numbers of floral species are endangered in many countries, most reports submitted to the secretariat relate to the movement of species of fauna. It is axiomatic that faunal species cannot be effectively conserved unless the survival of food resources, the plants upon which animals depend is ensured. In Kenya, for example, indigenous flora is under heavy pressure from loss and degradation of habitats due to expanding agricultural activities.[110] The rapid expanding population poses a serious

threat to remaining indigenous species.

On the whole, the regime has barely contributed to conservation species of floral and fauna in the last 15 years.

2:2:2 Sustainable Utilization of Species

By sustainable utilization is meant managing species to achieve and maintain optimum productivity without endangering their survival or that of other species with which they co-exist. Sustainable utilization is analogous to spending interest while keeping the capital.[111]

Existing international legal regimes adopt sustainable utilizaiton or exploitation of species as a principal conservation strategy. This strategy applies to species subject to exploitation by man on account that it entails determination of productive capacities of the species and the adoption of management measures to ensure that the capacity of the resource to sustain exploitation is maintained.

The effectiveness of sustainable utilization as a conservation strategy will be exemplified by examining the four decade experience of the International Convention for the Regulation of Whaling, 1946 (as amended).[112]

2:3:3 International Convention for the Regulation of Whaling, 1946 (as amended)

The International Convention for the Regulation of Whaling, 1946 was adopted in 1946 and came into operation in 1948. The objective of the convention is to protect all species of whales from over-fishing and to safeguard for future generations the great natural resource represented by whale stocks through the establishment of an international regulatory system for whaling.[113] Preamble to the convention is unequivocal that these objectives can only be achieved through sustainable exploitaiton of the resource. "...to provide for the proper conservation of whale stocks and thus make possible the orderly development of the whaling industry."[114]

The regime establishes an International Whaling Commission[115] whose duty is to regulate whaling either by prohibiting or controlling certain whaling activities. It is empowered to amend provisions of the schedule to the Convention and to adopt regulatory measures to facilitate conservation and utilization of the whale resource.

Four Decade Experience

For purposes of regulating whaling activities, the Convention adopted the so called Blue Whale Unit (BWU) system. Under this system, one blue whale was equated to two fin whales, two and

one-half humpbacks or six sei whales. Under the Blue Whale Unit System of whale management, depletion of whale stocks continued almost unabated on account that the industry was maintained on more abundant species while depleting the already declining stocks further.

The International Whaling Commission fixed the 1948 quota at 16,000 BWU.[116] Major whaling nations competed for the larger share of the quota and this witnessed massive slaughter of whales and wastage of whale carcases. This raised concern and the commission responded by reducing the quota to 14,500 BWU in the early 1950s. But major whaling nations lobbied for a higher quota. The commission's response was to raise the quota to 15,000 BWU for the 1958-9 season. Norway opposed this quota and fixed its own. The record setting number of whales were caught during the 1960-1 season, when 16,433 whales were killed.[117] With increased whaling, stocks of whales dwindled.

During the 1963-4 season, the International whaling commission reduced the quota to 10,000 BWU.[118] This was the commission's response to recommedations of a special committee appointed in 1962 to investigate on the status of whale stocks. By 1965, whale stocks had further dwindled and the commission fixed the 1965-66 quota at 4,500 BWU. The 1967-68 quota stood at 3,200 BWU. For the 1971-72 season, the International whaling Commission reduced the quota to 2,300 BWU.

The unprecedented rate at which whale stocks were declining attracted the attention of the United Nations Conference on the Human Environment, 1972. It had become clear that if whales were to survive as a species, let alone be exploited, responsibility had to be removed from the International Whaling Commission or immense external pressure had to be applied. The conference adopted a three-point resolution calling for,

i) increased research on the dynamics and status of the planet's whales,

ii) a 10-year moratorium on all commercial whaling, and

iii) further strengthening of the International Whaling Commission.

But major whaling countries thwarted attempts by Britain, United States, France and Argentina to have these resolutions adopted by the International Whaling Commission in 1972, 1973, and 1974 respectively.[119]

In 1973, the Blue Whale Unit System of whale management was abandoned in favour of the Maximum Sustainable Yield strategy. It was an improvement on the BWU, in that it managed whale species and genera individually unlike the strategy hitherto in operation.

The late 1970s and early 1980s saw more and more countries join the International Whaling Commission. On the initiative of Seychelles, the Indian Ocean was declared a sanctuary in 1982.

Although the Whaling Commission adopted a resolution calling for a moratorium on commercial whaling in 1982, it did not come into force until 1986. This is because major whaling countries and the scientific committee established by the convention opposed the move on the grounds that,

i) Scientific evidence could not justify a blanket moratorium on whaling, neither would a moratorium be in the interest of the whaling industry or consumers,

ii) a blanket moratorium on whaling would deny the scientific committee biological samples and

iii) since different species of whales competed for food and some species were more depleted than others, it would be desirable to kill the more abundant ones to prevent them impending the recovery of endangered ones.

The 1986 moratorium banned commercial whaling, but conservation euphoria soon turned to grief as several countries found reasons to defy the ban. This defiance posses a serious challenge to the authority and credibility of the International Whaling Commission.

But what may be an even more serious threat to the moratorium is a loophole in its provision which allows hunting of whales for "scientific or research purposes"[120] and aboriginal whaling. Iceland was among the first countries to sieze the opportunity to continue whaling under the guise of research. Other countries also joined the research bandwagon to justify continued whaling.

Issue arises as to whether the purported research and whalers intentions are bona fide or merely ways around the moratorium. The latter view appears more convincing.

The moratorium was reviewed during the meeting of the International Whaling Commission at Reykjavik in 1991. To the disappointment of many whaling countries the bann was not lifted. The scientific committee recommended the adoption of a new whale management strategy which the commission encorsed. The decision not to lift the ban on commercial whaling prompted Iceland to announce its withdrawal from the International Whaling Commission.[121] This was not an unexpected move. Birds of a feather flock together, Norway and Japan, both whaling nations, expressed their disappointment.

This is a serious blow to the commission because its membership is dwindling. Of the 36 registered countries only 30 turned up for the Reykjavik meeting.[122]

As far as the objective of promoting the recovery of whale stocks is concerned, the Reykjavik conference marked a step forward in the right direction.

Strengths and Weaknesses

By the standards of contemporary international law at the time of its adoption, the principles and rules articulated in the Whaling

Convention appeared progressive. It certainly represented an improvement over the pre-war situation. It was heralded as one of the greatest achievements of international co-operation and conservation.[123]

The establishment of the International Whaling Commission to oversee implementation of the convention is also a strength. But as borne out by facts, the convention articulated principles that were never attained. For most whale species, conservation came too late. Those involved in negotiations leading to the adoption of the convention ignored fundamental legal, biological and economic imperatives.

Since the regime articulated in the International Convention for the Regulation of Whaling, 1946, has numerous inherent and functional weaknesses its poor performance is not surprising.

Firstly, although in its preamble the convention explicitly states that its major objective is "...safeguarding for future generations the great natural resource represented by the whale stocks,"[124] and is unambiguous, that it seeks to preserve and expand the whaling industry by conserving stocks and regulating catches, it has nevertheless literally failed to ensure sustainable exploitation or utilization of the whale resource. Whale stocks have consistently dwindled.

Secondly, although the preamble to the convention is unequivocal

that one of the aims of the convention is to provide for the proper conservation of whales and orderly development of the industry, that is to say, getting rid of gluttony and wasteful competition which characterised the whaling industry before 1946, it failed to create an orderly industry.

Thirdly, the institutional framework erected by the regime is too weak to enhance substainable utilization of the whale. It is an open secret that the Internatinal Whaling Commission for many years presided on the gluttonous and merciless depletion of nearly all of the world's whale population. It failed to safeguard the whale for future generations. Whereas the powers of the commission spelt out in paragraph I[125] of Article V are wide and of far reaching consequences, giving it broad authority to promote whale conservation, qualifications under paragraph II[126] effectively incapacitate the commission from adopting any substantial measures to enhance whale conservation. The International Whaling Commission can neither limit the number of whales a state can catch nor the number of factory ships or landing stations. It is doubtful how the commission is supposed to promote conservation and sustainable use of whales.

Fourthly, the problem of enforcing the commission's decisions remain. The International Whaling Commission has neither power nor means to enforce its regulations and decisions. For many years, major whaling nations opposed the idea of independent observers appointed by the Whaling Commission. The international

observer scheme now in operation has not proved effective and, therefore, "reliance must be placed on the international legal requirement that parties fulfill their conventional obligations in good faith."[127]

Finally, the regime also failed to provide for an effective and efficient whale management strategy. The Blue Whale Unit (BWU) abandoned in 1973 worked against whale conservation and sustainable utilization of the whale resource. The Maximum Sustainable Yield (MSY) strategy adopted in 1973 has not worked well.[128] What compounds this weakness even further is the fact that reliable data on whale population dynamics has been hard to come by. In the past, the scientific committee has been unable to marshall adequate and reliable data. In a recently published interview, secretary to the Whaling Commission admitted that the Maximum Sustainable Yield strategy was insufficient.[129] During the 1991 International Whaling Commission meeting at Reykjavik, a new whale management strategy was adopted. Unfortunately, the strategy was not available for our perusal and comment.

The dismal performance of the International Convention for the Regulation of Whaling, 1946, demonstrate the centrality of national interests in international decision making. The International Whaling Commission had once embarked on a new convention but abandoned the move. Although a new convention would be an alternative, such a move has disadvantages too. The possibility that a new convention may not attract membership of

all present contracting parties cannot be ruled out. If, for instance, a new convention embraced more cetaceans, allowed no exception for aboriginal whaling, restricted issuance of permits, instituted an effective observer scheme and supported other conservation measures, there is a big possibility that it may not attract many whaling nations. However, it must be emphasized that a number of loopnoles in the present convention call for sealing. Some amendment is necessary.

Finally, the poor performance of the regime over the last four decades casts serious doubts on the capability of international law to protect the environment generally and in facilitating sustainable exploitation of living resources in particular.

2:3:4 Other Treaties and Instruments on Species and Genera

A plethora of regional instruments also adopt the sustainable exploitation mechanism as a principal species conservation strategy.[130] Since sustainable utilization of living resources is the purpose of exploitation conventions, this mechanism remains the basic conservation strategy under existing exploitation conventions. But as abundantly demonstrated by the four decades of experience under the Whaling Convention, sustainable utilizaiton is difficult to achieve in practice. As a result, these conventions provide for the submission of catch statistics, research into population dynamics and adoption of

regulatory measures including catch quotas.

Exploitation conventions ussually provide for the establishment of a commission and are in most cases designed to deal with the entire species. However, their effectiveness is largely dependent on the willingness of the parties to accept and implement catch restrictions necssary to maintain sustainable exploitation.

Although this conservation mechanism was greatly popularised by the World Conservation Strategy, 1980, principles 2[131] and 3[132] of the Stockholm Declaration, 1972 embodied it. It is also referred to in the World Charter for Nature, 1982.[133]

The sustainable exploitation strategy incorporates measures to control and regulate hunting and other ways and means of species collection. Strict regulation or total prohibition of activities and methods likely to jeopardize sustainable exploitation of species is encouraged. Under certain regimes, faunal capture by the use of poison, explosives, dazzling lights, nets, pits and snares is prohibited.[134] Taking eggshells and young ones of birds is also prohibited.[135]

In a nutshell, the issue of what to take, when to take and how to take is central in sustainable utilization of species. However, as demonstrated elsewhere, this conservation strategy has been largely ineffective.

Migratory Species

> "Migration is one of the most fascinating natural phenomena and it is still a highly mysterious one"[136]

Migration has been defined as a cyclical and, therefore, predictable phenomenon whereby certain animals perform periodic movements between two separate geographical areas one usually where they breed.[137] Biological requirements play a central role in the migratory patterns of species.

Migratory species come within the operational axis of international law because in most instances migratory routes are not confined within the boundaries of a single state, which means that as they move from one jurisdiction to another, they are subject to successive sovereign rights.[138] Since migratory species is the only category of species with a distinct legal regime, this is an approach to species conservation worth a detailed examination.

International legal norms governing conservation of migratory species are contained in a multitude of conventions. These include the Whaling Convention, 1946, the International Convention for the Protection of Birds, 1950, Convention for the Conservation of Antarctic Seals, 1972, International Convention for the Conservation of Antarctic Tunas, 1966, e.t.c. Although most instruments on migratory species address a specific species,

the International Convention on the Conservation of Migratory Species of Wild Animals, 1979,[139] address the conservation of all migratory species. It is necessary, therefore, to examine the regime articulated and assess its impact on conservation.

Convention on the Conservation of Migratory Species of Wild Animals, 23rd June 1979 , Bonn

The idea of an international legal instrument on migratory species was conceived during the United Nations Conference on the Human Environment, 1972, at Stockholm. This idea was written in recommendation 32 of the conference report.[140] The Federal Republic of Germany took the initiative and prepared the first draft Convention on the Conservation of Migratory Species of Wild Animals in 1974. Several years of negotiation saw the adoption of the Convention on the Conservation of Migratory Species of Wild Animals, 1979, (herein-after referred to as the Bonn Convention).

The Convention was adopted on June 23rd, 1979 and came into force on November 1st, 1983.

The objective of the convention is to conserve migratory species of wild animals by instituting strict conservation obligations on range states and encouraging them to conclude agreements to ensure effective management of these species. Preamble to the convention stipulates that migratory species are an international

resource to be conserved for the good of all humanity.

The convention defines migratory species as, one which the entire population or any geographically separate part of the population of any species or lower taxon of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries.[141] This definition is comprehensive enough and covers most aspects of migratory species.[142]

Obligations of contracting parties in relation to migratory species depend on the Appendix to the Convention in which the particular species is placed. The Convention establishes two Appendices. A species qualifies for inclusion in Appendix I if it is "migratory" and "endangered" within the meaning of the convention.[143] Range states of species in Appendix I are obliged to conserve and restore habitats, facilitate species migration and prevent factors endangering or likely to endanger species for example, control introduction of exotic species.[144] Taking of species listed in Appendix I is prohibited save in circumstances when such taking does not operate to the disadvantage of the species.

To merit inclusion in Appendix II, the species must either be in an "unfavourable conservation status and require international agreements for its conservaiton and management," or "have a conservation status which would significantly benefit from

international co-operation."[145] Unlike in the case of Appendix I species, where range States are under direct obligations to adopt measures to conserve the species, under Appendix II, range states are required to conclude other agreements between themselves to enhance conservation of species.[146] The Convention provides guidelines as to the contents of such agreements.[147] Such agreements should adopt an ecological approach. Article IV(4) of the convention extends the operational sphere of these agreements beyond appendix II.[148]

Institutional Framework

The convention establishes a conference of the parties,[149] a secretariat[150] and a scientific council.[151] As the policy and decision making body of the convention, the conference of the parties inter alia adopts budgets,[152] considers reports by the secretariat[153] and scientific council[154] and reviews implementation of the convention.[155] It is also empowered to make recommendations or adopt additional measures necessary to implement the convention.[156]

Responsibilities of the secretariat are clearly spelt out[157] and include, servicing conference of the parties meetings and acting as a liaison institution. Originally, UNEP financed and performed the secretariat duties of the convention. But at present UNEP performs administrative duties only.

As mandated by the convention, the conference of the parties appointed a scientific council in 1985. It also promulgated the councils rules of procedure.[11] The primary function of the scientific council is to advise both the conference of the parties and secretariat on all technical matters.[158] Other functions are determined by the conference of the parties.[159]

Contracting parties are entitled to lodge reservations relating to inclusion of species in either of the Appendices. However, such reservations are revocable by a written notice to that effect. General reservations are prohibited.

Historical Profile

The first conference of the parties was held at Bonn in 1985. The Bonn Conference established a standing committee to monitor the execution of the budget of the secretariat and implement the convention on behalf of the conference of the parties between conferences. It also established a trust fund and approved the 1986-88 budget. A scientific council was appointed and directed to draft agreements, review lists of species in both appendices and make recommendations. During the meeting, more species were added to both Appendices. Between the first and second conference of the parties meetings, the secretariats financial standing deteriorated leading to the reduction of staff to a single professional and a secretary.[160]

The second conference of the parties meeting was held at Geneva in October 1988. Since not a single agreement between range states of species listed in Appendix II had come into operation, the meeting encouraged range states to adopt less formal agreements to facilitate implementation of the convention. Seven small cetaceans were added in Appendix II. Most important, the conference approved the 1989, 1990 and 1991 budgets of US Dollars 308,000, 367,000 and 607,000 respectively.[161]

As of December 1990, the convention had received only 33 ratifications.[162]

Strengths and Weaknesses

The legal regime articulated in the Bonn Convention deals with migratory species as an ecological unit. It addresses conservation needs of these species throughout their migration. It takes the so called ecosystem approach. The legal rules and principles therein embodied address the major aspects in the conservation of migratory species.

Although the convention has considerable potential as a species conservation device, it has several weak points and its performance in the past has been unsatisfactory. Firstly, the regime has failed to attract majority of the would-be range states. The instrument was adopted over a decade ago, yet it has about 33 ratifications. Having failed to muster support from the

international community it is doubtful whether the convention could act as a truly international conservation instrument.

Secondly, though noble, the requirement that contracting parties with species listed under appendix II conclude "other agreements" works against the convention. To a large extent this amounts to requiring parties to conclude another "convention" over and above the Bonn Convention. This is likely to scare off many would-be parties to the convention. Thus, although draft agreements have been prepared none has been adopted. Admittedly, therefore, the conservation status of migratory species listed in appendix II remains largely unchanged.

Thirdly, the regime suffers from inadequate institutional and financial mechanisms. The secretariat, for example, remained an emaciated institution for many years. The Convention is financed through contributions of the parties through a special United Nations Trust Fund. It is administered by a Unit of the United Nations Environment Programme based in Bonn, Germany. It need not be over-emphasized that an efficient institutional framework and a sustainable financial regime are the basis of effective implementation of conventions.

In a nutshell, the Bonn Convention has failed to make any significant impact on the conservation of migratory species. It has literally failed to make "the dangerous game of migration any safer."[163] Would migratory species be worse off without the

convention? In our estimation they would not. Simon Lyster writes: "if I were a migratory species... depending on the Bonn Convention for my survival, I would quickly move to a protected area and stay there."[164]

The Ramsar Convention, 1971

Another instrument worthy of detailed examination is the International Convention on Wetlands of International Importance Especially as Waterfowl Habitats, 1971 ("Ramsar Convention").[165] Although it is specifically designed to enhance conservation of the waterfowl, which is a migratory species, it also facilitates conservation of wetlands. It, therefore, addresses both migratory species and their habitats.

Wetlands are among the most productive habitats. They provide enormous economic benefits to mankind. But most important, they provide habitats for waterfowl and countless species of flora and fauna species. Obviously, these riches can only be maintained if the essential ecological processes are maintained. However, human activities have persistently threatened most of the planet's wetlands.[166]

Effective conservation of global wetlands calls for a concerted effort on account that water upon which the health of wetlands depend is susceptible to pollution and could be seriously degraded by both air and water pollution. Concern for global

wetlands as principal habitats of the waterfowl attracted international action in the early 1970s. An international conference held at Ramsar (Iran) in 1971 culminated in the adoption of the Convention on Wetlands of International Importance Especially as Waterfowl Habitats, 1971. Ramsar convention is the only instrument on nature conservation dedicated to a specific habitat and species dependent on it. The Convention was adopted on February 2nd 1971 and came into force on December 21st 1975.

The objective of the convention is to enhance conservation of the Waterfowl through curbing loss of wetlands and ensuring their conservation.[167] The preamble to the convention also acknowledges the economic, scientific, cultural and recreational values of wetlands.[168] It is explicit that "Waterfowl in their seasonal migrations may transcend frontiers and so should be regarded as an international resource."

Over and above being under an obligation to be actively involved in conservation and wise use of waterfowl habitats, contracting parties are required to designate at least one wetland within their jurisdiction for inclusion in the list of internationally important wetlands maintained by the bureau of the convention.[169] Since the objective of the convention is waterfowl conservation, the selection of habitats for inclusion in the list has a bias towards wetlands with waterfowls.[170] However, contracting parties are free to add other wetlands to the list and extend or

restrict boundaries of those wetlands included in the list should "urgent national interests" necessitate such move.[171]

In addition, contracting parties are encouraged to establish nature reserves, carry out research, exchange data and train personnel for effective management of Waterfowl habitats.[172] They are also required to co-operate to facilitate effective conservation and management of wetlands.[173]

In its original form, Ramsar Convention was an unworkable crafty document. It provided for neither an administrative nor a finanicial framework. Some quarters have attempted to justify these shortcomings on the premise that the instrument was a ground-breaking venture. "...the Ramsar Convention was the first of the modern global nature conservation convention and so it is not surprising that there were problems."[174] To a large extent this contention is untenable. We think that delegates at Ramsar were determined to float a convention readily acceptable to the international community. Several arguments render credence to this view. In the first instance, although the major inadequacies of the convention were detected on time, it is incomprehensible why it took over 10 years to make the necessary amends. Secondly, after reviewing the obligations imposed on contracting parties a profound writer damns it "the painless convention."[175] Is this not precisely because its obligations tend to have a minimal effect on contracting parties? The best illustration is the position adopted by the Federal Republic of

Germany. When the country ratified the convention on June 26th, 1976, the relevant authorities advised the federal government that it could fulfill its obligations under the convention by simple administrative action.[176]

The principal deficiencies of the regime included, absence of an amendment procedure, an unfortunate language clause and lack of administrative and financial arrangements. It took many years to introduce necessary amendments.

Parties to the Ramsar convention held their first conference of the Parties at Calgliari, Italy in 1980. The conference recommended that the convention be amended to provide for an amendment procedure, criterion for identifying waterfowl habitats, and an administrative and financial framework.[177] Although the conference produced no tangible results, it succeded in laying down the foundation for future action. In 1982, an extra-ordinary conference of the parties convened in Paris adopted a protocol providing for the much needed amendment procedure and additional official language in line with the United Nations practice. The protocol came into force in 1986.

The second conference of the parties was held at Groningen in 1984. Ratifications had by then grown from 28 in 1980 to 35 and out of these, 32 had delegates in the conference. In addition, many observers from developing countries attended. Although the Groningen meeting deliberated on both financial and

administrative aspects of the convention, no firm conclusion was arrived at. However, the number of global wetlands in the list had grown by leaps and bounds from 75 in 1980 to 292. An ad-hoc committee was established to study and make recommendations on the administrative requirments of the convention. The Committee made recommendations on future secretariat requirements of the regime, amendments, rules of procedure of the conference of the parties and the need for a standing committee to act between conference of the party meetings.

The third conference of the parties was held at Regina (Canada) in 1987 (hereinafter referred to as the Regina Conference). This conference marked the turning point of the convention. It accomplished efforts to streamline Ramsar Convention. Accomplishments of the Regina Conference were variously administrative, financial and conservatory.[178] The conference adopted amendments to improve organization and increase authority of the conference of the parties. A permanent secretariat to deal with administrative, diplomatic and legal issues was established. In addition, a standing committee to act as an executive body between conferences was formed.

In order to meet the financial commitments of the convention, a fund financed by mandatory contributions by contracting parties was established. An ambitious budget of US dollars 1.2 million for the period 1987-90 was also adopted.

On the conservation front, the Regina Conference adopted a detailed criteria for identifying wetlands, modalities to enhance wise use of habitats, reviewed certain individual cases and recommended action.[179]

The fourth conference of the parties was held in Switzerland in 1990. It ensured the largest international gathering on waterfowl habitats. It reviewed the general implementation of the convention and the status of waterfowl habitats on the world list. It urged the governments of the Federal Republic of Germany, Jordan, Spain and the United States to take immediate measures to salvage wetlands at Donana, Everglades, East Frisian, Waroen Sea and Arzorq. Unanimously, the conference adopted a proposal to establish a global wetland conservation fund to provide technical assistance to developing countries. It also adopted a budget of US dollars 3.26 million for the 1992-3 period.

The fifth meeting is due in 1993 and is scheduled for Kushiro on Hokkaido island in Japan.

Strengths and Weaknesses

One of the principal strengths of the Ramsar Convention is the broad definition accorded the term "Wetlands".[180] The definition extends the operational sphere of the convention to encompass a broad spectrum of ecosystems and habitats. It covers a wide

range of freshwater and marine habitats including estuaries, salt marshes, mangrove swamps, coral reefs, tundra and flood plains.[181] Mangrove Swamps and Coral reefs are crucial for fish on which many coastal states depend. Although only a handful of contracting parties have jurisdiction over coral reefs at the present, their international recognition is important.[182]

Secondly, the regime gives the conference of the parties the mandate to recommend that an individual party take action to enhance conservation and wise use of Waterfowl habitats within its jurisdiction.[183]

Thirdly, Ramsar Convention is a highly flexible instrument. It is designed to facilitate the widest acceptance by the international community and adherence thereto by as many countries as possible. This flexibility is in particular reflected in Article II (5) which allows contracting parties to alter the boundaries of wetlands included in the world list or even delete them altogether to accomodate "urgent national interests." Arguably, this flexibility enables contracting parties to maintain a workable balance between national interests and international conservation obligations.

But the Ramsar Convention has numerous shortcomings which undermine its role as a Waterfowl and habitat conservation instrument. It is an open secret that implementation of this convention suffered severe setbacks during the 1970s and 1980s by

reason of these shortcomings. Language problems, lack of amendment procedure and inadequate financial and administrative arrangements plagued implementation of the convention for many years. Although contracting parties would least wish to see the convention's potential go to waste, in the past, financial resource, it would appear, has been an upstream resource that nobody seemed ready to let through the dam.[184] Pessimism has been expressed on the ability of the legal regime to promote conservation and wise use of Waterfowl habitats.

> "The Ramsar Convention is at once a fine-sounding document and a treaty to which nations may adhere without important repercussions among commercial and sporting interests at home. Whether the convention will provide real help in the world's wetlands and dwindling stocks of Wildfowl is decidedly less certain."[185]

Secondly, the regime has failed to muster adequate support from the international community. During the last two decades of its existence, it has attracted 62 ratifications only. Beyond doubt therefore, a large proportion of the planet's Waterfowl habitats are not governed by the regime. Although international recognition is likely to grow in future its performance in the past has been disappointing.

Finally, the criteria for identifying wetlands of international importance for purposes of the world list is very strict and many of the would-be beneficiaries are likely to be left out on

account of the formalities.[186] A less stringent criteria would increase the number of Waterfowl habitats covered by the regime and thereby enhance their conservation.

In a nutshell, Ramsar Convention has potential to promote conservation of the Waterfowl and its habitat through international co-operation. However, this potentiality is yet to be realized. As of 1990 the global list of wetlands of international importance had 445 sites covering over 30 million hectares and not a single wetland had been deleted.[187] The secretary to the Regina conference is nevertheless optmistic that the convention will now perform its role as an international wetland conservation device. "We are enthusiastic that the Ramsar Convention will now be able to demonstrate its full potential following the successful Regina Conference."[188]

In our view, Ramsar Convention is yet to demonstrate its role as a Waterfowl and habitat conservation device. Only time will tell, because, like babies, conventions must crawl before they walk and walk before they can run.

2:3:7 Other Regimes on Species and Genera

Other than the Convention on wetlands of International Importance as Waterfowl Habitats, 1971, which addresses conservation of the Waterfowl specifically, other regimes and in particular, regional

conventions contain general provisions relating to the protection of coastal wetlands and estuaries to promote conservation of species therein. As a general rule, these regimes do not particularise any species or genera.[189] Section 10 of the Convention for the Protection and Development of the Marine Environment of the Wider Caribean Region, 1983 provides inter alia, "...contracting parties shall, individually or jointly, take all appropriate measures to protect and preserve rare or fragile ecosystems, as well as the habitats of depleted, threatened or endangered species in the conservation area..." This convention came into force on 11th October, 1986. A similar provision is contained in sections 10, 11 and 14 of the Convention for the Protection management and development of the marine and coastal Environment of the Eastern African Region, 1985 (not yet in force), Convention for co-operation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region, 1981 and the Convention for the protection of the Natural Resources and Environment of the South Pacific Region, 1986 respectively.

The Protocol concerning Mediterrenean Specially Protected Areas, 1982, promulgated under the Convention for the Protection of the Mediterrenean Sea Against Pollution, 1976, covers wetlands "designated by each of the parties."[190] It came into force on March 23rd, 1976. The Protocol concerning Protected Areas and wild Fauna and Flora in the Eastern African Region, 1985, (not yet in force) also emphasizes the importance of enhancing

conservation of coastal wetlands to preserve species and genera of flora and fauna.[191] Although these protocols do not refer to the waterfowl specifically, the fact that they urge contracting parties to enhance conservation of wetlands habitats is critical and cannot be played down.

A plethora of other global and regional instruments address the conservation of specified migratory species.[192] Among the oldest of these is the International Convention for the Protection of Birds, 1950. The objective of the convention is to protect birds in the wild state.[193] With limited exceptions, the instrument is unequivocal that all birds should be protected.[194] It provides for a closed season to protect game birds during migration.[195] The convention's principal conservation device is regulation of taking.[196] It also provides for the regulation of trade in birds protected under the convention.[197] Most important, it provides for the creation of water or land reserves where birds can rest and nest.[198] Little emphasis is laid on habitats of migratory birds. In addition, exceptions under Articles 6 and 7 are susceptible to abuse and could lead to the extirpation of species of birds. Other instruments dealing with the conservation of birds include the Bern Convention, 1979, Convention concerning the Conservation of Migratory Birds and their Environmnet, 1976, Convention on Nature Protection and Wildlife preservation in the Western Hemisphere, 1940, and the 1986 ASEAN Agreement on the Conservation of Nature and Natural Resources. An essential characteristic of most instruments on birds is that they are

regional.

Other migratory species covered by existing legal regimes include marine species, for example, cetaceans and tuna[199] and other migratory species, for example vicuna[200] and the Polar Bear.[201] Save in a few instances, for example, under the International Convention for the Regulation of Whaling, 1946, most regimes on specific migratory species are regional and were in all cases concluded to regulate the harvesting of commercially important species where persons from different countries are involved. ~~Again,~~ as a general rule, these instruments largely ignore matters relating to the preservation of habitats such as resting and breeding sites. They deal almost exclusively with catch limitations.

In a nutshell, although there has been a lot of law making activity in the field of migratory species and genera and many instruments are in force today, migratory species particularly in the marine environment have not been in safe hands.

2:4 MEASURES TO PROMOTE EX-SITU CONSERVATION

Although it is generally agreed that the most effective and efficient mechanism for the conservation of biological diversity is habitat protection, it is acknowledged that ex-situ facilities, zoos, aquaria, botanic gardens and gene banks can be a critical component of a comprehensive conservation programme.

Ex-situ conservation programmes supplement in-situ conservation by providing for the storage, analysis testing and propagation of threatened and rare species of plants and animals. Moreover, these facilities are the principal repositories of genetic materials for crop plants, domestic animals and other genetic resources.

It cannot be doubted that conserving genetic resources plays a considerable role in the improvement of cultivated plants and domestic animals. Enhancing genetic resources, therefore, is a principal approach to biodiversity conservation. Ex-situ conservation is critical in that it acts as an insurance against extinction of rare species or races and provides genetic reservoirs for future re-establishment of species in natural habitats. With the unrelenting increase in the human induced degradation of natural habitats, the importance of this supplementary approach is likely to increase.

The international community has attempted to conserve genetic resources through various approaches. Principal among these is the giving of incentives to encourage and promote innovation. The history of granting exclusive rights, monopolies or patent is an old one. The international community has attempted to tailor the international intellectual property rights regime so as to encourage innovation and conservation.

The need to provide special protection for plant varieties in

particular was acknowledged as from the 1950s.[202] This realization occured in countries with advanced private plant breeding arrangements. The germ of plant breeding is traceable far back in the histroy of man where traditional selection of varieties to meet basic needs has always existed. During this epoch, however, development remained slow and unsystematic. It is only during the last two centuries that plant breeding has been accelerated and systematized. Thus, although plant breeding through crossing and backcrossing took root during the 18th and 19th centuries, it was only after Mendels discovery that plant breeding assumed a scientific character.

Increased research in this field saw researchers begin to lobby for property rights for plant breeders, such as those that had already long existed for inventors of technical subjects matter in the form of patents. The purpose of such property rights is to reserve commercial exploitation exclusively for the creator of an innovation and thus provide him with the possibility of recovering his investment and give him incentive to create further innovations.

Since the patent system had been designed specifically for technical inventions, it was generally held to be unsuitable for living resources, for example, plants. How then were plant breeders to be protected? Domestic attempts to protect plant breeders begun to emerge during the third decade of the 20th century.[203] However, none of these attemps was comprehensive

enough to guarantee plant breeders the requisite protection.

Many years of effort by plant breeders to obtain patent protection came to nothing. However, a ray of hope came in 1956 when the International Association of plant breeders for the protection of new plant varieties founded in 1938 by plant breeders from various countries proposed that France convene an international conference on the protection of new plant varieties. Deliberations of the Paris Conference culminated in the adoption of the International Convention for the Protection of New plant varieties, 1961.

The objective of the convention is to recognize and protect the rights of breeders of new varieties of plants and their successors in tittle. Contracting parties constitute UPOV (Union for the Protection of New Varieties of Plants).[204] The convention establishes sui generis provisions that are better suited to the subject matter to be protected than were the traditional requirements of patentability. A breeder has the right to authorise any production or commercial marketing of the new variety.[205] These rights must be restricted unless the breeder receives sufficient remuneration. Titles of protection are issued by member states after official examination of the variety and may be granted for a limited period.[206]

The protection accorded plant breeders under the International Convention for the Protection of New plant varieties, 1961, has

the following elements:- In the first instance, the subject matter of protection is the variety as such, and not the inventive idea for the breeding of a variety. Undeniably, therefore, and in line with the need for protection in the field in living resources, plant variety under the convention begins at the point where a patent ends. On account of the biological characteristics of different plant varieties, a variety must meet the following requirements. Firstly, its plants must be distinguishable from those of other varieties in the expression of their characteristics. Secondly, it must be homogenous, that is to say, plants must be sufficiently similar in those characteristics that determine the distinctiveness. Thirdly, it must be stable, which means, the expression of characteristics of the plants resulting from each reproduction or propagation must correspond to those of plants of the preceding generation.[207]

In addition, the variety, that is to say, material thereof may not have been marketed or may only have been marketed within specific time limits.

Lastly, since the genetic potential for expressing specific characteristics cannot be seen in the propagating material of a variety, the variety must be designated by means of a denomination to assit users in identifying it. Negotiators of the UPCV convention did not require the value of the variety to be a facet of the prerequisites for protection on account of its variation from both region to region and within specific regions.

The convention was amended in 1978, and the revised text addresses the regulation of the nullity and forfeiture of the granted rights in its own way. It also determines the scope of protection. Each contracting state is obliged to provide specified minimum protection to plant breeders. Only plant breeders should alone be authorised to produce propagating material of the variety, namely, seed or other propagative material for purposes of commercial marketing. However, the protection does not extend to production for consumption and the consumption stages. This is the position in situation where a farmer, for example, makes use of harvest material produced in an earlier season as propagating material for the production of harvest materials in his own field. However, the production of propagating material is prohibited.

Under UPOV, a protected variety may be freely used for further development. Breeders can freely improve protected varieties for the creation of new varieties. Such variety is subject to protection and can be marketed for propagation without the first breeders authorization or payment. The convention also provides for the protection of the final product particularly in the case of ornamental plants.

In a nutshell, under the International Convention for the Protection of New varieties of plants, 1961, it is the user's intention that decides whether his acts in respect of the variety fall within the scope of protection or not. Where a farmer grows

a cereal variety and sells the crop, the issue whether he had authority to do so from the variety owner is dependent upon the purpose for which he intended the harvested material. If he sells it for consumption, this is not covered by variety protection. But should he declare it a seed, he will require authorization of the owner of protection. Under this regime only one protective right exist for each variety.

It must be emphasized that under the UPOV convention, farmers and gardeners have unrestricted authority to use protected varieties without having to worry about plant variety protection matters so long as they produce no propagating material. The owner of protection has a right in a variety that comprehends the variety and cannot be encroached on by other variety protection rights. This would mean that owners of protected varieties contrary to patentees in many cases, are not faced with the need to defend their rights against others who either contest their effectiveness or claim that use of the protected variety interferes with other rights protected.

Although the regime articulated in the UPOV convention reflects a vast improvement on the disparity of legal situations and the legal vaccum prevailing in the field before the convention, it has a number of weak points. Firstly, other than Article 5 (3) which provides that repeated use of a variety for the commercial production of another is subject to authorization, the convention takes no account of the specific nature of hybrid varieties.

Secondly, farmers are able to use a variety continously for purposes of satisfying their subsistence demands without paying any royalties.[208] Thirdly, although it has been argued that impoverishment of genetic variability is not a direct result of plant variety protection,[209] its contribution in this respect cannot be played down. Effective varieties spread fast and could lead to the abandonment of earlier varieties.

2:4:1 Strengthening the Plant Breeder's Rights System Under UPOV

In order to streamline plant variety protection under UPOV, contracting parties adopted several amendments during their 1991 conference. In their entirety, these changes are an unequivocal manifestation of the wishes of developed countries. The demand to protect biotechnological inventions played a significant role in this regard.

The new text of the convention incorporates several definitions. The term "breeder", for example, has been expanded to include any person who breeds, discovers or develops a variety. Thus, discoveries have now been recognized as protectable under the convention. It extends protection further to all "genera and species."[210] However, fundamental tenets for protection remain unchanged.

In line with increased demand for better plant variety protection by breeders, the new text introduces the concept of "derived variety" with a view to eradicating "cosmetic breeding."[211] In situations where the new variety is directly or indirectly based on another variety on which breeder rights have been granted, the new variety will be considered as "derived" from that other variety and its protection will fall under that of the earlier variety. Thus, title-holders of earlier protected varieties control derived varieties. This could affect plant breeding adversely.

Of the most important innovation of the 1991 amendments is the expansion of breeders rights in respect of propagating material of a protected variety. Breeders of protected varieties will now authorise not only production and offering for sale, but reproduction (multiplication), conditioning for the purpose of propagation, exportation, importation and stocking. In addition, breeders authorization also applies to harvested material.

Finally, the duration of rights conferred was extended to 25 years.

These innovations and changes were designed to tighten up plant variety protection to keep pace with research and development. Some countries have even gone further and are now allowing protection of genes or varieties by utility patents and this provides more strigent protection than plant breeders rights.

Before analyzing the implications of a uniform intellectual property rights regime for the planet, it is necessary to consider the role played by the FAO International Undertaking on Plant Genetic Resources, 1983. This is essentially because like UPOV it addresses plant protection.

2:4:2 Genetic Resources

Genetic resorces are species and varieties of plants and animals with proven or potential value steming from the genes they contain or the chemicals they produce. They include medicinal plants and animals, traditional and modern varieties of crops and livestock and their wild relatives. Although genetic resources differ from biological resources, it is indisputable that the two are inseparable.

Because of the nature of the interests involved, the debate on genetic resources between north and south assumes a dual dimension. Whereas developing countries argue that access to these resources should be in exchange for biotechnology and financial resources, developed countries insist on free access. But, what compounds the problem is that in addition to insisting on free access to genetic resources in developing countries, developed countries are further committed to strengthening and expanding the legal frameworks that confer rights on "improved" genetic resources and technologies that permit their extraction and exploitation.

Because of the different interests to be protected and enhanced, it is indisputable that the uniform intellectual property rights system which most developed countries are pressing for to protect innovations related to genetic resources will leave developing countries out in the cold. This is precisely because although developing countries possess most genetic resources and indigenous farmers in these countries have over the years preserved and improved many varieties of food crops and their gene pools thereby maintaining genetic diversity, the legal framework does not grant any rights on these varieties. In addition, these countries are chronically short of financial and technological resources to exploit these resources.

The 1983 FAO Undertaking on plant Genetic Resources was an attempt by the international community to create an equilibrium between owners of germplasm and the sources of unimproved genetic resources.[212] The Undertaking provided for a free-flow regime for the exploration, preservation and movement of genetic resources for scientific purposes.[213] It also requires parties to erect appropriate legislative measures, co-operate and adopt measures to enhance in-situ and ex-situ conservation of plant genetic resources for purposes of plant breeding and scientific research.[214]

The Undertaking emphasizes the importance of free access to plant genetic resources by all for purposes of scientific research, plant breeding and conservation. It is emphatic that "...plant

genetic resources are a heritage of mankind..."[215] In addition, it underscores the centrality of international co-operation between adhering parties and international research bodies in the exploration, collection, conservation, maintenance, evaluation, documentation, exchange and use of plant genetic resources.[216] Most important, the 1983 FAO International Undertaking on Plant Genetic Resources adopts the reporting system.[217] Adhering governments are obliged to provide the Director General of FAO with information on the measures they have taken or propose to take to achieve the objectives of the Undertaking annually.[218]

The free-flow regime of both improved and unimproved genetic resources proved unacceptable to developed countries whose determination to enhance protection of intellectual property rights was ripening. Developing countries were also unhappy with the notion of free access by outsiders to both cultivated and wild plant varieties. This was because existing national legislation and the International Convention for the Protection of New Plant Varieties, 1961, protected plant breeders interests. As a way out, developed countries proposed a system where only obsolete, and primitive cultivars and wild and weedy species would be made freely available. Such a system would obviously ignore the owners of wild and primitive cultivars in that whereas their "resources" would be freely available to would-be exploiters, improved varieties would be regarded as private property outside the realm of free accessibility.

That indigenous farmers in many developing countries have contributed significantly to the domestication, improvement and conservation of genetic resources cannot be denied. But the issue is, should they lobby for an international intellectual property rights regime which grants farmers exclusive rights on these varieties or a compensatory mechanism for what they have already lost or will loose? The former appear more attractive. An understanding was arrived at during the 25th Session of FAO in Rome, 11th to 30th November, 1989. Deliberations at the conference culminated in the adoption of the Interpretation of the International Undertaking on Plant Genetic Resources, 1989. Under the compromise, both sides softened their positions. Developing countries accepted the principle of free access subject to plant breeders rights, while developed countries recognized the concept of "farmers rights".[219] According to the interpretation, this amounted to a recognition of the important role that farmers have played in the creation, conservation, exchange and knowledge of genetic diversity. But the so called "farmers rights" amount to nothing but an obligation on the part of the developed world to return greater benefits to farmers from the use of genetic resources. As of now, the concept is an empty shell on paper. Although the FAO Commission on plant Genetic Resources established an international fund for plant Genetic Resources in 1988, contributions to the fund have been minimal.

In the sections that follow, we shall consider the implications of tightened intellectual property rights regime under the

International Convention for the Protection of New Varieties of Plants, 1961, (UPOV) and the 1983 FAO Undertaking on biodiversity conservation in developing countries.

The driving force behind the 1991 amendments to the UPOV Convention, 1961, was to reinforce and strengthen protection of plant breeders rights with a view to enhancing research and development in developed countries. New plant varieties introduced in developing ccuntries have on the one hand led to abandonment of indigenous varieties and contributed to genetic uniformity and hence vulnerability of species on the other. Studies have shown that increased intellectual property rights protection does not necessarily promote innovation in agriculture in developing countries.[220]

As observed, the FAO Undertaking on Plant Genetic Resources, 1983, and its 1989 Interpretation do not erect a global regime capable of enhancing conservation of plant genetic resources tremedously. We think that "farmers rights" recognized by the Undertaking are inadequate to promote conservation of plant genetic resources in developing countries unless developed countries enhanced technology transfer and increased [redacted] investment in Conservation.

Expanding and strengthening protection of plant breeders' rights under the UPOV Convention is designed to enhance protection of biotechnological inventions in particular. The regime now

approximates the patent system. This should, therefore, be seen as an integral part of a scheme by developed countries to create a uniform intellectual property rights regime to achieve their own ends. If successful, such regime will make necessary technologies difficult to obtain and interest in conservation in developing countries is likely to decline.

What emerges is that as of now, the intellectual property rights regime is progressively and effectively denying developing countries the opportunity to join the global biotechnology community. The trend is towards sealing the monopoly on biotechnology by developed world firms. In their entirety, existing and proposed intellectual property rights regimes will effectively marginalize developing countries technologically. It is submitted, that although the 1991 version of the International Convention for the Protection of New plant Varieties, 1961 retains the concept of novelty, the same has to a large extent been diluted by the newly introduced "essentially derived variety" concept.

What appear almost certain is that existing and proposed intellectual property rights regime is ill-suited to enhance conservation of genetic resources in developing countries. The challenge facing developing countries therefore is not whether time is ripe to protect inventions, but the ways and means of protection. In view of the complexity of this problem, we think that an intellectual property rights regime on living forms which

recognizes the rights of developing countries to access to germplasm and technology and compensation for genetic materials would be a reasonable compromise.

2:5 MEASURES TO ENHANCE CONSERVATION OF BIODIVERSITY OF COASTAL ZONES AND THE HIGH SEAS

From the earliest times, seas and oceans have played a tremedously important role in the development and civilization of mankind. In addition to other important roles, they provide an additional source of food, recreation and industrial raw materials. Oceans and seas are endowed with many living resources which man needs. Therefore, their conservation and sustainable utilization is necessary.

Exploitation and conservation of natural resources of the sea constitute one of the most topical problems of contemporary international law. From the view of utilization and conservation of the resources of the sea traditional international law recognized the sub-division of the sea in two areas, namely, the territorial sea (together with the internal waters) and the high seas or open sea. Whereas the dorminant principle of the regime of the terrirorial sea was the sovereignty of coastal states, that of the high seas was the freedom of the High Seas, that is the right of all states to use and exploit its resources.[221] Article 4 of the 1958 Geneva Convention on the High Seas.provides that "Every state whether coastal or not has the right to sail

ships under its flag on the high Seas". This right was based on the dual premise of the inexhaustibility of resources, and the view that by their very nature the oceans could not be subjected to sovereignty. The oceans therefore became res communis Traditional Customary international Law could not give an adequate answer to conservation. The only mechanism for conservation was the duty arising out of the freedom of the high seas, the duty of each state in enjoying the freedom of the high seas to ensure equal freedoms of other states were not infringed.

By the middle of the 20th Century, the international community had realized that conservation of living resources of the sea was not merely a scientific and technical problem but an economic and social problem as well. States had already started taking unilateral action to conserve areas within or contiguous to their territorial sea. The League of Nations Conference in the Hague, 1930 and the General Assembly resolutions on conservation, 1949 failed to articulate an acceptable conservation regime.

A spirited attempt to codify the law of the sea culminated in the adoption of the Geneva Conventions of 1958. The approach of the conventions was to allocate competence to states to adopt conservation measures. To a large extent the Geneva Conventions 1958, codified customary international Law of the Sea. Article 4 of the Convention on the High Seas, 1958, is a good example. But the freedoms accorded to all states, that is to say, freedom of navigation, fishing, laying submarine cables and pipelines is

subject to the qualification that they should be exercised with reasonable regard to the interests of other states to do the same. The Convention on Fishing and Conservation of the Living Resources of the High Seas 1958, oblige state parties to co-operate in the adoption of measures to conserve fishery resources of the high Seas.[222] In limited cases, it gives coastal states the right to unilaterally adopt conservation measures for areas of the high seas contiguous to its territorial sea.[223] Unfortunately, this Convention has remained largely ineffective.

Article II of the Convention on the Continental Shelf, 1958 gives a coastal state sovereign rights to explore and exploit natural resources of the continental shelf. However, under Article III such right does not affect the legal status of waters of the high seas or air space above such waters. But Artcle V (i) is unequivocal that the exploration and exploitation of natural resources of the continental shelf must not result in unjustifiable interference with fishing or the conservation of living resources of the sea.

Coastal states are further obliged to adopt appropriate measures to protect living resources of the sea from harmful agents.[224]

Finally, the Convention on the Territorial Sea and the contiguous zone, 1958, empower states to adopt conservation and environmental protection measures and enforce the same over the territorial sea and in zones of the high seas contiguous to its territorial sea.

The regime articulated in the Geneva Conventions, 1958, laid a firm foundation on states competence to individually and collectively adopt measures to protect the marine environmentt from contamination and for the conservation of its components of biological diversity. Subsequent conventions have attempted to improve upon this regime.

2:5:1 Instruments on Specific Species

There is no doubt that the international community has realized that conservation is essential in the development of a rational exploitation of living resources of the sea. Instruments on specific species of the sea are for the most part exploitation conventions and their principal conservation mechanism is almost invariably sustainable utilization. This conservation strategy has been described variously as optimum sustainable yield,[225] maximum sustainable productivity[226] or catch,[227] and rational exploitation[228] or utilization.[229]

These instruments are characterised by provisions for the establishment of commissions with powers to adopt regulatory measures which bind parties when approved. Such measures relate to exploitation gear and seasons, and catch limitations.

sustainable yield from those resources so as to secure a maximum supply of food and other marine products..."

Like their counter part on specific species, most conventions addressing groups of marine living resources are exploitation oriented and make provision for the establishment of commissions empowered to adopt regulatory measures.[231]

However, a number of conventions and protocols in this field adopt a broader approach and are designed to enhance conservation of both species and ecosystems. The Convention on the Conservation of Antarctic Marine Living Resources, 1980, is a good example. This convention was promulgated to reinforce the regime relating to conservation and exploitation of living resources in the Antarctic. It came into force in 1982. The objective of the convention is to conserve marine living resources of the Antarctic by safeguarding the environment and protecting the marine ecosystems.[232] Although it is essentially an exploitation convention, it is designed to enhance conservation of both species and the Antarctic marine ecosystem.

2:5:3 Specially Protected Marine and Coastal Areas

In order to enhance conservation of biodiversity of the marine environment, existing instruments and protocols make provision for the establishment of special areas in the sea. Annex I of

the International Convention for the Prevention of Pollution from ships, 1973, make reference to special areas where strict control of marine pollution is made obligatory. Such areas include, the mediterrenean, Baltic and the Black seas. To qualify for the special area status, the area must display three features, that is to say, oceanographic and ecological requirements and traffic of a particular character.[233] Annex II and V also refer to special areas. These areas are established for purposes of reducing contamination levels.

Article IX (9) of the Convention on Conservation of Antarctic Marine Living Resources, 1980, empower the commission for the conservation of Antarctic Marine Living Resources, to adopt conservation measures inter alia, "designation of ... special areas for protection and scientific study."

Several conventions under the auspices of the UNEPs Regional Seas Programme contain Articles obliging contracting parties to establish Specially Protected Areas in the sea to promote conservation of habitats and ecosystems. The standard Article provide inter alia that,

> "... parties shall... take all appropriate measures to protect and preserve rare or fragile ecosystems and depleted, threatened or endangered flora and fauna as well as their habitat... parties shall establish protected areas such as parks and reserves and prohibit or regulate any activity likely to have adverse effects

on the species ecosystems or biological processes that such areas are designed to protect."[234]

But the corresponding Article under the Convention for Co-Operation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region, 1981 is much broader in that is requires parties to establish specially protected areas to "protect and preserve rare and fragile ecosystems as well as the habitats of depleted, threatened and endangered species and other marine life."[235]

The international community has gone a step further and negotiated protocols within the framework of the UNEP Regional Seas conventions specifically for the protection and conservation of biodiversity of the marine environment. The Protocol concerning Mediterrenean Specially Protected Areas, 1982, promulgated under the Barcelona Convention for the Protection of the Mediterrenean Sea Against Pollution, 1976, is a representative example. The protocol came into force on March 23rd, 1986. It contains detailed provisions on special areas in the sea.

Contracting parties are obliged to take all appropriate measures to protect those marine areas which are important for the safeguard of the natural resources and natural sites of the Mediterrenean Sea area, for the safeguard of their cultural heritage in the region.[236]

The protocol encourages parties to establish protected areas and undertake action to safeguard:

a) sites of biological and ecological value,

b) genetic diversity amongst species and satisfactory population levels of those species,

c) representative types of ecosystems as well as ecological processes,

d) sites of particular importance on account of their scientific, aesthetic, historical, archaeological, cultural or educational interest.[237]

Under the protocol, protected areas can only be established within territorial waters of the parties.[238] In addition, parties may establish "buffer zones" to strengthen protection of protected areas.[239] Finally, all parties are required to take necessary action to maintain the integrity of protected areas.[240]

Other protocols which address the establishment of protected areas in the sea in terms similar to the Mediterrenean Sea protocol but have not yet come into force are the Nairobi, 1985,[241] Paipa, 1989,[242] and Kingston, 1990.[243]

It is necessary to note that although articles in the Nairobi Protocol appear similar to those in the mediterrenean protocol, they are more wide-ranging. Moreover, the protocol provides a criteria to guide contracting parties in the establishment of protected areas in their territories.[244]

need not be over-emphasized that the establishment of
tected areas in the sea, especially in coastal areas and
lands which teem with biodiversity would go a long way in
ancing conservation of biodiversity of the marine environment.

:4 United Nations Convention on the Law of the Sea, 1982

United Nations Convention on the Law of the Sea, 1982,
tains a general provision obliging states to undertake
sures to protect and preserve rare and fragile ecosystems as
l as habitats of depleted, threatened and endangered species
other forms of marine life.[245] Although, the establishment
protected areas is not a major ecosystem and species
servation device under this Convention, it embodies the
system approach.

h regard to conservation of species, the principal
servation strategy is sustainable exploitation.[246] For
poses of conserving marine living resources within the
lusive economic zone, coastal states are obliged to determine
allowable catch and adopt conservation and management
sures which can produce the "maximum sustainable yield".[247]
ionals of other states fishing in the EEZ of other states are
quired to observe conservation measures and regulations of the
stal state, these include fishing gear, types of fish to be
ght, sizes of species e.t.c.[248] Coastal states without

acity to harvest the entire allowable catch are obliged to
er into agreements or arrangements to allow other states
ess to the surplus.[249] The practical difficulties of
lementing such obligation are apparent and would possibly work
inst conservation of marine living resources.

far as living resources of the high seas are concerned, the
vention require states to co-operate in the adoption of
sures to conserve and manage them.[250] Under the Convention,
states have the right for their nationals to engage in the
loitation of living resources on the high seas.[251] The
vention requires also that parties co-operate in the adoption
measures and the establishment of fisheries organizations.
eral are already in existence. In its present state, the
vention favours rich and technologically advanced countries
h regard to exploitation of marine living resources.[252]

FINANCIAL MECHANISMS

servation is changing and can no longer be measured solely in
ms of the number of species saved or the acreage of land kept
stine. Effective conservation integrates human needs on a
tainable basis with the planet's fragile ecosystems and
itats. But no where is this balance more difficult or more
ortant to achieve than in developing countries. Although
se Countries which are mostly in the diversity rich Tropical

gions harbour the bulk of the planets biodiversity, threats to
is global resource is greatest and they have inadequate
sources to support conservation efforts. For sustainable
nefits, conservation of biological diversity require
vestment in staff, infrastructure, education, training and
search. But because developing countries can only increase
vestment in conservation at the expense of other development
iorities, sustainable financial regimes are necessry if they
e to fulfil their international obligations.

response to the realization that sustainable financial regimes
ay a central role in enabling countries with inadequate
sources meet their international conservation obligations,
empts have been made to incorporate financial mechanisms in
nservation instruments.[253]

5:1 Multilateral Funds

e most prevalent mode of raising funds to finance conservation
tivities is through compulsory and voluntary contributions by
ntracting parties. Some instruments establish multilateral
nds to support the secretariat and conservation activities
der the regime.

e World Heritage Convention, 1972, establishes the World
ritage fund,[254] a fund financed by mandatory and voluntary
ntributions by state parties, other states, international

ganizations, public and private bodies and private individuals. e 1987 amendments to the Ramsar Convention, 1971, established a ltilateral fund to be financed by compulsory contributions by ate parties. The fund established by the 1990 London justments to the Montreal Protocol, 1987, will be financed by th voluntary and assesed contributions from the parties with phasis on contribution from the developed contries.

must be emphasized that these multilateral funds are blished to provide financial and technical assistance for the plementation of international conservation obligations to state rties with inadequate resources.

principal shortcoming of this funding mechanism is that nservation activities are subjected to the vagaries of state propriation and charity. If experience is anything to go by, se funds are more often than not short of money.[255] uctance by state parties to pay their share remains the rule fund shortage has not infrequently paralysed operation of retariats. Whereas reluctance by some state parties is erstandable on account of severe political and economic woes, e backsliders are neither poor nor unable to meet their igations.[256]

ike the funds established under the above instruments which e created to promote conservation, the fund established by the

International Convention on the Establishment of Fund for Compensation for Oil Pollution Damage, 1971, pursuant to the provisions of the Civil Liability convention, 1969, addresses the curative approach to adverse effects of oil pollution.

As a conservation financing mechanism, the multilateral fund has become too popular to be ignored in the financial regime of the proposed legal instrument on biological diversity.

Generally, existing regimes do not encourage generation of local funds and most conservation projects are heavily dependent on external funding. The immediacy of human needs and their pressure on the ecology places unique demands upon limited resources in developing countries. In the absence of documented evidence on the implications of ploughing back funds from conservation, a worthwhile assessment cannot be undertaken here.

The picture which emerges is that global efforts to enhance conservation of biological diversity are grossly underfunded at all levels and unless additional funding is made available, conservation will continue to suffer.[257]

Thus, while the international community agrees that conservation of biological diversity is a biospheric imperative, governments still have genuine difficulties in finding sufficient resources to finance it in a manner commensurate with societal needs. Undoubtedly, most developing countries cannot fulfill their

international obligations under existing legal regimes. The need for innovative and sustainable financial mechanisms cannot, therefore, be over-emphasized. Although the existence of financial mechanism is not the panacea to effective conservation of global biological diversity, sustainable financial regimes rank high on the hierachy of principal prerequisites.

2:7 INTERNATIONAL CO-OPERATION

> "Indeed the entire ecology of the planet is not arranged in national compartments and whoever interferes seriously with it anywhere is doing something that is almost invariably of serious concern to the international community at large."[258]

Kennan's prediction more than two decades ago is being borne out by the evidence of impoverishment of global biological diversity where potential and actual threats are likely to have global implications. Loss of biological diversity is a global environmental problem and is currently most severe in developing countries. Ipso facto the challenge precludes resolution through purely domestic efforts. Globalism and regionalism should replace sovereign individualism and national self-interest.

International co-operation is the cornerstone of international

action. It is through co-operation that policies and intents of the international community are formulated and implemented. International Co-operation, therefore, remains the mainstay of any concerted attempt to address global environment concerns. Although it has and continues to play a considerable role since the Stockholm Conference, 1972, its future role remain enormous.

Because biological diversity, financial resources, technology and technical expertise are unevenly distributed, with the former being more abundant in the south, international co-operation would enable developing countries fulfill their international obligations through assistance from the developed countries.

With regard to shared resources, international co-operation plays a special role in enhancing their sustainable utilization.

Under exploitation conventions, co-operation facilitates research, exchange of data, modes of exploitation and dealing with infractions. Conventions on marine pollution require parties to co-operate on a vast range of activities.[259] The gluttony which characterised the whaling industry for many years was a function of lack of active co-operation by some whaling nations.

Most important, international co-operation facilitates conservation of migratory species[260] and habitats and ecosytems extending beyond the limits of national jurisdiction.[261]

International co-operation is frequently threatened in situations where national interests are likely to be adversely affected. In 1981 for example, Brazil, Iceland, Japan, Norway and the USSR objected to the banning of the "cold grenade" harpon as a means of killing minke whales for commercial purposes. Since these were the only countries engaged in minke whaling, their action rendered the ban entirely useless. Recently, Iceland intimated that it would quit the International Whaling Commission because the ban on commercial whaling was not lifted during the Reykjavik meeting in June, 1991.

Since international co-operation is predicated on the assumption that the regime will muster reasonable international support so that actions taken have a truly international character, this aspect is seriously compromised when conventions fail to muster the requisite support.

In a nutshell, North-South co-operation is the linchpin in conservation of the planets biological diversity. This will facilitate the exchange of technical assistance and resources and the trickling of wealth and affluence from north to south.

Generally, existing regimes on biodiversity do not provide for the transfer of technology or financial resources from developed to developing countries. The 1990 London adjustments to the Montreal Protocol, 1987, specifically provided for the transfer of technology and technical resources to developing countries to

facilitate the switch-over from ozone depleting substances to ozone friendly substances. Such a development is illustrative of the emerging trend in the evolution of environmental relations between North and the South.

The foregoing illustrates that a lot remains to be done in the realm of financial resources, technology and other forms of international co-operation. It may be submitted that if the planets biological diversity is to be effectively conserved, global imperatives and long-run economic considerations must replace short-term national economic interests.

2:8 SUMMARY

In the foregoing, the nature, character and extent of the normative schemes relating to conservation of biological diversity have been demonstrated. In this endeavour, global and regional instruments were used to exemplify the principal conservation mechanisms and strategies. However, the survey would be incomplete if the following pertinent observations were not made.

In the first instance, existing arrangements on biodiversity have for the most part evolved on a piece-meal and sectoral basis. They address conservation of components of biological diversity in compartments. Although this approach has advantages, rules articulated under some instruments tend to be too specific and

narrow to the extent of being parochial. Most of the so called exploitation conventions address single species and ignore fundamental ecological imperatives. The International Convention for the Regulation of Whaling, 1946,is illustrative of this argument. Although the convention does not define the term "whale", it deals with whales only. It ignores smaller cetaceans with which whales share the marine ecosystem and are directly or indirectly affected by whaling activities.

Secondly, although habitat degradation and modification remain the single most important cause of biodiversity impoverishment, its conservation receives limited emphasis if any in existing regimes. Generally, exploitation conventions do not address conservation of habitats and ecosystem. Most instruments on the conservation of species ignore aspects such as land-use and development and place more emphasis on the regulation of "taking" as their principal conservation tool. Where land-use and habitat conservation are addressed, elaborate details are lacking and what remains are vague statements purpotedly imposing legal obligations on contracting parties. The African Convention on the Conservation of Nature and Natural Resources, 1968, adopts such approach.[262]

Thirdly, most instruments appear to have been an urgent response to a particular problem and are, therefore, lacking in essential details. The best illustration is the Torrey Canyon disaster which inspired two conventions under the auspices of the Inter-

governmental Maritime Consultative Organization (IMCO) now International Maritime Organization (IMO).[263] The Ramsar Convention, 1971, and the Whaling Convention, 1946, do not appear to have been exhaustively deliberated upon prior to their adoption. The former suffered from inadequate details for many years. The Whaling Convention, 1946, was adopted to control the supply of Whale oil in the market[264] to maintain economic viability.

Fourthly, although habitat degradation and modification remain the principal cause of loss of biological diversity, there is no global instrument for the protection of habitats and ecosystems of endangered species and genera.[267] However, some regional conventions negotiated under the auspices of UNEPs Regional Seas Programme contain general obligations on the protection of habitats and ecosystems of endangered and threatened species. It cannot be over-emphasized that conservation of habitats and ecosystems is the surest way to enhance the survival of as many species and genera as possible.

In addition, since most regimes on biological diversity operate on a regional basis, large gaps in geographical coverage remain. For illustrative purposes, whereas North America, parts of Europe, Japan, Australlia and U.S.S.R. are relatively well covered by existing regimes on migratory species, no instrument covers migratory birds in South America, Africa and the rest of Asia. This is a serious gap in coverage because North American

and European migratory birds flow to South America, Africa and Asia in winter.

It also clearly emerges that existing normative structures do not generally encourage ex-situ conservation. The supplementary role that ex-situ conservation measures play in conservation cannot be played down. Since existing and proposed intellectual property rights regimes aim at enhancing protection of innovations and discoveries, it is ill-equiped to promote conservation of biological diversity. This is precisely because it will be much more difficult for developing countries to obtain environmentally related technologies and germplasm.

A fundamental shortcoming of existing regimes on biodiversity generally is that they suffer from inadequate institutional and financial arrangements and are thus ill-equiped to implement their provisions effectively. By no stretch of imagination could conventions be expected to operate in absence of a financial regime and an effective institutional framework. The Ramsar Convention, 1971, had neither financial nor institutional framework for over a decade and not surprisingly, it remained ineffective. These regimes are also lacking in financial and economic incentives to enhance conservation of biological diversity.

But enforcement stands out as a major shortcoming of both global and regional regimes on conservation. Most instruments have no

real enforcement provisions and rely on voluntary compliance. The African Convention on the Conservation of Nature and Natural Resources, 1968, is a good illustration. But even conventions with elaborate enforcement procedures do not appear to have performed well. For example, although the convention on the conservation of Antarctic Marine Living Resources, 1980, (CCAMLR) sets out a commendable standard for the conservation of marine living resources in the Antarctic, fishing remained almost unregulated for many years on account that the commission established under the convention to oversee exploitation of these resources failed to agree on how to implement requirements of the convention. It is also an open secret that despite severe restrictions in CITES, illegal wildlife trade is widespread. Finally, although the Convention on the Conservation of European Wildlife and Natural Habitats, 1979, prohibit deliberate damage to breeding and resting sites of species in appendix II of the convention, these sites are continously degraded in many member countries. Ought one ask whether existing normative structures have failed in their objectives? Undoubtedly, a lot remains undone in the realm of enforcement. International and national environmental groups should exert more pressure on state parties to uphold their commitments under existing conservation instruments.

Finally, although the World Heritage Convention, 1972, deals with the protection of the planets cultural and natural heritage, unlike other conventions which address specific aspects of

biodiversity and are for the most part regional, it does not broadly and in a systematic fashion promote conservation of major ecosystem types and habitats. Ultimately, therefore, though admittedly closest to enhancing conservation of biological diversity, it is not designed for such purpose *per se*.

What emerges is that much as existing normative structures have attempted to enhance the conservation of species and genera and some ecosystems, and provide potentially effective mechanisms in certain instances, they labour under numerous shortcomings and are collectively inadequate to conserve biological diversity systematically and comprehensively on a planetary scale.

FOOTNOTES

1. NORMAN, MYERS: The Sinking Ark: A New look at the Problem of disappearing Species, Westview Press, Colorado 1979 p. 65.

2. It was widely believed that conservation and development were incompatible, conservation was generally perceived as the antithesis of development.

3. UNEP, WWF, IUCN: The World Conservation Strategy, 1980

4. These include, setting aside wildlands to protect representative samples of ecosystems, clampdown on illegal hunting and wildlife trade, boast tourism to support parks and reserves, educate the public to arouse support for conservation and converting virgin lands into croplands.

5. Organization and bodies such as UNEP, IUCN, WWF, Greenpeace, Friends of the Earth, e.t.c. played a central role in publizing the challenge.

6. DE KLEMM, CYRIL: "Conservation of Species: The Need for a New Approach." (1982) 9 Environmental Policy and Law. p. 124

7. Principle 4 of the Declaration stipulates that,
   "Man has a special responsibility to safeguard and wisely manage the heritage of wildlife and its habitat, which are now gravely imperilled by a combination of adverse factors. Nature conservation, including wildlife, must therefore receive importance in planning for economic development."

8. Priciple 2 states that, "The genetic diversity on earth shall not be compromised, the population levels of all forms of wild and domesticated must at least be sufficient for their survival an to this end necessary habitats shall be safe-guarded."

9. SCHNEIDER, JAN: World Public Order of the Environment Stevens and Sons, London, 1979, p.83

10. In certain instances, conventions have taken long to obtain the required number of ratifications. The United Nations Convention on the law of the Sea, 1982, is a good illustration. Though adopted almost a decade ago, it has not yet received enough ratifications to enable it enter into force.

11. DE KLEMM, CYRILL: "The conservation of Biological Diversity: State obligations and citizens duties." (1989) 19 (2) Environmental Policy and Law p. 53.

12. See: NTAMBIRWEKI, JOHN: "Developing Countries in the Evolution of an International Environmental law with particular emphasis on the work of the UNEP" (1991) 14 Hastings International and Comparative Law Review p.905

13. KOESTER, VEIT: "From Stockholm to Brundtland": (1990) 20 (1/2) Environmental Policy and Law p.14

14. U.N.G.A. Resolution A/RES/37/7 October 29th, 1982

15. ibid P. 1

16. South West Africa (Voting Procedure) 1955 ICJR 67 p.115

17. HIGGINS, R. "The Development of International Law through the Political Organs of the United Nations 1963 American Journal of International Law p. 5

18. BROWNLIE, I Principles of Public Internationa Law, Oxford University Press 3rd Edition (1979) p. 8

19. DE KLEMM: Loc Cit p. 6

20. The documents perceive conservation as an integral part of the overall attempt to satisfy human needs. The principles articulated therein are directed to all and sundry.

21. UNEP: Rationalization of International Conventions on Biological Diversity Doc/Bio div.1/2 Nairobi 3.10.88 p.3

22. WCED: Our Common Future: Report of the World Commission on Environment and Development, Oxford University Press, 1986, Chapter VI p. 1-2

23. FAWCETT, W. CHARLES:"Vanishing Wildlife and Federal Protective Laws." (1971) 1 Ecology Law Quarterly p. 520 at 520.

24. See: RAVEN, PETER:"The politics of Conserving Biological Diversity". (1990) 40 (10) Bioscience p. 769 at 771

25. More emphasis is now being laid on the conservation of life support systems, ecosystems and habitats as opposed to specific species.

26. These include, protected areas, introduction of exotic species, integrating conservation and development e.t.c.

27. See, WWF: The Importance of Biological Diversity: Statement by WWF. p. 26.

28. See: for example Article X (1) (i) of the African Convention on the conservation of Nature and Natural Resources, 1968. (1976) 1001 United Nations Treaty Series p.4

29. Article III

30. Article II

31. See: p. 4 and principle 3 respectively

32. Project 8 of UNESCOs man and Biosphere Programme is concerned with protected areas.

33. Paragraph 5 of the preamble to the treaty.

34. The Independent, London June 5th, 1991.

35. The aim of these measures is primarily to enhance integrity of the Antarctic ecosystem.

36. Provision of the International Convention on the Conservation of Migratory Species of Wild Animals, 1979, for example, require contracting parties to protect, mirgratory routes, feeding and resting sites.

37. By mid-1982, for example, it was estimated that over 2,600 areas covering nearly 400 million hectares of land had been designated parks or other protected areas world wide.

38. Although large tracts of land have been designated protected in many developing countries for purposes of floral and faunal protection, in-situ conservation activities appear to be minimal.

39. UNEP, WWF, ICUN, op cit p.9

40. "Contracting parties shall ensure that conservation and management of natural resources are treated as an integral part of national and/or regional development plans ... full consideration shall be given to ecological as well as economic and social factors."

41. AHMAD, J. YUSUF: Environment Impact Assessment in Developing Countries

42. See Article VI (3) of the convention for the protection of the World Cultural and Natural Heritage, 1972.

43. BROOM, HERBERT: A selection of Legal Maxims: Classified and Illustrated, Sweet and Maxwell, London 1939. 10th Edition. p. 238.

44. (1932) A.C. 562 at 568

45. LESTER, A. P. "River Pollution in International Law." (1963) 57 American Journal of International Law p. 838 at 830.

46. United Kingdom V. Albania (1949) International court of Justice Reports p.4 at 44.

47. 3 UNRIAA 1905 (1949)

48. See Article X (2) African Convention on the Conservation of Nature and Natural Resources, 1968.

49. See Stockholm Declaration, 1972, World Charter for Nature 1982, and the World Conservation Strategy, 1980.

50. Supra Note 3 p. 13

51. See principle 9 of the Stockholm Declaration, 1972, Articles XIII (1) (b) (i), VII and XXVII (1) of the African Convention 1968, Convention on Conservation of Nature in the South Pacific, 1976, and the World Heritage Convention, 1972, respectively.

52. Conservation Programmes in developing countries rarely permeate into the rural areas where the majority of the citizenzy reside.

53. These include, habitat destruction or modification, diseases, pests predation and competition for food.

54. This can be gleaned from the prominence it has received in the negotiations on a legal instrument on biological diversity. Secondly, more and more genetically modified species are likely to be released.

55. See Principle 3: World Charter for Nature, 1982 p. 2

56. Preamble to the convention, Paregraph 2

57. These include:
    i) Natural features consisting of physical and biological formations or groups of such formations.
    ii) Geological and physiographic formations and precisely delineated areas which constitute the habitats of threatened species ofplants and animals and
    iii) natural sites or precisely delineated natural areas.

58. Article IV

59. Article XI

60. Whereas the International Union for Conservation of Nature and Natural Resources (IUCN) assesses natur[illegible] sites, the International Council on Monuments [illegible] (ICOMOS) assess cultural sites.

61. Article XV

62. Article XXIX

63. These include,
    i) a criteria for selecting cultural and natural items for inclusion in the World Heritage list.
    ii) a format and content of nominations to the World Heritage list.
    iii) format and content of request for technical assistance.

64. Properties could now be deleted from the list if,
    i) they had deteriorated to the extent of loosing characteristics which determined their inclusion.
    ii) their intrinsic qualities were already threatened at the time of its inclusion and no conservation measures have been taken.

65. These include, Galapagos Islands, Ngorongoro conservation area, Grand Canyon, Tikal National Park e.t.c.

66. UNESCO is generally associated with cultural aspects.

67. OSLAYTER, RALPH "The Origin and Evolution of the World Heritage Convention" (1983) 12 (3/4) Ambio 138-145.

68. Article II

69. RICHARDSON, BENJAMIN J. "A study of Australlian Practice pursuant to the World Heritage convention" (1990) 20 (4/5) Environmental Policy and Law p. 143 at 144.

70. The idea of a World Heritage Trust was first proposed by a White House conference on international co-operation in the United States in 1965. The conference called for ... a trust for the World Heritage that would be responsible to the World Community for the stimulation of international co-operation efforts to identify, develop and manage the worlds important natural and scenic areas and historical sites for the present and benefit of the international community. Russel E. Train the Chairman of the United States Council of Environmental Quality promoted the idea vigorously. It was later introduced into the programme and activities of UNESCO, and IUCN.

71. U.N.G.A: Op. cit. p. 1

72. TOLBA, MOSTAFA K. "To preserve Natures Brightest Torches". Speech delivered at the opening of the second session of the Ad-hoc Working Group of Experts on Biological Diversity Geneva 19th February, 1990.

73. WCED op. cit. p. 2

74. See, Article III

75. See, for example, Convention Relative to the Preservation of Fauna and Flora in their Natural State, 1933, Convention on Nature Protection and Wildlife in the Western Hemisphere, 1940, and the African Convention, 1968.

76. (1976) United Nations Treaty Series p. 244

77. MOSS, CYNTHIA: "CITES 1989: A Personal View" (1990) 13 (i) Swara p. 8

78. Article II

79. FIZTGERALD, SUSAN: International Wildlife Trade: Whose Business is it? WWF, Washington D. C. 1989 p.321-22.

80. Article III

81. ibid Sub-sections 2, 3, 4 and 5

82. FIZTGERALD: op cit p. 322

83. Article IV

84. ibid Sub-section 4

85. Supra Note 39 p. 322

86. Article II (3)

87. Article V

88. ibid Sub-section (2) (a-c)

89. ibid Sub-section 3 and 4

90. Article XI

91. Article IX (1) (a-b)

92. Article XXIII

93. Article 1 (b)

94. LYSTER, SIMON: International Wildlife Law: An analysis of International Treaties concerned with the Conservation of Wildlife. Grotius Publications, Cambridge 1985, p. 239-277.

95. The Endangered Species Act, 1973, of the United States is a good illustration.

96. THORTON, ALLAN "The Ivory Trial" (1989) Greenpeace p. 8.

97. ibid p. 9

98. ibid p. 9

99. Britain, France, Germany and Switzerland were among the first Western Countries to bann ivory trade.

100. See, (1989) 1 (4) Our Planet p. 8-9

101. These include, Zimbambwe, Malawi, Zambia, Mozambique and South Africa among others.

102. Supra note 79 p. 324.

103. In 1985 for example, data from importing and exporting countries relating to individual shipments agreed for only 25% of all imports reported by members.

104. See OKOTH, OWIRO A. "The limitations of Kenyas Environmental legislation" (unpublished) p. 25

105. Article VII

106. Supra Note 79 p. 328

107. This is because reserving countries are not bound by decisions in respect of which a reservation has been lodged.

108. Article XXIII 2 (a-b)

109. Reproduced in op cit note 79 p. 330

110. NJUGUNA, STEVE: "CITES 1989: A Botanists view" (1990) 13 (2) Swara p. 15 at 16

111. Supra note 3 p. 4 (1964) United [illegible] p.161

113. ibid Preamble to the [illegible]

114. ibid [illegible] paph 6

115. ibid Article III

116. Before the convention came into force, the figure stood at 24,000 BmU.

117. This figure exceeded the annual quota and contributed to dwindling of whale stocks.

118. The committee was established in 1982. It recommended a total ban on blue and humpback whales, a reduction in fin catches and regulation of individual species.

119. HOLT, SIDNEY: "Lets All go Whaling" (1985) 15 (3) Ecologist 249 at 250.

120. Major Whaling Countries such as Japan, Iceland and Norway have continued killing large numbers of whales in the name of research.

121. See, The Independent, London.

122. ibid

123. SCAFF, JAMES E: "The International Manangement of Whales Dolphins and Porpoise: An Interdisciplinary Assessment:" (1977) 6 Ecology Law Quarterly 326 at 328

124. HOLT: Loc. Cit. p. 249

125. The relevant paragraph empowers the whaling commission to amend "from time to time provisions of the schedule by adopting regulations fixing",

a) Protected and unprotected species
b) Open and closed seasons
c) Open and closed waters including the designation of sanctuaries
d) Size limits for each species
e) time methods and intensity of Whaling (incluing the maximum catch of whales to be taken in any one season)
f) types and specifications of gear and apparatus and appliances which may be used
g) methods of measurements and catch returns and other statistical and biological records.

126. Sub-section 2 provides that,
These amendments of the schedule
a) shall be such as are necessary to carry out the objects and purposes of this convention and to provide for the conservation development and optimum utilization of the whale resources.
b) shall be based on scientific findings
c) shall not involve restrictions on the number or nationality of factory ships or land stations, nor allocate specific quotas to any factory ship or land station or to any group of factory ships or land stations and
d) shall take into consideration the interests of the consumers of whale products and the whaling industry.

127. BIRNIE, PAT W: "International Legal Issues in the Management and protection of the whale: A Review of four decades of Experience" (1989) 29 (4) Natural Resources Journal p. 928.

128. See, CAMPBELL, RAY: "Whale Conservation: Role of the International Whaling Commission" (1977) Marine Policy 301 at p. 307.

129. See, (1989) 3 The Pilot p. 14.

130. See, Convention on Conservation of North Pacific Fur Seals, 1976, Convention for the Conservation of Atlantic Seals, 1972, Convention of Fishing and conservation of the Living Resources in the Baltic Sea and the Belts, 1973, North-East Altantic Fisheries convention, 1959, e.t.c.

131. Principle 2 states that,
"The natural resources of the earth including the air water, land flora and fauna and especially representative samples of natural ecosystems must be safeguarded for the benefit of the present and future generations through planning or management as appropriate"

132. Principle 3 states that,
"The capacity of the earth to produce vital renewable resources must be maintained and whenever practicable restored or improved."

133. Principle 4

134. Article X of the London Convention, 1933.

135. See, Articles IV and IX of the International Convention for the Protection of Birds, 1950 and the Benelux Convention on Hunting and Protection of Birds, 1970 respectively.

136. See, (1989) 29 (4) Natural Resources Journal p. 979.

137. DE KLEMM, CYRILL: "Migratory Species in International Law" (1989) 29 (4) Natural Resources Journal p. 935.

138. See, BROWNLIE, IAN: Principles of Public International Law Oxfort University Press, Oxford, 3rd Edition.1979 p. 108.

139. 19 International Legal Materials p. 15.

140. It is recommended that governments give attention to the need to enact international conventions and treaties to protect species inhabiting international waters or those which migrate from one country to another.

141. Article 1 (1) (a)

142. The convention perceives migratory species as an ecological unity.

143. Article III (1)

144. Article II (1)

145. Article IV (1)

146. ibid Sub-Section 3 and 4

147. Article V

148. The sub-section provides that,
"parties are encouraged to take action with a view to concluding agreements for any population or any geographically separate part of the population of any species or lower taxon of wild animals members of which periodically crossone or more national jurisdiction boundaries.

149. Article VII

150. Article IX

151. Article VIII

152. Supra (note 139) Sub-section 4

153. ibid Sub-section 5 (d)

154. ibid

155. ibid Sub-section 5 (b)

156. ibid Sub-Section 5 (h)

157. supra (note 140) Sub-section 4 (a-k)

158. supra (note 141) Sub-section 5

159. ibid

160. LYSTER, SIMON: "The convention on the conservation of migratory species of wild animals" (The "Bonn Convention" (1989) 29 (4) Natural Resources Journal p.979 at 997

161. ibid p. 997

162. ibid p. 980

163. LYSTER, SIMON: op. cit. p.297

164. LYSTER, SIMON: loc. cit. p.1000

165. (1972) II International Legal Materials p. 969

166. NAVID, DANIEL: "The International Law of Migratory Species: The Ramsar Convention" (1989) 29 (4) Natural Resources Journal p.979 at 980.

167. Preamble to the convention

168. ibid Paragraph 2

169. ibid Article II (1)

170. ibid Article II (6)

171. ibid Sub-section (5)

172. ibid Article IV (5)

173. ibid Article V

174. See, Interview between Daniel Navid and Environmental Policy and Law reported in (1987) 17 (5) Environmental Policy and Law p. 180-181.

175. See, "Ramsar: The Painless Convnetion" (1975) 1 Environmental Policy and Law p. 1

176. ibid p. 1

177. See, (1985) 15 (4/5) IUCN Bulletin p. 42-45

178. NAVID, DANIEL Loc cit p. 1008-1010

179. See, "Ramsar Convention: Progress Achieved" (1987) 17 (5) Environmental Policy and Law p. 179-180.

180. The convention defines "Wetlands" as, "areas of marsh, fen, peatland or water, whether natural or artificial permanent or temporary with water that is static or flowing, flesh brackish or salty, including areas of marine water the depth of which alow tide does not exceed six metres."

181. WELLS, SUE: "Coral Reefs and the Ramsar Convention" (1980) 15 (4/6) IUCN Bulletin p. 56

182. These include, Australia, Japan, Jordan, India, Iran, South Africa e.t.c.

183. Article VI (d)

184. This is borne out by facts in that even before the second meeting of the conference of the parties the secretariat had already reduced its staff to two persons.

185. LYSTER, SIMON: Supra p. 1

186. i) Criteria for assessing the value of representative or unique wetlands: a wetland should be considered internationally important if it is a particularly good

example of a specific type of wetland characteristic of its region.

ii) General criteria for using plants animals to identify wetland of importance.

a) it supports appreciable assemblage of rare vulnerable and endangered species of plants or animals or an appreciable number of individuals of any one or more of these species or
b) it is of special value for monitoring the genetic and ecological diversity of a region because of the high quality and peculiarities of its flora and fauna or
c) it is of special value as the habitat of plants and animals at a critical stage of their biological cycles or
d) It is of special value for its endemic plant and animal species or communities.

Specific criteria for using waterfowl to identify wetlands of importance. A wetland should be considered internationally important if

a) it regularly supports 20,000 waterfowl or
b) it regularly supports substantial number of individuals from particular groups of waterfowl indicative of wetland values, productivity or diversity
c) Where data on populations are available, it regularly supports 1% of the individuals in a population of one species or sub-species of waterfowl.

187. LYSTER, SIMON: loc. cit. p. 992

188. See, loc. cit. (note 174) p. 181

189. Conventions concluded under the auspices of UNEPs Regional Seas Programme provide good illustrations.

190. Article II

191. Article VIII

192. Examples include, Convention for the Conservation and Management of Vicuna 1970, Convention on conservation of Nature in the South Pacific, 1976, Agreed Measures for the Conservation of Antarctic Fauna and Flora, 1965, Convention on the Conservation of Antarctic Marine Living Resources, 1980.

193. Article I

194. Article II (a-b)

195. Article XI

196. Articles III - IX

197. ibid

198. Article XI

199. See, Convention for the Establishment of an Inter-American Tropical Tuna Commission, 1949, International Convention for the Conservation of Altantic Tunas, 1966.

200. See, Convention for the Management of Vicuna, 1970.

201. See, Agreement on the Conservation of Polar Bears, 1973

202. See, BUANEC, BERNARD: "Variety Creation and Intellectual Property 60 UPCV Plant Variety Protection: Gazette and Newsletter of the International Union for Plant Variety Protection p. 20

203. KUNHARDT, HENNING: "Industrial Property Rights and Their Impact on Industry and Agriculture" 59 UPOV Plant Variety Protection: Gazette and Newsletter of the International Union for Plan Variety Protection p.30.

204. Articles I XV - XXVI

205. Article V

206. Articles VI VII and VIII

207. KUNHARDT: loc. cit. p. 32

208. To strengthen plant breeders rights protection, the revised version of the convention alters this position fundamentally.

209. See, BUANEC: loc. cit. p. 24

210. See, CORREA, M. CARLOS: "Biological Resources and Intellectual Property Rights" Paper presented at the Workshop on Property Rights Biotechnology and Genetic Resources Nairobi Kenya June 10th, 14th 1991 p. 4-11

211. ibid p. 9

212. FAO Resoulution 8/83 Doc CPGR/87/inf.3

213. ibid Article V

214. ibid Article IV

215. ibid Article I

216. ibid Article VI

217. ibid Article XI

218. This is critical for purposes of assessing implementation of the undertaking by adhering governments.

219. FAO Interpretation of the International Undertaking on plant Genetic Resources. Doc/FAO/C 89/24, Rome, July 1989 Appendix 2 p. 9.

220. KUNHARDT: loc. cit. p. 39

221. GARCIA, AMADOR F. The Exploitation and conservation of the Resource of the sea: A stucy of Comtemporary International Law. A. W. Sythoff Leyden 2nd Edition 1963 p. 2.

222. Article I (2)

223. Article VIII

224. Article V (1) and (7)

225. See, Convention for the conservation of Atlantic Seals, 1972 in KISS ALEXANDLE CHARLE (Ed) Selected Multilateral Treaties in the Field of the environment. Prudential Printers Ltd., Nairobi 1983 p. 272

226. ibid Convention on conservation of North Pacific fur Seals, 1976 p.

227. ibid Convention for the Establishment of an Inter American Tropical Tuna Commission, 1949 p. 76

228. ibid North East Atlantic Fisheries Convention, 1959 p. 136.

229. ibid Convention Concerning Fishing in the Baltic Sea, 1959 P. 141.

230. See, DE KLEMM, CYRILL: "Migratory species: A Review of Existing International Instruments" (1985) 15 (3-4) Environmental Policy and Law p. 81 at 88.

231. See, generally op. cit. (Notes 225 - 229)

232. Article II

233. Regulation I Paragraph 10

234. Article 14 Convention for the Protection of the Natural Resources and Environment of the South Pacific Region, 1986.

235. Article II

236. Article I (1)

237. Article III (1) and (11)

238. Article II

239. Article V

240. Article VII (a-k)

241. Protocol Concerning Protected Areas and Wild Fauna and Flora in the Eastern African Region, 1985.

242. Protocol for the Conservation and Managemnt of Protected Marine and Coastal Areas of the South East Pacific, 1989.

243. Protocol Concerning Specially Protected Areas and Wildlife to the Convention for the Protection and Development of the Marine Environment of the Wider Carribean Region, 1990.

244. Article VII (3)

245. Article 194(5)

246. Article 61

247. ibid Sub-section (3)

249. Article 62 (2)

250. Article 118

251. Article 117

252. This is precisely because developing countries do not have the requisite expertise and capital to exploit marine living resource of the high seas.

253. NTAMBIRWEKI, JOHN: loc. cit p. 8

254. Article XV

255. The financial position of the convention for the protection of the World Cultural and Natural Heritage, 1972, and the convention on wetlands of International Importance Especially as Waterfowl Habitats, 1971 during the first decade of their coming into force is illustrative of this point.

256. The Union of Soviet Socialist Republics has at times been slow in fulfilling its international obligations.

257. The notion of "additionality" has spread and envisages new

235. Article II

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237. Article III (1) and (11)

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245. Article 194(5)

246. Article 61

247. ibid Sub-section (3)

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257. The notion of "additionality" has spread and envisages new

funding mechanisms covering all aspects of environmental relations between developed and developing countries. Among the principal challenges facing the international community in its endeavour to conserve biological diversity is the provision of additional funding to conservation efforts in developing countries.

258. KENNAN, G. "To prevent a World Wasterland". (1970) 48. Foreign Affairs p. 401 at 402.

259. MENG, QUING NAM: Land-base Marine Pollution: International Law Development Graham and Trofman, London, 1987 p. 71-80.

260. See, generally Convention on the Conservation of Migratory Species of Wild Animals, 1979 KISS ALEXANDRE C. op. cit. p: 509.

261. See (1971) II International Legal Materials p. 967.

262. Article VIII

263. The change of name from Inter-governmental Maritime Consultative Organization (IMCO) to International Maritime Organization (IMO) took effect on May 22nd 1982. It was one of the effects of the entry into force of amendments to the organizations conventions adopted by the assembly.

264. For many years it failed to accomplish this objective. Whaling countries competed for larger shares of the quotas set by the International Whaling Commission.

265. The general approach has been to protect the species in ways other than conserving their habitats and ecosystems.

CHAPTER III

CONTROL OF POLLUTION AND OTHER INFLUENCES DELETERIOUS TO BIOLOGICAL DIVERSITY

That the integrity of the biosphere plays a considerable role in the maintenance of environmental stability and the enhancement of biological diversity need no belaboring. This is because regions of environmental and climatic stability are characterised by high diversity. It, therefore, follows that any comprehensive attempt to conserve components of the planets biological diversity should address measures to protect the biosphere from contamination and other influence detrimental to components of biological diversity.

The large number of conventions in the field of contamination of the biosphere by pollutants and other influences is illustrative of the fact that the international community recognizes the central role that the biosphere plays in its survival on the planet.

This chapter examines the principal legal strategies in the attempts to reduce, control and prevent contamination of the biosphere by pollution and other influences harmful to components of biological diversity.

The chapter is divided into four parts. The first part considers

the legal regime relating to the prevention and control of marine pollution. The second part analyses attempts to protect the stratospheric ozone layer. The third part examines measures to control air pollution while the last part is a summary of the chapter.

The international community now realizes that contamination of the marine environment and the atmosphere, depletion of the ozone layer and global warming could have serious and negative effects on humankind and components of biological diversity. To reduce the magnitude of the effects, the international community has developed rules and principles to reduce, control and prevent contamination of the biosphere.[1] The operative principles are for the most part articulated in global and regional instruments.

The Marine Environment

Nature has endowed the marine environment with enormous riches.[2] No doubt, the marine environment is the home of a large proportion of the planets components of biological diversity. Humanity has been attracted to this environment since time immemorial. For many years now humankind has used the marine environment as a source of food, adventure, communication and recreation. The discovery of minerals in oceans further widens the spectrom of uses into which humanity can put the marine environment.

Although mankind has used the marine environment for many years, some uses are incompatible not only with other uses but also with the complex interdependence between living organisms and the marine environment. Some uses affect this environment detrimentally. The use of oceans for transportation purposes, for example, has proven unhealthy side effects, the Torrey Canyon[3] disaster is a case in point. The oil spill from this accident posed enormous health hazard to living resources of the sea, human health and coastal amenities. Waste disposal on the other hand could have adverse effects on the environment and has often rendered some areas desolete. Finally, mineral extraction sometimes render parts of this ecosystem unsuitable for marine life.

The multiple uses into which mankind has put the marine environment has given rise to the acute problem of marine pollution. Legal control of marine pollution has been found necessary because issuing the simple fiat "thou shalt not pollute" would only freeze development and exploitaiton thereby stiffling management and use of the marine environment. Since unbridled application of science and technology could also affect the marine environment adversely, legal controls should be designed in such a way that they facilitate wise husbanding of the enormous potentiality of the oceans.

Marine Pollution

The first explicit definition of the term marine pollution was given by GESAMP[4] and has been adopted in many conventions. According to GESAMP, marine pollution means "the introduction by man directly or indirectly of substances or energy into the marine environment (including estuaries) resulting in such deleterious effects as harm to living resources, hazard to human health hindrance to marine activities including fishing, impairment of quality for use of sea water and reduction of amenities.".

The second and widely accepted definition is found in Article I, paragraph 4 of the United Nations convention on the law of the sea, 1982. This definition is an improvement to the GESAMP one and has also been used in other instruments.[5] The basic elements of both definitions are (a) human interference with the marine environment and (b) the undesirable consequences of that interference.

Marine pollution involves a variety of contaminants, principal among them are, halogenated hydro-carbons, organic chemicals, inorganic substances, radio-active substances and thermal pollution. These pollutants enter the marine environment through various ways.

The marine pollution problem is complex and a variety of legal

measures are necessary, that is to say, global, regional and national. The problem is complicated by the fact that it results from a variety of sources which have different categories of pollutants with varied degrees of injurious effects.[6] Although some marine pollution problems are local, many have global implications and this gives the entire problem an international tag. It affects the health of oceans in all parts of the planet, it also affects all countries and all contribute some aspect of the problem. In a nutshell, the marine pollution problem is a complex phenomenon with interlocking economic, technological, political and legal aspects. No single solution or remedy can be expected. This part examines how the existing international legal regime has attempted to control and regulate marine pollution resulting from sea-based activities, dumping and land-based sources.

3:1 Legal Control of Marine Pollution

Legal protection of the marine environment from pollution has for the most part been realized by treaty. However, some general principles of international law have evolved through state practice or judicial articulations. The international court of justice decision in the corfu channel[7] case and the arbitral decision in the celebrated Trail Smelter[8] are illustrative of this argument.

General Principles of International Law

Under customary international law, the freedom of all states to enjoy anything freely available to all humankind is visited by a duty not to impair equal freedoms of other states.

Judicial decisions have played a significant role in the evolution of international legal principles applicable in the realm of marine environment protection. It is a trite principle of international law that states are under an obligation not to pollute other states or cause transfrontier pollution.[9] The basis of this norm, it would appear, is the maxim "sic utere tuo ut alienum non laedas," or use your own property so as not to injure that of another, which is recognized as a general principle of law. This obligation has been affirmed by land-mark decisions of international courts and tribunals.

In the Corful Channel case the International Court of Justice confirmed that it is a general and well recognized principle of international law, namely, "...every state's obligation not to allow knowingly its territory to be used contrary to the rights of other states."[10] This decision is not infrequently cited to justify the existence of a general principle of international law that prohibits the use of one's territory to cause harm to the territory of another state. But earlier, the tribunal in the Trail Smelter Arbitration was unequivocal that "under principles of international law... no state has the right to use or permit

the use of its territory in such a manner as to cause injury by fumes in or to the territory of another or the properties or persons therein when the case is of serious consequences and the injury is established by clear and convincing evidence."[11] Although this proposition was enunciated in a case dealing with fumes, it is equally applicable in the realm of marine pollution.

It is important to note that had the tribunal in Trail Smelter not referred to the nature of the injury or evidence, the decision would have imported into the international arena a regime where states would be required to refrain from all activities causing any magnitude of injuries instantly or over a period of time. By alluding to the character and nature of injury and evidence, the tribunal limited the prima facie utility of the decision in any context where the goal is to prevent all environmental injuries. By suggesting that the case must be of serious consequence, the decision leaves the matter hanging as to how serious the injury must be before action is deemed necessary. In addition, by suggesting that the injury must be established by clear and convincing evidence, the decision deepens the quagmire of burden of proof in environmental cases where harm is in certain circumstances irreversable. However, it may be submitted that generally, an act becomes internationally wrongful when it produces substantial injury.

The obligation to prevent transfrontier pollution was indirectly referred to in the Corful Channel Case. In the Nuclear Test

Case[12] however, the dissenting opinion of judge de Castro confirmed the status of the obligation to prevent transfrontier damage as an operative principle of international law.

Principle 21 of the Stockholm Declaration, 1972, embodies this obligation.[13]

State obligation to prevent transfrontier pollution is also a logical derivation from the maxim "sic utere tuo. Its appearance in treaties does not alter the fact that it is a principle established by general international law. However, when all is said and done international legal norms on marine pollution are almost in their entirety contained in treaties of which there are now a considerable number. To strengthen the legal regime on the protection of the marine environment from contamination, the international community has concluded both regional and global conventions.

Treaty Law

This part examines how the international community has attempted to protect the marine environment and its components of biological diversity through international agreements.

3:1 Sea-based Pollution

The era of anti-pollution conventions was prompted by increase in

the use and carriage of oil by water which led to increased pollution of ocean waters by oil. Despite earlier attempts,[14] the first convention on marine pollution was adopted in 1954[15] and came into force in 1958. The objective of the convention was to deal with the discharge of oil and oily mixtures by ships. Oil discharge was prohibited within 50 miles of land.[16] The convention was amended in 1962 to tighten oil discharge requirements further.[17] These requirments remained largely ineffective partly on account of difficulties in detecting violations. Further amendment in 1968 removed the zonal concept and prohibited oil discharge in principle.[18] This led to a reduction in deliberate discharge oil.[19] The fundamental shortcoming of the 1954 convention was that it dealt with marine pollution from oil only.

Although the Geneva Convention on the High Seas, 1958,[20] did not address marine pollution generally, it affirmed the duty of states to control particular types of marine pollution, namely, oil and radio active waste.[21] The inherent weakness in the provisions was that they did not set any standards and in absence of applicable standards, it was difficult to ascertain whether standards were being maintained. In addition, it did not address marine pollution from toxic waste.

Further articulations of international legal norms to regulate sea-based pollution are to be found in the Convention on the Liability of Operators of Nuclear Ships, 1962,[22] and the Treaty

Banning Nuclear Weapon Tests, 1963.[23] The former convention imposes strict liability with a high ceiling for nuclear waste dumping. But it operates after the fact and has no application where violations go undetected. The latter convention prohibits nuclear weapon test explosions under water or in the high seas.[24] Although it takes the commendable preventative approach, many countries with nuclear capacity were not members and therefore not bound by its provisions. Secondly, some parties have conducted nuclear tests in the high seas clandestinely.[25] It is submitted that the danger of marine pollution from nuclear waste still looms.

The Inter-governmental Maritime Consultative Organization (IMCO) (now International Maritime Organization (IMO) was established in 1948 to promote marine safety and navigation to prevent and reduce marine pollution by oil.[26]

Although accidental pollution is not the main source of marine pollution, the Torrey Canyon and the Amoco Cadiz disasters demonstrated the disastrous consequences of pollution caused by accidents. The Torrey Canyon disaster inspired two global instruments. The International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties, 1969[27] (IMCOS "Public Law" Convention) dealt with the measures a coastal state could take if threatened by a danger from a vessel beyond territorial sea.[28] But the convention applied only to measures of intervention against casualties

causing or threatening marine pollution by oil. Secondly, although it recognizes both necessity and proportionality, it does not address preventive measures. This is a serious omission because an ounce of deterrence is not only better that a pound of spilt oil, but it is imperative on account of the impotence of after-the-fact rehabilitative measures. The 1973 protocol to the convention extended coastal state powers of intervention to casualties causing or threatening pollution by substances other than oil.

Despite its shortcomings, the 1969 convention appears to blaze a new and hopeful trail in the development of truly effective measures at the international level to combat oil pollution damage.[29]

The Torrey Canyon tragedy also demonstrated the need for a new international concept of liability for oil pollution damage. As a direct reaction, the international community concluded a convention, the International Convention on Civil Liability for Oil pollution Damage, 1969[30] (IMCOS "Private Law" convention). Subject to three exceptions only, damage caused on the territory of a contracting party by oil imposes strict liability on the ship owner.[31] The upper limit stood at 210 million French Francs. This convention is supplemented by the International convention on the Establishment of an International Fund for compensation for oil pollution Damage, 1971.[32] The fund supplements compensation available under the civil liability

convention, 1969 and compensates an impressive array of costs.[33]

Although these conventions have worked relatively well in compensating oil pollution damage,[34] they basically address post-spill issues whereas more efforts should have been marshalled to enhance preventive measures.

The foregoing survey shows that the legal regime articulated by these treaties did not cover the whole complexity of the problem. Although the Geneva Convention on the High Seas, 1958, the Convention on the Liability of Operators of Nuclear Ships, 1962, the Nuclear Test Ban Treaty, 1963, and the Convention Relating to Civil Liability in the Field of maritime carriage of Nuclear Material, 1971, address radio active waste as a source of ship-borne marine pollution, these are not the sole pollutants of the high seas.

Significant attempt to articulate rules to regulate marine pollution from sea-borne activities were made by the International Convention for the Prevention of Pollution from Ships, 1973 (MARPOL).[35] The convention was designed to remedy the deficiencies of the 1954 convention. The convention addresses all aspects of marine pollution other than dumping. It has five annexes[36] and re-introduced the zonal concept, that is to say, areas within which oil discharge is prohibited. Under the convention, contracting parties and vessels have more obligations to prevent oil and other contaminants from entering

the marine environment.

With regard to regional instruments, other than the Convention on the Protection of the Marine Environment of the Baltic Sea, 1974,[37] which contains detailed regulations on oil and other pollutants, most regional conventions address the problem of marine pollution from ships in very general terms.[38]

3:2 Dumping

Much of the world's waste flows into the marine environment. Pollutants enter the marine environment through coastal run-off, discharge, marine transportation activity, sea-bed oil and mineral development, atmospheric fall outs and ocean dumping.[39] Our principal concern here is dumping. Although the amount of waste dumped into the marine environment is small compared to the total volume of contaminants reaching it, dumping contributes significantly to the problem of marine pollution because much of the waste entering the environment contain materials that affect it and its components of biological diversity adversely.

Global attempts to regulate and control dumping of waste at sea begun in the early 1970s. There is now one global convention and a considerable number of regional treaties and protocols on dumping. The Convention on the Prevention of Marine Pollution by Dumping of Waste and Other Substances, 1972,[40] (London Convention) was adopted in 1972 and came into force in 1975. The

convention defines the term dumping as, "any deliberate disposal at sea of wastes or other matter from vessels, aircraft, platforms or other man-made structures at sea, or the deliberate disposal of vessels, aircraft, platforms or other man-made structures at sea."[41] For purposes of regulating dumping, the convention creates three categories of waste.[42] Specific regulations relating to the dumping of any substance depends on the category in which it has been placed.

The general principles in the preamble and introductory articles of the convention emphasize the obligation of contracting parties to prevent pollution of the marine environment by dumping. Contracting parties are required to designate appropriate authorities to issue permits and maintain up-to-date records of all dumping activities.[43] For enforcement purposes contracting parties are empowered to act on any vessels registered or loading waste in their territories or under their jurisdiction, believed to be engaged in dumping. In addition, the convention provides for the holding of periodic meetings to allow review of its implementation, or making any necessary amendments. In 1978, for example, the convention was amended to make provision for the compulsory settlement of disputes.

One fundamental shortcoming of the London Convention is that it is silent with regard to private enforcement. It includes no waiver of sovereign immunity that would permit individuals of a country allegedly violating the convention to sue for redress.

Secondly, it is not self-executing, which means, it requires implementation by domestic procedures and institutions. Finally, the convention grants too many exceptions to the total prohibition of dumping.

However, the London Convention has numerous strong points. Firstly, it recognizes that the marine environment can assimilate waste and therefore does not prohibit dumping in its entirety. Incontrovertibly, oceans can and do assimilate large quantities of non-toxic and readily biodegradable material. However, dumping of highly radio-active wastes, chemicals and biological warfare agents, concentrated heavy metals and synthetic chemicals is outrightly prohibited.

Secondly, although the convention does not allow private enforcement, it represents an important mechanism for international regulation of marine pollution on account that it sets a common standard for national behaviour. It is submitted that its adoption represented a positive step towards universal control of marine pollution. It demonstrates an unprecedented willingness on the part of the international community to control dumping in oceans.[44]

Finally, the convention acknowledges the need for national flexibility and discretion in implementing its mandate. It establishes no rigid standards and implicitly recognizes that policy considerations should be allowed to influence national

decisions. Allowance for national flexibility helped the convention achieve broad international support. This is a sure way of enhancing its overall effectiveness.

What emerges is that a more vigorous ocean dumping regulatory instrument could not have been possible in view of the many variables to be considered. To a large extent, the regime reflects a compromise of the many interests involved.

3:3 Regional Attempts

A plethora of regional instruments address the problem of marine pollution from dumping. Among these, only the Baltic Sea Convention adopts a very strict approach to dumping. Conventions adopted under the auspices of UNEPs Regional Seas Programme simply call upon contracting parties to take "appropriate measures" to prevent and reduce marine pollution by dumping.[45]

In addition to the regional instruments, protocols have also been concluded. The Barcelona Protocol for the Prevention of Pollution of the Mediterrenean Sea by Dumping from Ships and Aircraft, 1976, is a good illustration. The protocol was concluded under the Convention for the Protection of the Mediterranean Sea Against Pollution, 1976, and came into force on 12th February 1978. It prohibits the dumping of organohalogen and organosilicon compounds, mercury, cadmium and their compounds, crude oil and hydrocarbons, high, medium and low-

level radio active wastes, acid and alkaline compounds and chemical and biological warfare materials.[46] Save for a few additions, the protocol is a almost a carbon copy of the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other matter adopted in London in 1972.

The Protocol for the Prevention of Pollution of the South Pacific Region by Dumping, adopted at Noumea in 1986, adopts an approach not dissimilar to the Barcelona Protocol. This protocol is yet to enter into force. Unlike the Barcelona Protocol, the Noumea Protocol prohibits dumping of organophosphorous compounds.[47] In addition, it contains elaborate provisions relating to institutional arrangements.[48] Like the Barcelona Protocol, it has three annexes and subjects the dumping of any substances into the sea to a permit system.[49]

It is contended that, although these protocols do not make any radical departures from the London Dumping Convention, 1972, it is an important indication that the international community is still determined to reduce and control marine pollution from dumping.

But despite the proliferation of conventions and protocols on dumping, the marine environment remains one of the most promising dumping grounds. We think that because of the inherent and functional weakness of the permit system, marine pollution from dumping is likely to persist. However, hope lies in the fact

that strict regulation effectively implemented could reduce the amount of waste dumped into oceans appreciably. The existing legal framework is not adequately equiped to accomplish this objective effectively.

3:4 Land-based sources of Marine Pollution

Discharges of wastes from land are by far the most significant sources of marine pollution. This is because they directly affect over 90% of marine fishery resources and other species and genera.[50] Although land-based sources remain the most important source of marine pollution, it is the source in respect of which the least international control effort has been made. There is no global convention on this source of marine pollution.

Land-based sources of marine pollution are largely invisible and raise complex political and economic issues. At the international level, political problems are acute in states with economic problems. Marine pollution from land-based sources is complicated because it emanates from a variety of human activities which are not all easy to control.[51] In addition, it is the most "national" source of marine pollution.

International concern with land-based marine pollution is of recent origin. Many global forums have discussed the issue since th early seventies. Principle 7[52] of the Stockholm Declaration, 1972, epitomizes international community's concern for the marine

environment.

Other than the United Nations Convention on the Law of the Sea, 1982, which is not yet in force, international legal norms relating to land-based marine pollution are in their entirety contained in regional conventions and protocols.[53] The issue was first addressed in detail in the Convention for the Prevention of Pollution from land-based sources, 1974, (Paris convention). The geographical coverage of this convention is restricted to the North East Altantic and the North Sea. It deals with the various forms of land-based sources of marine pollution save atmospheric discharges and precipitation directly into the sea. For regulation purposes, substances are grouped into four categories.[54] Over and above the competent national authorities charged with the responsibility of enforcing the regime, the convention establishes a commission which oversees its implementation.[55]

The strategy of adopting framework conventions including general principles as well as provisions common to different sources of marine pollution and other specific issues is the basic format of instruments negotiated under the auspices of UNEPs Regional Seas Programme. This programme has so far resulted in not less than eight conventions. Apart from the Barcelona and the Lima convention, six of UNEPs conventions do not specifically address land-based sources of marine pollution. Two of the remaining instruments are not yet in force.[56] The wording in the six

conventions is very general. Contracting parties are required to take all "appropriate measures" to prevent, reduce and control, abate and combat marine pollution. Only two instruments refer to air-borne pollution as a source of land-based marine pollution.[57] However, four conventions contain separate articles on "pollution from or through the atmosphere."[58]

Relevant articles of the six conventions contain provisions relating to,

a) a general obligation to take appropriate measures against land-based sources of marine pollution,

b) identification of the applicable area and

c) an indication of the types of discharge covered.

The Baltic Sea Convention, 1974, which is not part of the UNEP Regional Seas Programme adopts an approach not dissimilar to the Paris convention. It addresses all types of marine pollution, but instead of imposing a general obligation on parties, it contains detailed provisions relating to each type. It treats air-borne pollution as part of land-based sources of marine pollution.[59]

Both the Barcelona and Lima Conventions have protocols dedicated to land-based marine pollution.[60] Both protocols oblige contracting parties to adopt appropriate measures to prevent, control, abate and combat marine pollution from land-based sources.[61] The Barcelona Protocol entered into force in 1983 and

the Quito Protocol in 1986. With regard to their scope, the Barcelona protocol is much broader in that it covers discharges from fixed man-made offshore structures.[62] However, both conventions consider pollution from the atmosphere as part of land-based marine pollution.

Finally, althogh the Paris convention was the first to address the problem of land-based sources of marine pollution in detail, it was not until 1986 that atmospheric pollution was included as a source of land-based marine pollution.

From the foregoing review, it is clear that existing norms relating to land-based sources of marine pollution do not address the problem systematically and comprehensively. In some instances, the obligations imposed on contracting parties are too general. However, in May 1991, the Governing Council of UNEP recommended the preparation and adoption of a global convention on the control of Marine Pollution from Land-based sources.

3:5 Enforcement

One major problem facing marine pollution prevention and control regimes generally is enforcement. Indisputably, a state's competence to legislate against marine pollution is different from its competence to enforce such legislation. The ability and commitment to enforce international standards is critical because it ultimately rests on individual contracting states.

Enforcement jurisdiction depends on whether a particular state is a flag, coastal or port state. Under MARPOL, for example, a coastal state is empowered to take legal action against vessels violating the convention, or forward such evidence to the flag state.[63] Port authorities of port states are empowered to detain any vessel found to be a threat to the marine environment.[64] Finally, contracting parties are required to inform flag states of any violations of the convention when detected.[65]

It is important to note that existing framework for the prescription and enforcement of marine pollution control standards is less than satisfactory. In the first instance, many flag states have been lax in enforcing provisions of instruments to which they are parties. This problem is compounded by the so called "flags of convenience" or the "free flag system." This system entails the granting by a state its flag to foreign-owned vessels. It is an established principle of international law that every state has absolute discretion to determine the conditions upon which it may grant foreign-owned vessels its flag.[66] This practice is common with developing countries, which grant foreign-owned vessels the right to fly their flags for minimal economic benefits. Liberia, Panama and Costa Rica among others are actively involved in the practice. In 1981, for example, it was estimated that over 30% of the worlds merchant tonnage operated under the free-flag.[67] Liberia had the largest fleet of ships in the world. Ship owners in developed countries, particularly in the United States, exploit the gullibility of

governments in developing countries created by economic and political woes for purposes of out witting their business competitors. This is facilitated by the fact that they pay less in crew wages, tax benefits and by avoiding tougher health, safety and welfare standards imposed on ships registered with their national flags. It would be extending logic too far to imagine that ship owners seeking lower operational costs would be prepared to comply with high safety and health standards set by the flag state.

Attempts to do away with the free flag system have so far led to a blind alley. At the June 1981, UNCTAD meeting, 49 votes were in favour while 18 votes against it.[68] The tug of war appear to be between some developed countries, notably the United States,on the one hand and a mixture of both developed and developing countries on the other. Whereas the former group lobby for its retention, the latter would want to see the practice abolished. The latter group appear convinced that only a genuine link between the vessel and the state would facilitate exercise of meaningful control over the vessel. During the Geneva Conference, 1958, a spirited attempt to incorporate the "genuine link clause" into the High Sea Convention, 1958, failed to materialize. The link, it was argued would enable flag states to enforce marine pollution control regulation more effectively,

> "In the absence of that genuine link, the state would be unable to ascertain whether navigational regulations were being complied with or to enforce such regulations

> by enforcing penalties or taking other measures against persons responsible for the operation of the ship."[69]

These arguments did not convince states whose nationals were deeply involved in the practice that time was ripe to abandon it. It does appear that the tug of war is likely to persist for sometime, because,

> "...the roots of the problem lie not in the legal sphere, but in the complex economic structure of the international shipping industry."[70]

The United Nations Convention on the Law of the Sea, 1982, did not address this problem.

Failure by flag states to enforce marine pollution control and prevention regulations spells disatrous consequences because these are the only states which can take action against vessels polluting the marine environment beyond territorial seas where most pollution from vessels occur.

In 1986, at Geneva, under the auspices of IMO, the Convention on condition for the Registration of Ships was signed. It aims at strengthening the link between the state and the ships flying its flag. It inter alia requires the flag state to enforce its legislation on international rules for safety and protection of the environment.

By way of conclusion, it is submitted that whereas there are many

sources and contaminants of the marine environment, the problem is a unitary one and its fundamental elements should be dealt with as such. Thus, while particular conventions may be retained for specific types of marine pollution, general provisions whether in a separate instrument or in a general convention on the regime of the sea should establish as a minimum the clear duty of contracting parties not to pollute the marine environment. In additon, the regime should provide for the promulgation of sea water quality standards. Control and regulation of marine pollution should be perceived as a global regional, sub-regional and national challenge.

Finally, pollution prevention and regulatory mechanisms instituted should, if they are to be really effective and sufficiently comprehensive, be devised with the active co-operation of all interested states.

3:6 Implications of the United Nations Convention on the law of the Sea, 1982

An attempt to codify law of the sea has been made in the 1982 Law of the Sea Convention. Although the convention is not yet in force,[71] it is necessary to appraise its provisions relating to the prevention, control and reduction of marine pollution.

The convention contains detailed provisions on the use of the marine environment generally.[72] Part XII deals with the

protection and preservation of the marine environment and is therefore the focus of this section. In addition to addressing all the principal sources of marine pollution, the convention requires contracting parties to protect and preserve the marine environment.[73] The full implications of this obligation will be felt when the convention finally comes into force.

The convention is undoubtedly a comprehensive package and goes along way towards establishing a legal order for the sea demanded by the turmoil and conflicting claims characteristic of the last half-century. One writer describes it as "a constitution for the ocean."[74]

Part XII of the convention seeks to establish in clear terms the principles adopted in the Stockholm Declaration, 1972,[75] and reiteriated in many conferences since then. Article 193 stipulates that, "states have the sovereign right to exploit their natural resources pursuant to their environmental policies and in accordance with their duty to protect and preserve the marine environment."

The general obligation of states to take all necessary measures to protect the marine environment is qualified by the sentence, "the best practicable means at their disposal and in accordance with their capabilities." Developing countries successfully lobbied for the inclusion of the qualification because they felt that international standards to conserve the

environment would place disproportionately heavy burden on them. This qualification would now enable economic considerations to be taken into account. However, by virtue of the principle of pacta sunt servanda all contracting parties will be fully responsible for protecting the marine environment.

Secondly, the convention makes no reference to the institution responsible for implementing part XII. This is a fundamental omission in view of the character of the regime under the convention.[76] It is imperative that international organizations are fully aware of the role they are supposed to play in implementing the convention.

Thirdly, although part XII deals with the various sources of Marine Pollution, that is to say, pollution from or through the atmosphere,[77] pollution by dumping,[78] pollution from vessels or through the atmosphere,[79] pollution from installations and devices used in exploration and exploitation of natural resources of the sea-bed and sub-soils[80] and from other installations, its principal focus is vessel-source pollution. It is only with regard to vessel-source pollution that specific rights and duties are clearly spelt out.

Finally, the convention fails to resolve the highly contentions issue of the "flags of disputable convenience,"[81] which incidentlally is central to the enforcement of marine environment protection regulations. The flag state was therefore retained as

the basic standard setting authority in international shipping. However, as observed elsewhere, a convention to rectify the situation has already been concluded. ~~The flag state was therefore retained as the basic standard setting authority in international shipping.~~

3:2 Protection of the Atmosphere

In this section we shall examine the strategies instituted to protect the stratospheric ozone layer, reduction of global warming and air pollution.

The Stratospheric Ozone Layer

Scientific evidence has now established that constant emission of chlorofluorocarbons into the atmosphere is gradually depleting the ozone layer.[82] A diffuse layer of ozone in the upper atmosphere shields life on the planet from ultra-violet radiatic..[83] Ozone absorbs much of the ultra-violet radiation entering the atmosphere and indirectly converts it into heat which maintains the stratosphere.

Stratospheric Ozone Depletion

At least two theories propounded to explain depletion of the stratospheric ozone layer have now been scientifically disproved.[84] Depletion of ozone layer it has been established is

the result of a chain chemical reaction between the constituents of ozone on the one hand and chlorine and bromine containing gases in the stratosphere on the other.[85] Although chlorofluorocarbons were discovered as early as 1928[86] and had been in constant use in many fields ever since, it was not until 1974 that their culpable behaviour was documented.[87] When released into the lower atmosphere, these stable substances randomly drift upwards and ultimately reach the stratosphere. Once they become exposed to high energy ultra-violet solar radiation, they decompose releasing highly reactive atomic chlorine which combine with ozone molecules thereby destroying stratospheric ozone layer.[88] Diminution of ozone layer allows penetration to the earths surface of ultra-violet radiation which is harmful to species.

Global Warming

Global warming is said to occur when high concentration of carbon dioxide and other trace gases in the atmosphere absorb and remit low-energy radiation emanating from the earths surface thereby warming the atmosphere.[89] The phenomenon is similar to that which occurs in a greenhouse and has therefore been dubbed the "greenhouse effect."

Industrial and agricultural effluents have exceedingly raised concentrations of greenhouse gases in the atmosphere lately, stepping up global warming. The most important contributors to

global warming are water vapour, carbon dioxide, methane, nitrous oxide and chlorofluorocarbons, particularly CFC - 11 and 12. Because the concentration of greenhouse gases has increased exponentially with time, estimates have it that the planets mean temperature is likely to increase by between 1.5^{O} and 4.5^{O}C by the year 2030.[90] Though seemingly insignificant, an increase of 1.5^{O}C would be the greatest temperature change experienced in the recent past and would affect biological diversity detrimentally.

Since global climate and ecological balance is maintained on a delicate balance, changes resulting from ozone depletion, global warming and air pollution could have far reaching effects on humankind and components of biological diversity. The challenge facing the international community therefore is to device effective mechanism to protect the biosphere from the vagaries of global warming, ozone depletion and air pollution.

3:2:1 International Legal Regime on the Protection of the Ozone Layer

Protection of the stratospheric ozone layer is a field in which there already has been some amount of law making activity. When ozone depletion by chlorofluorocarbons was first confirmed in the early 1970s, several countries banned their use in certain activities.[91] But this initial phase of regulation led down a blind alley on account that it restricted the use of CFCs in certain areas only while their use in other ventures increased

and thus depletion of ozone layer continued.

More shocking scientific revelations during the eighties changed the course of events. It was evident that the stratospheric ozone layer was disappearing at an alarming rate and immediate action became a necessity. In the negotiation processes that followed, it emerged that only production cuts, scientific consensus on the causes and effects of ozone depletion, finance and resource transfer could form a workable basis of a convention on ozone layer. Determined efforts by UNEP culminated in the adoption of the Vienna Convention for the Protection of the Ozone Layer, 1985. It came into force in 1988.

The objective of the Vienna Convention is to protect human health and the environment from the potentially harmful effects emanating from modifications of the ozone layer.[92] Contracting parties are required to take appropriate measures in accordance with the convention and protocols to which they are parties.[93] This obligation is not only general but vague.

Being a framework convention,[94] the Vienna Convention, 1985, does not provide for a machinery to translate its provisions into practice.

> "The Vienna Convention itself contains no substantive requirements for specific measures to protect stratospheric ozone. Instead, it embodies only a vague unenforceable exhortation to protect the stratospheric

ozone through the implementation of "appropriate measures".[95]

Countries which had sought more from the Vienna Conference,[96] 1985, were proved right when subsquent scientific evidence demonstrated the necessity for urgent and meaningful commitment to reductions in CFC emission. By the 1987 Montreal Conference, consensus of opinion was that CFC production had to be reduced to save stratospheric ozone had already emerged. A protocol to the Vienna Convention calling for a 50% reduction in the production and consumption of specified CFCs over an approximately 10-year period was adopted in September, 1987.[97] The Montreal Protocol on Substances Which Deplete Ozone Layer, 1987, is the epitome of the realization by the international community that uncontrolled emissions of CFCs could significantly deplete and modify stratospheric ozone to the detriment of human health and the environment.[98] The protocol changes emphasis from atmosphere contamination control to contamination prevention.

The objective of the protocol is to protect stratospheric ozone by taking precautionary measures to control emissions of substances that deplete it. The agreement requires contracting parties to restrict the production and import of eight primary ozone deplet ng substances. 1 freezes production and consumption of five CFCs at 1986 le els by 1993, reduce them at 80% of the 1986 levels by 1993 and to 50% of those levels by 1998.[99] Production and consumption of three halons will be

frozen at 1986 levels by 1992.[100]

The protocol creates a special category for developing countries. Countries consuming less than 0.3 Kg per capita of substances in Annex A are permitted to delay implementation of provisions obliging parties to reduce production and consumption of these substances by ten years from the date the protocol comes into force.[101]

But events took another turn after the Montreal Conference, 1987, when, scientific data revealed the magnitude of the Antarctic ozone role. A hole was also observed in the ozone layer above the Arctic Circle. These revelations depicted the Montreal protocol as inadequate and in need of revision.[102] It is submitted that although the international community had taken a step forward at Montreal, it was at least two steps behind in responding to the challenge at hand. It became clear that targets set in the Montreal protocol were not ambitious enough.[103] To reduce CFC and halon emission appreciably, higher targets and shorter deadlines were necessary.

In its 1987 form, the Montreal protocol had several weaknesses. Firstly, it left out a number of substances known to be actively involved in ozone depletion.[104] thereby delaying minimization and eradication of ozone depleting substances. Secondly, it failed to set out elaborate resource and technology transfer modalities to facilitate the switch-over from ozone depleting substances to

ozone benign substances. This inadequacy had already prompted India and China to register their unwillingness to join the protocol.[105] Refusal by India and China to join the protocol at the time demonstrated that the international community was not cohesive enough to regulate the matter comprehensively.

Because of these inadequacies, planning for the adjustment and amendment to the protocol begun almost immediately. There was an urgent need to strengthen the Montreal Protocol and make it more attractive to developing countries. Developed countries needed both co-operation and participation of developing countries. But because the requisite financial and technology transfer modalities were lacking, developing countries would experience serious problems had they attempted to meet their obligations under the protocol.

The entry into force of the Montreal Protocol on January 1st, 1989 was an anticlimatic affair on account that the international community was again pondering how to implement meaningful cuts in the production and consumption of ozone depleting substances. In its 1987 format, large quantities of CFCs would have continued drifting into the atmosphere during the 21st century.

Convincing scientific revelations on the magnitude of ozone layer depletion and increased publicization of the challenge hastened the heart beat of the international community which now viewed

the Montreal Protocol as inadequate. By the opening of the London Conference of parties to the Montreal protocol, in June 1990, there was a general consensus on the desire to phase out entirely substances specified by the protocol. Negotiations culminated in the adoption of various amendments to the Montreal Protocol, 1987,[106] The amendment added carbon tetrachloride and methyl chloroform to the protocol, and those substance are to be phased out by the year 2000 and 2005 respectively. Most important, it incorporated Articles on technology transfer[107] and established a multilateral fund[108] to be supervised by a committee of members drawn from both developing and developed countries.[109] At the conclusion of the London Conference, representatives from India and China intimated that they would advise their respective governments to consider signing the protocol. The two governments have already indicated that they would be ratifying the protocol.

The basic regulatory structure of the Montreal Protocol, 1987, is to require parties thereto to reduce production and consumption of CFCs in Group I and three halons in Group II both in Annex A to the protocol. The London Amendments to the protocol in 1990 accelerated the time-table and deepened the cuts by requiring contracting parties to phase out production and consumption of these substances by the year 2000.[110]

Several points may be noted in relation to the legal regime as amended. Firstly, although the London adjustments, 1990,

accelerated the time-table to phase out CFCs, other chemicals, namely, HCFCs, a family of CFC substitutes not covered by the protocol raises concern on account that they destroy high altitude ozone.[111] The amended protocol puts no legal restrictions on their use. Secondly, even total cessation of CFC emission by the year 2000 will produce little immediate effect. Depletion of the ozone layer high in the stratosphere continue almost unabated because CFCs and other gases emitted in the past can survive in the atmosphere for many decades and are slowly drifting upwards towards the stratosphere. Thus, whereas CFC production and use on large scale basis is likely to cease by the year 2000, substantial depletion of stratospheric ozone is likely to persist well into the 22nd century.[112]

Although the primary objective of the Montreal Protocol is to protect the planets stratospheric ozone layer, its implementation will inevitably slow down the rate of change in global climate by limiting the build up of radio-active trace gases on an international basis. This argument is premised on scientific evidence, that since at the 1986 emission levels CFCs contributed about 25-30% of the annual commitment to warming from the build up of the full ensemble of trace gases cessation in production and use will reduce global warming considerably.[113]

The Montreal Protocol, 1987, has been hailed as among the vanguard of pollution prevention efforts in the recent years.[114] Although it is not a total solution to either the problem of

ozone depletion or global warming, it is illustrative of the fact that with a clear scientific consensus, the international community can move relatively quickly to reduce risk of environmental damage on a planetary scale. Secondly, it shows that such action can be taken before catastrophies occur, and finally, it demonstrates the potential to develop flexible provisions for limiting emissions of specific atmospheric pollutants.[115]

Other than the Montreal Protocol, 1987, it is submitted that although the legal regime articulated in the Nuclear Test Ban Treaty, 1963, was designed to control proliferation of nuclear weapons, it indirectly regulates atmospheric contamination by nuclear material. Most countries with nuclear capacity are now parties to the convention.[116]

3:3 Air Pollution

At the regional level, the Convention on long-range Transboundary Air pollution, 1979,[117] is the leading legal instrument in this field. The convention was adopted in 1979 by about 34 countries within the framework of United Nations Economic commission for Europe. It entered into force in 1983.[118] The adoption of this convention was precipitated by the problem of long range acid disposition. The objective of the convention is to prevent and reduce air pollution to protect man and the environment.[119] Parties are obliged to reduce and prevent air pollution including

long range transboundary air pollution. To attain this objective, parties commit themselves to adopt policies and strategies to combat the discharge of air pollutants[120] The convention has a permanent secretariat based in Geneva.

In developing concrete pollution reduction agreements to implement the convention, a "protocol system" has evolved. The Convention has three protocols which set specific goals and outline responsibilities for participating countries. The protocols are, protocol long-term Financing of the Co-operative Programme for Monitoring and Evaluation of the Long-Range Transmission of Air Pollutants in Europe (EMEP), 1984 Protocol on the Reduction of Sulphur emissions or their Transboundary Fluxes by at least 30% and the Protocol concerning the control of emissions of Nitrogen Oxides or their Transboundary fluxes, 1988. Cummulatively, the protocols establish a permanent funding for the region-wide pollution monitoring programme known as the co-operative programme for monitoring and evaluation of Long-Range transboundary air pollution (EMEP), agree to reduce Sulphur emissions by 30% by 1993 from the 1980 levels and an agreement to freeze emissions of nitrous oxides at 1987 levels.

Although the convention does not set out specific pollution reduction goals or emission limits, it establishes the framework for negotiating and implementing proposals. Since 1983, when it came into force, the convention has helped achieve significant reductions of a number of pollutants, encouraged the exchange of

scientific and technical information and provided a form for negotiation of abatement strategies. The protocol system underlines this flexibility.

But a number of factors have worked against reduction in the level of pollutants emitted.[121] Firstly, because the relationship between emission of pollutants and damage in respect of acid disposition is difficult to determine countries have used the argument to justify their refusal to reduce emissions. Britain and the United States were good examples.

Secondly, the protocols have shortcomings too. The protocol on the reduction of Sulphur emissions came into operation in 1985. The protocol aims at reducing Sulphur emissions by 30%. It is axiomatic that the flat rate strategy ignores the fact that countries contribute to transboundary air pollution unequally. Secondly, the selection of 30% as a target appear to have been arbitrary.[122] Though admittedly a step forward, it is submitted that a 30% reduction may not have been the percentage needed to combat transboundary air pollution. However, the protocol has enhanced reductions in emissions. As of 1988, eleven parties had already attained the 30% target. They plan to reduce their emissions by 50% by 1995. However, as "arbitrary as it may have seemed at first, the tangible 30% goal has since become a useful yardstick for the effectiveness of national air pollution measures."[123]

The Protocol concerning the control of emissions of nitrogen oxides or their transboundary fluxes, 1988, is less favoured and many countries are reluctant to implement it. As of may 1991, only 9 out of 24 had ratified it. One problem faced by this protocol is that since most nitrogen oxide emissions come from mobile sources, for example automobiles and different exhaust standards apply, the strigent controls instituted by the protocol are not complied with. It would appear that reduction of emissions is practically difficult.

Although initially viewed as a toothless bulldog, the Convention on long-range Transboundary Air Pollution, has contributed to the reduction of air pollutants significantly.[124] That positive steps have been felt in less than seven years is commendable.

3:4 SUMMARY

This chapter set out to explore the international legal regime relating to the protection of the biosphere from contamination by pollutants. It is evident that the international community is deeply involved in the protection of the biosphere and its constituent components of biological diversity.

With regard to the marine environment, the international community has attacked the challenge from its principal sources, namely, sea-based activities, dumping and land-based. Both global and regional regimes have been concluded. Notable in this regard is the ambitious UNEPs Regional Seas Programme under the

auspices of which many regional conventions to protect the marine environment and its components of biological diversity have been concluded. Although the regional approach is likely to suffer from inadequate financial resources, it takes into account the peculiarity of contamination of the marine environment in different geographical areas of the globe. It is submitted that with the necessary co-operation, contamination of the marine environment could be considerably reduced.

As at present, no global convention addresses the problem of marine pollution from land-based sources. An international standard setting regime is necessary as a yard stick for regional attempts. UNEP has recognized its desirability and the Governing Council has already recommended the adoption of such Convention.

To facilitate the enforcement of marine pollution control and regulation by flag states, the Convention on conditions for the Registration of ships, 1986 concluded under the auspices of the International Maritime Organizations (IMO) is a commendable attempt to the problematic flags of convenience, which have hitherto been a stumbling block to the enforcement of marine pollution prevention and control regulations.

With regard to the protection of the stratospheric ozone layer, it has been demonstrated that a firm regime appear to be in place. It is hoped that the switch-over from ozone depleting substances to ozone friendly ones through transfer of technology from

developed to developing countries will be realized. However, the international community will still have to contend with considerable ozone depletion by reason of the thousands of tonnes of ozone depleting substances already in the atmosphere. Concern has also been expressed on the suitability of certain substitutes, for example the HCFCs.

On
Other than the Convention Long-Range Transboundary Air Pollution, 1979, which is a regional convention, no global instrument addresses the problem of air pollution. It is submitted that a global approach is necessary to establish specific obligations designed to reverse air pollution on a planetary scale.

It has also been demonstrated that although the atmospheric build up of greenhouse gases continue unabated and despite growing realization of the disastrous consequences it could have on components of biological diversity, there has been no effective response to the challenge posed by global warming.

On the whole, the chapter illustrates that although there has been considerable law making activity in the realm of protecting the biosphere and biological diversity from contamination and other deleterious influences, it is evident that existing strategies are insufficient and require revamping. It is imperative that the international community co-operate to facilitate implementation of existing regimes as well as in devising additional ones for greater efficiency.

FOOTNOTES

1. For the purposes of section contamination is treated in so far as it affects the marine environment and the atmosphere.

2. RAHMATULLA, KHAN: "Marine Pollution and International Legal Controls" (1973) 13 Indian Journal of International Law p. 389 at 389.

3. The "Torrey Canyon", a Liberian registered tanker wrecked about 16 miles from the southwest corner of England at a spot beyond the jurisdiction of any state. About 100,000 tonnes of crude oil spilled into the sea within 8 days. The slick covered the beaches of Cornwall and spread eastwards to Normandy and Britanny 255 miles away.

4. GESAMP is the joint Group of Experts on the Scientific Aspects of Marine Environment. The Group was set up as a permanent Working Party in 1969 by IMCO (now IMO) FAO, UNESCO and WMO to advice the sponsoring organizations on matters related to marine pollution. Today it is sponsored by eight international agencies (see BOEHMER C. S.) "The Scientific Basis of Marine Pollution Control" (1982) 6 Marine Policy p. 2

5. See, The Nairobi, Barcelona and the Abidjan Conventions.

6. SCHACHTER, OSCAR, SERWER, DANIEL: "Marine Pollution and Remedies." (1971) 65 American Journal of International Law p. 84 at 86.

7. (1949) International Court of Justice Reports p. 4.

8. 3 URIAA 1905 (1949)

9. This is the legal effect of the decisions in the Corful Channel and Trail Smelter Arbitration

10. Supra p. 22

11. Supra p. 1965

12. Australlia V. France (1974) International Court of Justice Reports p. 253.

13. "The principle urges states inter alia to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or in areas beyond the limits of national jurisdiction".

14. As early as 1926 United States convened a conference to deliberate the issue of oil pollution. The conference produced a draft convention which permitted coastal states to establish zones within which oil discharge would be prohibited.

15. The International Convention for the protection of pollution of the Sea by Oil, 1954, see, 4900 United Nations Treaty Series p. 327.

16. ibid Article III

17. The area within which oil discharge by vessels was prohibited was expanded to 100 miles from the coast.

18. supra Sub-sections (b) (ii) and (iii)

19. GARCIA, AMADOR F. The Exploration and Conservation of the Resources of the sea: A study of contemporary International Law A. W. Sythoff Leyden 2nd Edition 1963 p.5

20. (1963) 45 United Nations Treaty Series p. 64

21. ibid Article XXV

22. (1963) 57 American Journal of International Law p. 268

23. (1963) United Nations Treaty Series p. 486

24. ibid Article I (1) (a)

25. United States and France

26. This organization was established pursuant to the provisions of the convention for the establishment of an Intergovernment Maritime Consultatire Organization (IMCO), 1948

27. (1970) 9 International Legal Materials p. 25

28. ibid Article I

29. HARGROVE, JOHN LAWRENCE: Law, Institutions and the Global Environment: Papers and Analysis of the Conference on Legal and Institutional Response to Problems of the Global Environment, Oceana Publication, New York 1972 p. 249.

30. (1970) 9 International Legal Materials p. 45

31. i) Where damages results fromwar or act of God
    ii) Where damage is wholly caused by an act or omission of a 3rd party with intent to cause damage
    iii) Where damage is wholly caused by negligence or other wrongful act of any government or other authority responsible for the maintenance or lights or other navigational aids

32. See GANTEN, R. H. "The International Oil Pollution Compensation Fund" (1984) 12 Environmental Policy and Law p. 5-8

33. These include,
    i) expenses incurred incleaning up the sea and beaches contaminated by oil.
    ii) overtime and additional costs by employed personnel
    iii) costs for the repair of roads beaches or adjacent areas
    iv) loss of incomes to fishermen hoteliers and shop shop keepers in the tourist industry.

34. GANTEN: loc. cit. p. 8

35. Economic costs and technical difficulties delayed entry into force of the convention from 1973 to 1983.

36. Annex I deals with oil, Annex II address noxions Liquids, Annex III, harmful substances carried by the sea in package form, Annexes IV and V address sewage and garbage respectively.

37. See, KISS, ALEXANDRE C (ed) Selected Multilateral Treaties in the Field of the Environment, UNEP, Nairobi, 1983 p. 63

38. See, Conventions concluded under the auspices of UNEPs Regional Seas Programme

39. ZEPPETELLO, MARC A: "National and International Regulation of Ocean Dumping: The Mandate to Terminate Marine Disposal of Contaminated Sewage Sludge." (1985) 12 (3) Ecology Law Quarterly p. 619.

40. KISS ALEXANDRE: op cit. p. 283.

41. ibid Article III (1) (a)

42. It categories wastes into the "black", "grey" and "white" lists dumping of substances in the black list, for example oil, plastics and cadmium is prohibited. Dumping of substances in the grey list, such as arsenis, zinc, copper and lead is subject to a permit system. Substances not covered by the black or the grey lists are presumed to be in the white list their dumping is subject to the permit system.

43. Article VI

44. Article VII (1) (a-c)

45. See, Article VI of the Convention for the Protection and Development of the Marine Environment of the Wider Carribean Region, 1983

46. Article IV

47. Annex I A (7)

48. Article XV and XVI

49. Article VI

50. See, UNEP "Pollution from Land-based Sources". (1983) 11 Environmental Policy and Law p. 88-91

51. Agricultural and other on-shore activities.

52. Principle 7 states that,
"States shall take all possible steps to prevent pollution of the sea by substances that are liable to create hazard to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea."

53. Examples include, The Paris Convention, 1974, The Abidjan Convention, 1981, The Nairobi Convention, 1985, Protocol for the protection of the Mediterrenean Sea Against Pollution from land-based sources, 1980, and Protocol for the Protection of the South-East Pacific Against Pollution from Land-based Sources, 1983.

54. The blacklist consists of the most noxious pollutants and contracting parties have agreed to eliminate marine pollution from them. Less noxious substances are contained in the grey list and their discharge into the marine environment system. Radio-active substances are grouped in one category and parties are obliged to take measures to control them.

55. Article XVI

56. The Nairobi Convention, 1985 for the Western Part of Indian Ocean and the Naumea Convention, 1986 for the South Pacific Region.

57. Articles VI of the Kuwait and Jeddah conventions.

58. Article IX of the Abidjan, 1981, Cartagena, 1983, Nairobi, 1985, and Noumea, 1986 conventions.

59. Article VI (8)

60. See, Protocol for the protection of the South-East Pacific Against Pollution from Land-based Sources, 1983.

Protocol for the protection of the Mediterrenean Sea Against Pollution from Land-Based Sources, 1980.

61. ibid Articles III and I respectively

62. Article IV (2)

48. Article XV and XVI

49. Article VI

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Protocol for the protection of the Mediterrenean Sea Against Pollution from Land-Based Sources, 1980.

61. ibid Articles III and I respectively

62. Article IV (2)

63. Article IV

64. Article V (2)

65. Article VI

66. See, Lauritzen V. Larsen 345 US 571 584 (1953)

67. See, REDDING, ANTONY: "Flags of Disputable Convenience" in the Development Forum October 1981.

68. ibid

69. See, Speech by Mr. Riphagen of the Netherlands on March 4th, 1958 (1958) 4 United Nations, Official Records, second committee p. 2

70. ibid p. 3

71. See, Law of the sea: Official text of the United Nations on the Law of the Sea. United Nations Publications, New York, 1983 p. 292.

72. See NANDAN, SATYA: "A constitution of the Ocean: The United Law of the Sea convention" (1989) 1 Marine Policy p.1

73. Article 192

74. NANDAN: loc. cit. p. 1

75. RAMAKRISHNA, KHAN: "Environmental Concerns and the New Law of the sea". (1985) 16 (1) Journal of Maritime Law and Commerce p. 1 at 14.

76. ibid p. 16-17

77. Article 212

78. Article 210

79. Article 211

80. Article 208

81. REDDING: loc. cit.

82. SHERWOOD, ROWLAND: "Stratosp eric Ozone Depletion by Chlorofluorocarbons" (199.) 19 (6-7) Ambio p. 281-292.

83. Ozone is an ustable gas composed of three atom oxygen molecules that tends to breakdown into two oxygen molecule which human breath. Ozone exist in the stratosphere because ultra-violet radiation creates ozone by breaking apart diatomic oxygen. This ozone eventually returns to its more stable configuration. Ozone Layer operates as a shield even

though the concentration of ozone is only about one molecule in every 100,000.

84 The first theory posited that ozone depletion had always taken place. Implicit in this argument is the notion that ozone depletion is part of the planets evolutionary process.

A second theory proceded from the premise that loss of stratospheic ozone resulted from its transportation elsewhere and its replacement by poor ozone air from other altitudes and latitudes. This theory appeared more convincing because the concentration of ozone in the stratosphere is not uniform. It was contended that the upward movement of tropospheric air could account for the lower levels of ozone.

85. It is estimated that the annual global release of CFC-12 over the past 15 years ranged between 350,000 and 400,000 tonnes. Production of CFC-13 has quadrupled since 1975 to an estimated 300,000 tonnes annually. Approximately one million tonnes of various CFCs has been released every year since mid 1970s with substantial increase during mid 1980s.

86. CFCs were developed as an answer to refrigeration by Thomas Midgely.

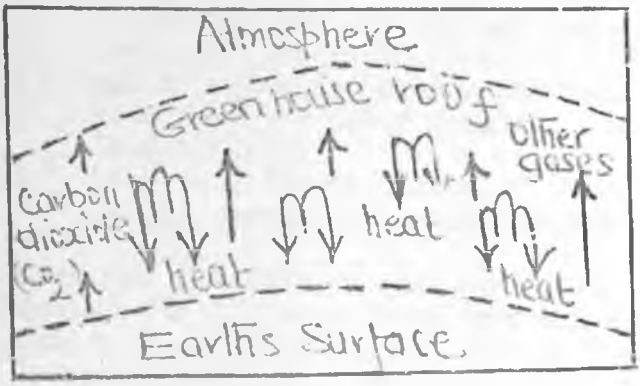
87. MOLINA, M. J., ROWLAND, F. S: "Stratospheric Sink for Chlorofluorocarbons: Chlorine Atom Catalyzed Destructiction of ozone". 249 Nature 810 (June 1974)

88. i) CCI_2F_2 + Ultra-Violet Radiation CI + $CCIF_2$

ii) The Chlorine combine with an ozone molecule to form two diatomic molecules chlorine monoxide (CIO) and molecules of oxygen.
CI + O_3 --- CIO + O_2

iii) The chlorine Atom left in the CCF_2 product (above) is loose and reacts with ozone in the upper atmosphere.

89. The "Greenhouse" effect



These estimates are based on current and on-going research on global warming.

The United States, Belgium Norway, and Sweden banned the use of CFCs as aerosols propellants.

Paragraph 7 of the preable to the convention.

Article II

By a framework convention is meant a document that aims not at substantive norms, but rather establishment of the institutional framework that will result in such norms.

WRITH, DAVID A., LASHOF, DANIEL A: "Beyond the Montreal Protocol: Multilateral Agreements on Greenhouse Gases". (1990) 19 (6-7) Ambio p.305 at 307.

These include Finland, Norway and Sweden

Montreal Protocol on Substances That Deplete Ozone Layer, 1987.

Paragraph 3 of the preamble to the Protocol.

Article II

ibid Sub-section (2)

Article V

In 1985, and soon after adoption of the Montreal Protocol, 1987, Scientist in Britain and the United States confirmed massive loss of Antarctic ozone in the springs of 1982, 1983 and 1984.

This is because enormous quantities of CFCs would have continued drifting into the atmosphere.

Trichlorcethane (Methychloroform) and Carbon Tetra-Chloride.

Developing countries opposed the protocol arguing that,

i) it epitomized the attempt by developed countries to impede modernization and industrialization in developing countries.

ii) their economies could not bear the burden of switching from ozone depleting substances to ozone friendly ones,

iii) they were being called upon to accommodate a problem created by industrialized countries.

Save for the second argument which addresses the fundamental challenge which developing countries would face in their attempt to fulfill obligations under the protocol, the other arguments are unsustainable on

account that developing countries harbour a large proportion of the planets population and contribute about 16% of the total CFC emission.

See, ARMIN, ROXENCRANZ, MILLIGAN, BEINA: "CFC Abatement: The Needs of Developing Countries" (1990) 29 (6-7) Ambio p. 312.

See, also The Independent (London) June 30th 1990.

See, "Amendment to the Montreal protocol on Substances That Deplete Ozone Layer" (1990) 20 (4-5) Environmental Policy and Law p. 169

ibid Article 10A

ibid Article 10

ibid Sub-section (5)

ibid Article 2 (e)

HOFFMAN, JOHN S: "Replacing CFCs: The Search for Alternatives" (1990) 19 (6-7) Ambio 129.

It is estimated that CFCs can survive in the lower atmosphere in their inert state for about a century.

MINTZER IRVING M: "A matter of Degrees: Energy Policy and the Greenhouse effect". (1987) 17 (6) Environmental Policy and Law p. 247 at 253.

SIEDEL, STEPHEN R; BLANK, DANIEL P: The Montreal Protocol: Pollution Prevention on a global scale" (1990) 1a (6-7) Ambio p.301 at 302.

The protocol recognizes the special category of developing countries and provide for a gradual phasing out of substance listed in the Annex.

The convention has about 117 ratifications.

See, (1979) 18 International Legal Materials p. 1442

Only 16 countries had ratified the convention

Paragraph 8 of the preamble to the convention.

Article 3

Firstly, member countries have not infrequently refused to reduce emission levels arguing that the relationship between levels of emission and damage is unclear. Secondly, others have deliberately refused to ratify the convention to avoid its obligations. Finally, the flat rate strategy adopted by

the protocol on the reduction of Sulphur emissions, 1985 has several weaknesses.

122. Britain for example is the largest emitter of SO_2 in the Western Europe. Sweden on the other hand had already reduced her emissions to a bare minimum. If the two countries were to reduce emission by 30% Britain would obviously continue emitting lare amounts of SO_2.

123. SIEDEL, S. R. & BLANK, D. P. The Montreal Protocol: Pollution on a Global Scale" (1990) 19 (No.617) Ambio 301 at 302.

124. FRAENKEL, AMY A: "The Convention on Long-Range Transboundary Air Pollution: Meeting the Challenges of International Co-operation" (1989) 30 (2) Harvard Journal Of International Law p. 442 at 476.

CHAPTER IV

4:0:0 TOWARDS A SYSTEMATIC AND COMPREHENSIVE APPROACH

In summary, chapter two and three reveals that despite an impressive panoply of normative and institutional structures at the international level, the destruction of ecosystems, habitats and the extinction of species continue almost unabated. Loss of components of biological diversity has been unrelenting. Undeniably, the piece-meal and sectoral approach which for the most part characterises the evolution of legal norms in the field of biodiversity conservation has failed to articulate general principles and rules of universal application. It seems imperative that existing mechanisms and strategies to facilitate and promote concerted global environmental action be strengthened. In addition new mechanisms should be created to complement existing ones. Such mechanisms would affirm the global character of the challenge and through appropriate funding, administrative and other arrangements build upon and co-ordinate existing regimes, cover gaps in coverage and facilitate transfer of resources to developing countries to promote sustainable development. This is likely to reduce pressure on ecosystems and habitats and enhance conservation of biological diversity.

For many centuries now, mankind has lived seemingly confident of

the permanence and nurturing capacity of the biosphere. However, since the epoch making Stockholm Declaration of 1972, it has become increasingly clear that the biosphere is by no means an infinite asset to be exploited senselessly, but rather, a fragile and finite system in need of comprehensive protection and sound environmental management. The international community now recognises that it stands face to face with the finitness of the biosphere. Since the continuing deterioration of the state of the environment and serious degradation of it's life support systems could irreparably disrupt ecological balance and jeopardize life sustaining qualities of the planet, the international community has no choice but to husband and manage biospheric resources sustainably to maintain itself on Earth.

Although the United Nations Conference on the Human Environment, Stockholm 1972, ushered in an era of globalism in environmental concern and provided the best opportunity to pick up loose threads to develop an international programme to conserve the planets biological diversity, and despite steady growth in environmental awareness, an international definitive legal approach is yet to be articulated. However, there is a growing realization that global measures for the protection, preservation and improvement of the environment are not only essential but indispensable. The international community is currently involved in negotiations on a global convention on the conservation and utilization biological diversity.[1]

The best existing statement of global conservation objectives which would constitute the basis of an instrument on biological diversity is the World Conservation Strategy, 1980. Its objectives are:

(i) to maintain essential ecological processes and life support systems,

(ii) to preserve genetic diversity and

(iii) to ennance sustainable use of species and ecosystems.[2]

Despite its general nature, it is the basis upon which a meaningful conservation convention could be made. Such an instrument would aim at translating the general principles intc specific implementable actions.

This chapter is set to examine the nature and character of the proposed convention on biolcgical diversity and what in our view it should contain. However, it is imperative first to examine the issue whether time is ripe for a new convention on biological diversity.

4:1 A Case for a Global Convention on Biological Diversity.

It has been observed that:

> "There is need for a global convention to protect biological diversity. The lack of funds and political will, the rate of ecosystem degradation ... knowledge is limited... species and ecosystems vanish because of human activity. Choices

must be made. What is needed is a global convention for the conservation of biological diversity that fills in the gaps and builds on the undoubted success of conventions and programmes now in force."[3]

Tolba is of the same view. He writes:

> "In the silent ritual of extinction, we desparately need a global convention that fills the gaps and takes the global view of biological diversity conservation if we are to halt this biotic genocide"[4]

But why a new convention while over a dozen global and regional conventions address biological diversity? Is there something wrong with existing regimes? Several points may be noted in relation to existing regimes. In the first instance, although the challenge posed by loss of biological diversity is global and affects mankind as a whole, no instrument covers the conservation of all kinds of habitats or species on a global scale. We subscribe to the view that "Conservation cannot be met through unilateral action."[5] Secondly, other things being equal, current rates of loss of biodiversity are illustrative of the fact that existing regimes have failed to stem loss of biological diversity. Thirdly, other than the Convention Concerning Protection of World Cultural and Natural Heritage, 1972, all other instruments address specific aspects of biological diversity. Although this approach has its advantages, in some cases it tends to be too narrow. It does not address the inter-sectoral connections and, therefore, fails to present a wholistic

picture. But even the World Heritage Convention, 1972, does not broadly promote conservation of major types of ecosystems in a systematic manner. Fourthly, whereas certain geographical regions are relatively well covered by existing regimes, others are not and major gaps in geographical coverage remain. Finally, none of the existing conservation instruments address the effects of pollutants on habitats and species.[6] The foregoing notes indicate that there has been neither systematic nor comprehensive attempt to conserve the planets biological diversity.

Most important, secretariats under existing arrangements are chronically short of funds and most regimes suffer from inadequate institutional framework. Some regimes provide for neither financial nor institutional arrangements.[7] Financially, existing regimes are perpetually subjected to the vagaries of state appropriation and charity. Since a sustainable financial regime and an effective and efficient institutional framework play a pivotal role in the implementation of conventions, their adequacy is imperative and cannot, therefore, be over-emphasized. Implementation of conservation conventions has in the past suffered severe setbacks by reason of inadequate financial and institutional mechanisms. In addition, existing arrangements lack financial incentives to enhance conservation of biological diversity. This does not augur well for attempts to conserve biodiversity.

A new convention would publicize the challenge posed by

biodiversity impoverishment, legitimize the concept of biodiversity conservation, promote awareness in conservation matters, commit contracting parties to adopt minimum conservation standards and catalyse both international and national environmental organizations, groups and individuals to promote conservation of biological diversity.

In a nutshell, a new convention on biological diversity would plug the gaps in existing regimes, devise innovative financial mechanisms, address all aspects of biological diversity and promote systematic and comprehensive conservation of the planet's biological diversity.

It must, however, be emphasized that devising a globally acceptable and workable instrument on biological diversity posits an enormous challenge. Several difficult hurdles must be surmounted before an instrument worth the paper it is written on is concluded. Little, it appears, will have been achieved if the instrument fails to provide for a sustainable financial regime. In addition, despite the urgency with which effective measures to halt impoverishment of biological diversity are needed, a considerable length of time will have to elapse before the convention finally comes into force. In the same vein, no single international convention can address all biodiversity conservation needs. In any event, conservation cannot wait for the convention. Above all, the fact that many conservation instruments have not performed well in the past works against the

thought of a new convention. It has been argued that there are already enough conventions in this field.[8] Some countries have gone a step further and registered their unwillingness to become parties to the proposed instrument.[9] Although it had been suggested that existing regimes could be amended to enhance their utility, there is now a general consensus that this is an unworthy course of action on account of its tedious and cumbersome nature.[10]

From the foregoing, it is evident that a convention on biological diversity is necessary if the international community is to prevent a biological holocaust.

4:2 Current Trends

Global concern for the planet's biological diversity is traceable to the late 1960s. The Man and Biosphere Conference, 1968, spearheaded global concern for environmental conservation. However, the real foundation was laid in 1972 by the epoch setting Stockholm Declaration, 1972. Principle 4 of the Declaration is the epitome of global concern for biological diversity.[11] The decade of the 80s witnessed the emergence of a consensus among the international community that environmental concerns play a centre stage in the international arena. Although the international community has striven to protect certain species and habitats since 1972, the global approach

envisaged by the Declaration is yet to be articulated let alone to attained. However, the galvanizing effect of the Stockholm Conference, 1972, will most likely result in a global convention on biological diversity before the turn of the century.[12]

Steady growth in environmental awareness and increasing concern about the planets biological diversity prompted the floating of the famous and globally respected World Conservation Strategy, 1980.[13] This comprehensive and elaborate document outlines the fundamentals of conservation in general and biodiversity conservation in particular. It is reputed to be foundation upon which the popular concept of sustainable development was built.[14]

Increased concern for biological diversity culminated in the World Charter for Nature, 1982.[15] It was solemnly proclaimed by the United Nations General Assembly in 1982.[16] Although it generally re-emphazises the principles outlined in the Stockholm Declaration, 1972, it is unequivocal that "all forms of life are unique..."[17]

The Montevideo Programme for the Development and Periodic Review of Environmental Law, 1982, is a further illustration of the attempt by the international community to place conservation in its proper perspective.[18] Although it does not refer to biodiversity conservation as field for development of a convention or guidelines or principles, nevertheless provided the

momentum for the creation of binding rules of international law in the field of the enviroment to which the present movement towards a convention on biological diversity owes its origin.

By reason of the exceedingly exponential rate at which biodiversity was being lost, the second half of the 1980s witnessed greater efforts by the international community in its attempt at biodiversity conservation. In June, 1987, during its 14th meeting, the United Nations Environment Programme Governing Council registered its concern about the disappearance of floral and faunal species and requested the Executive Director in consultation with governments and within available resources to establish an ad-hoc Working Group of experts to investigate in close collaboration with the Ecosystem Conservation Group and other international organizations, the desirability and possible form of an umbrella convention to rationalize activities in the field and consider other areas likely to fall under such convention.[19]

At the request of the Executive Director, a Small Working Group of Experts on Biological Diversity met in Nairobi in August, 1988 to consider Governing Council Resolution 14/26. The experts made a finding of fact that there was a general consensus at the international level that the planet's biological diversity should be conserved.[20] After a detailed and in depth review of existing regimes on biological diversity, the Working Group reported that, "a global convention would be a powerful catalyst drawing

together the efforts of the various sectoral and regional conventions in this field."[21]

In its report to the Executive Director, the Working Group of Experts on Biological Diversity included not only the objectives of the would-be convention, but the principal mechanisms to facilitate their realization.[22] However, on account of the disappointing performance of existing conservation regimes, the Working Group cautioned that any new instrument should only be concluded if it:

i) had a sound basis in Science,

ii) was comprehensive in scope, convering in-situ and ex-situ conservation measures, general protection of the biosphere and supplement other conventions,

iii) defined practical obligations and goals leaving contracting parties with responsibility to implement them,

iv) had the commitment by governments to funding at realistic levels,

v) had realistic provisions to facilitate transfer of resources to developing countries which harbour much of the planets biological diversity to allow to implementation, and

vi) was equiped to catalyse and co-ordinate efforts of governments and agencies under existing instruments in the field.[23]

These issues are critical to any global regime on biological diversity. In order to enhance conservation of the planets biological diversity, it is imperative that these issues be reconcilled in the convention. This would promote its workability. On the workability of a new instrument on biological diversity, UNEP, Executive Director says:

> "UNEP is not interested in crafting a paper tiger. Nor will UNEP agree to any international agreements that infringe upon the soverignty of nation-states."[24]

The idea of a global instrument on biological diversity crystallized in 1989. Governing Council Resolution 15/34 gave UNEP the mandate to negotiate an international legal instrument on the biological diversity of the planet. The resolution was emphatic that;

> "The Governing Council, Having considered the report... on rationalization of international conventions on biological diversity, recongnizing the need to conserve biological diversity on Earth... Authorises the Executive Director to convene ... an ad-hoc Working Group of Legal and Technical experts with a mandate to negotiate an international legal instrument for the conservation of biological diversity of the planet."[25]

The resolution directed the negotiators to adopt a socio-economic approach in their negotiations. It also called upon the

governments of developed countries to provide financial and technical resources to facilitate the full and effective participation of the developing countries.

Resolution 15/34 concretized the legal basis of a new international instrument on biological diversity and the broad elements to be covered by the convention.

Pursuant to the Governing Council resolution, an Ad-hoc Senior Advisory Panel of Experts on Biological Diversity met in Nairobi in September, 1989. The Secretariat considered the economic dimensions of biodiversity conservation as required by resolution 15/34. It was unequivocal that "the conservation of biological diversity is essential for environmentally sound and sustainable development."[26] In addition, it addressed other elements crucial in the conservation of biological diversity.[27]

The second session of the ad-hoc Working Group on Biological Diversity was held in Geneva from 19-23 February, 1990. Their task was to advise further on the contents of the proposed instrument with particular emphasis on its socio-economic context. The group requested the Executive Director to commission studies as a means of responding to specific issues. The studies covered global conservation needs and costs, multilateral and bilateral financial support for biodiversity conservation, access to genetic resources and the relationship between intellectual property rights, genetic resources and biotechnology.[28]

Results of the studies were presented to the Ad-hoc Working Group in its third session. In its report, the Working Group listed the elements for possible inclusion in the proposed convention.[29] A UNEP Consultant based in Nairobi made an impressive attempt to consolidate all of the would-be elements of the proposed convention in April, 1990.[30] If records of the latest session of the Ad-hoc Working Group of Legal and Technical Experts are anything to go by, there has been no radical departures from the consultants catalogue of elements.[31]

The Ad-hoc Working Group of Legal and Technical experts on biological diversity held its first session in Nairobi in November, 1990. Deliberations culminated in a draft convention on Biological diversity.[32] Whereas the general themes have already been agreed upon, the challenge facing the experts is how to incorporate the contentious issues, namely, technology transfer, access to biological diversity and financial mechanisms.

The Ad-hoc Working Group of legal and technical experts on biological diversity held its second session in Nairobi in February, 1991. The various elements of the draft convention were considered and outcame a revised draft convention on biological diversity.[33] The revised draft of the proposed instrument addresses the critical issue of additional funding to enhance biodiversity conservation in developing countries.[34] Elements contained in the revised draft were scheduled to be

deliberated upon during the third session of the ad-hoc Working Group of legal and technical experts on biological diversity in Madrid between 24th June and 3rd July, 1991. Worthy of note, the negotiation process has been relatively slow. The Chairman to the negotiating team attributes the delay to the inexperience of negotiators from developing countries. The disappointed Chairman laments that most sessions have been tutorial sessions for the delegates from developing countries.[35] What must be emphasized is the fact that the consensus being sought on the various issues is imperative because it constitutes the mainstay of the proposed instrument. Examining the nature and character of the proposed legal instrument it is hoped will afford us an opportunity to assess its practical significance in biodiversity conservation.

4:3:0 The Proposed Legal Instrument on Biological Diversity

The objective of the proposed convention should be to enhance conservation of biological diversity and promote sustainable utilization of its components for the benefit of present and future generations, through co-opertion and adoption of appropriate policies.[36] For purposes of realizing this objective, the convention should contain obligations to adopt both in-situ and ex-situ conservation measures. It should encourage parties to conserve biodiversity within national frameworks for land use planning and species protection within and outside designated areas. Parties should be obliged to

facilitate access to components of biodiversity, technology transfer, research and development. They should also be required to adopt effective measures to minimize threats to biodiversity through pollution of the biosphere, unsustainable exploitation, introduction of undesirable alien and genetically modified organisms, and other factors. It should address all levels of biodiversity.[37]

4:3:1 General Obligations

The general obligations are the guiding principles of the contracting parties. They are general postulations of what the parties have committed themselves to. In the proposed convention, contracting parties should be obliged both individually and collectively to adopt appropriate strategies, programmes and policies to facilitate conservation and sustainable utilization of biological diversity in all states and in areas beyond national jurisdiction.[38] Secondly, parties should be required to refrain from activities which threaten biological diversity within and beyond their jurisdiction. This is important to prevent transfrontier damage to biodiversity.

Contracting parties should also be required to integrate conservation and sustainable use of components of biological diversity into their national development strategies.[39] This is essential because all countries have planning mechanisms which

inter alia set policy priorities and allocate resources. Lamentably, very few countries have incorporated biodiversity conservation into their national development strategies. Until this is done, it will remain low ranking as a national priority.

Parties should also be required to co-operate in the development of agreed measures, procedures, standards, technologies, facilitate technical assistance and adoption of protocols to implement the convention. Co-operation in this case is critical because whereas the South needs technology owned by the north, the North requires genetic material, the bulk of which is found in the Tropical and sub-tropical South. In addition, the south cannot fulfill its international obligations effectively without technical assistance from the North.

For purposes of enhancing sustainable development, contracting parties should be required to adopt and implement economic and legal policies that foster maintenance and sustainable use of biological diversity.[39] Such obligation is important in view of the fact that government policies have previously contributed to the impoverishment of biological diversity enormously.

In order to facilitate the development of a conservation ethic, contracting parties should be under an obligation to promote public awareness on conservation matters through formal education, community education programmes, through the media and other available means. All and sundry should be made aware that

conservation of biological diversity is central to the development of the national economy and in promoting agriculture and animal husbandry and hence the communitys well being. Knowledge as to why and how to conserve biological diversity is critical to the development of a conservation ethic. The target of the environmental awareness programmes should invariably be the entire citizenry. Awareness rising encourages participation and support for conservation activities.

Contracting parties should also be under an obligation to provide both financial and institutional support to existing in-situ and ex-situ conservation programmes within their jurisdiction. Such support would enhance their utility and, therefore, their contribution in global conservation efforts. Such obligation is essential because the proposed instrument should aim at complementing national efforts to boost their efficacy.

For purposes of preventing further loss of biodiversity and mitigating inevitable losses, contracting parties should be under a primary obligation to ensure that environmental impact assessment precede implementation of programmes and projects likely to have adverse consequences on biological diversity.

Finally, all contracting parties should be under an obligation to encourage participation and support conservation and sustainable use of biological diversity by all sectors of the society. Such obligation would require parties to involve local communities in

conservation and sustainable use of biodiversity. This is important because the root causes of the biotic crisis being witnessed today are embedded in the peoples way of life.

The general obligations outlined above underline the fundamental and basic approaches to the attainment of the objectives of the proposed convention.

4:3:2 Approaches to Conservation

The proposed convention should adopt a systematic and comprehensive approach to conservation. It should place equal emphasis on both ex-situ and in-situ measures and adopt both short-term and long-term conservation measures. The revised draft of the proposed convention on biological diversity adopts this unprecedented approach.[40] This appears to be an explicit acknowledgement that ex-situ conservation measures play a fundamental role in any comprehensive conservation regime.

4:3:3 In-Situ Conservation

In-situ conservation entails conserving biological diversity in its natural habitat. Beyond doubt, habitat and ecosystem protection provide the most effective, efficient and promising mechanism for conserving biological diversity as opposed to

activities designed to protect individual species. This mechanism has more advantages than disadvantages and is the most prevalent. Firstly, it is more commensurate with a view of nature as a habitat. It recognizes that all species exist not in isolation but in functioning and interconnected habitats. Secondly, saving habitats is saving a collection of both flora and fauna. This is because unknown and unidentified species are protected along with better known and rare species. Finally, this approach has reasonable chances of success.

The different forms of in-situ conservation measures include, scientific reserves or strict nature reserves, national parks and game reserves. Strict nature reserves provide the greatest protection. In developing countries, it manifests itself almost invariably in the form of protected areas wherein minimal human activity is permitted if at all. These large tracts of land are mostly public land. Although forest zones are also protected through this mechanism, most protected areas in developing countries are chosen by virtue of their faunal characteristics.

From the above facts, it can be surmised that most protected areas in developing countries have been designated without much consideration being given to how the ecosystem contributes to global or regional conservation. What remains towering, however, is the fact that the establishment of a comprehensive system of protected areas remain the most effective way of conserving much of the genetic capital within tropical habitats

and ecosystems. In the same vein, it is important to note that although more habitats and ecosystems must be conserved if an appreciable proportion of the planets biological diversity is to be retained, elaborate financial and management strategies are also necessary.

It is against this background that we intend to examine relevant provisions of the proposed legal instrument.

According to the draft convention on biological diversity, contracting parties would be under an obligation to take all necessary measures to secure in-situ conservation of biological diversity by carrying out periodic surveys, preparing inventories and monitoring biodiversity for purposes of establishing biogeographic areas.[41] Secondly, parties would be required to maintain up-todate lists of protected and other biodiversity conservation areas, adopt co-ordinated management plans and strategies, rehabilitate species, habitats and ecosystems, adopt measures to prevent pollution and other forms of environmental degradation, regulate introduction of alien and genetically modified organisms, encourage land use and management practices compatible with maintenance of biological diversity and adopt policies to enhance sustainable use and development of species, natural habitats and ecosystems.

Contracting parties should also be obliged to use knowledge of the indigenous communities relevant to the conservation and

sustainable use and development of biological diversity. Although this knowledge is basically unrecorded, it could facilitate conservation and sustainable use of the components of biological diversity.

It is important to note that the obligation to carry out periodic surveys, inventories and monitoring of biological diversity acts as an evaluation mechanism, in that it could demonstrate the effectiveness of the management plans and strategies in operation and therefore the contribution of in-situ measures in conservation. Incorporating the foregoing obligations in a new convention on biodiversity would on the one hand enhance conservation and sustainable use of biodiversity and encourage designation of more protected and conservation areas on the other.

4:3:4 Ex-Situ Conservation

Although it is generally agreed that ecosystem and habitat protection remain the most effective biodiversity conservation mechanism, it cannot be doubted that off-site (ex-situ) conservation measures play a significant role in any comprehensive conservation programme. It is evident that as more and more species become endangered and ecosystems impoverished by habitat degradation, hunting, pollution and other human assaults, methods of keeping species artificially, maintaining and boosting

their reproduction and ultimately returning them to the wild will play an exceedingly important role in conservation.

Ex-situ conservation measures include, gene banks, botanic gardens, zoos and aquaria among others. Basically, they supplement in-situ conservation by providing storage, analysis, testing and propagation of threatened and rare species.

Although existing regimes do not as a general rule emphasize ex-situ conservation strategies,[42] in view of the present state of global biological diversity, it remains one of the principal conservation mechanisms.[43] Since ex-situ conservation backs up in-situ conservation, both should be established and co-ordinated as facets of a unified programme.

The proposed convention should show the way by placing more emphasis on ex-situ conservation strategies. It should require contracting parties to establish centres for ex-situ conservation of threatened species and adopt strategies for the re-introduction of species conserved by ex-situ means in to their natural environment. They should also be under an obligation to financially and institutionally support existing ex-situ conservation programmes and co-operate with the International Board of Plant Genetic Resources and FAO at all levels of management strategies and co-ordination of ex-situ conservation. This is crucial in view of the expertise possessed by these bodies. For evaluation purposes, parties should be required to

carry out periodic surveys, prepare inventories and monitor ex-situ conservation measures.

To facilitate the conservation and collection of germplasm of wild species of economic importance contracting parties should be obliged to develop the worlds botanic gardens and arboretas as principal ex-situ network.

At the national level, parties should be required to expand ex-situ conservation networks by establishing more genebanks, botanic gardens and encouraging research in this field.

Incorporating the above obligation and strategies in the proposed legal instrument would undoubtedly be a commendable gesture on account that it would enhance survival and sustainable utilization of germplasm and species threatened with extinction.

4:3:5 International Co-operation

Since every country possess biological diversity crucial for the survival and development of present and future generations, its conservation is, therefore, not an issue for countries with large numbers of species alone but a concern for all humanity. Loss of biodiversity is a global phenomenon and therefore calls for the attention of mankind as a whole. Because neither biodiversity nor resources or technology is evenly distributed accross the

planet, little it appears could be achieved without international co-operation in the implementation of the proposed instrument.[44]

The proposed instrument should, therefore, oblige contracting parties to co-operate between themselves and with competent international organizations to facilitate conservation and sustainable use of components of biodiversity. Parties should be required to co-operate in the evaluation, documentation, identification of biographic areas, utilization and exchange of genetic materials and information and support national and international institutions engaged in biodiversity conservation activities.

International co-operation is fairly central in this regard because it could facilitate technical assistance, technology transfer and financial support for conservation activities in developing countries by the north. It could also assist in determining national priorities and promote research.

4:3:6 Financial Mechanisms

It has been observed that:

> "A convention on the conservation of biological diversity without a functioning secretariat and financial means would be meaningless."[45]

There is a general consensus at the international level that the establishment of funding mechanisms to facilitate the fulfilment of international environmental obligations is necessary.[46] This development epitomizes a realization that states are endowed with resources unequally. It is an explicit acknowledgement that transfer of resources to developing countries to enable them fulfill their environmental obligations is essential. The situation in developing countries is critical because habitat degradation has been unrelenting. Effective conservation of biodiversity in these countries necessitates the institution of sustainable financial regimes with elaborate structures to facilitate transfer of financial resources. Tolba writes"

> "What is at issue is an investment in the future. Nations of the World may not have a common past but they certainly have a common future in the betterment or well-being of which they have at stake. A new order of priorities based on global partnership is needed. It must be an order in which everyone from all parts of the globe pay their shares in a common pool of resources to combat environmental dangers."[47]

That conservation of biological diversity is currently grossly underfunded world-wide is indisputable. The situation is worse in developing countries where loss of biodiversity has reached alarming proportions. Financial needs of developing countries are both numerous and complex. The principal ones include:

i) funds for conventional needs for development assistance,

ii) unmet conservation needs, viz, support for sustainable development programmes, and

iii) funds to meet emerging global environmental problems.[48]

Because of the inavailability of the requisite outlay of funds, developing countries can only commit funds to conservation at the expense of other development priorities. The situation is further compounded by the fact that tension between conservation and development has not yet been resolved. The following words are illustrative of the position;

> "In the aftermath of the Stockholm Conference, two views emerged. One called for giving more attention to the development process and the other stressed attention to the environment. We in the developing countries have opted for development and rejected any measures that may impede its path. This is because development represents the only means to satisfy the basic needs of our people, food, shelter and a decent living. On the other hand, the developed countries have stressed the need to preserve the environment as a safeguard against the negative effects of the development process."[49]

From the foregoing, it is evident that developing countries have yet to perceive conservation and environmental protection as a form of investment worth substantial funding. Because developing countries have inadequate financial resources, additional funds

are necessary to assist them fulfill environmental obligation. The picture which emerges is that if the planets biological diversity is to be conserved. the proposed instrument must establish sustainable and effective financial regimes. However, it must be emphasized that the policy and institutional arrangements in developing countries should equally be supportive.

4:3:6:1 Financing Conservation of Biological Diversity

In the course of negotiations, various ways and means of financing biodiversity conservation have been considered.[50] Studies and consultancies have been commissioned with a view to determining global conservation needs and costs and the best approach to finance them.[51] Although the final form of the financial mechanisms is yet to be articulated, most likely via a protocol, the proposed convention should go a step further and incorporate innovative financial mechanisms as opposed to the run of the mill approaches which characterise existing regimes.[52]

For purposes of conserving biodiversity, the proposed legal instrument should address a multilateral fund and debt-for-nature swaps. Beyond the convention, other financial mechanisms will also be considered. We shall examine each mode inturn and assess its viability.

4:3:6:2 The Multilateral Fund

The establishment of a multilateral fund is seen as one of the principal avenues in financing biodiversity conservation. Precedent in this direction has already been set by the Montreal Protocol on substance which Deplete Ozone Layer (as amended), 1987.[53] During its second session in Geneva in 1990, the ad-hoc Working Group of experts on biological diversity noted that:

> "on financial matters, there was a consensus that those who enjoy most the economic benefits of biological diversity should contribute equitably to its conservation and sustainable management."[54]

The desirability of a multilateral fund to finance biodiversity conservation has also been expressed by the Executive Director of UNEP in the following words "a common pool of resources to combat environmental dangers."[55] The critical issue remains the sources of monies to maintain the fund. This is a major hurdle because contracting parties have continuously failed to contribute their shares as mandated under existing regimes. Although contributions by contracting parties are crucial, for purposes of sustainability, the proposed instrument should provide for additional sources of funds. The multilateral fund should be financed by monies from,

i) mandatory contributions by contracting parties,

ii) voluntary contributions by states, gifts, bequests from states, organizations, public and private bodies

and individuals,

iii) payments by states collected from users and beneficiaries of biomaterial,[56]

iv) collection and receipts from events organized for the benefit of the fund,

v) interest from endowments created for that purpose,

vi) borrowing and other sources.

State payments by users and beneficiaries of biomaterial would entail remitting a percentage of the total amount collected from commercial users and beneficiaries. Modalities as to how and when to remit would have to be worked out depending on the market situation. Noteworthy, the greater the number of specific sources, the greater the chance of raising a reasonable amount for conservation.

However, if the proposed fund is to operate efficiently, developed countries should be required to provide additional funds over and above their present levels of contribution. Additional funding is neceessary to cover all aspects of global environmental concerns. But why additional? In the words of Maurice Strong,

> "Additionality is not a mere political slogan. It reflects the stark reality that however much developing countries may recognize that investment in sustainable development makes sense in terms of their long-term economic and evironmental interests, they simply cannot afford the

additional funds thus will often require in the short-run. It is in every ones interest that they should have access to these additional funds and to the most environmentally sound technologies. The sooner this is done, the less it will cost environmentally and economically."[57]

Since the multilateral fund cannot be the all and end all means to finance conservation and sustainable use of global biological diversity, existing sources should be revamped and innovative ones devised.

4:3:6:3 Debt-for-nature Swaps

This is an innovative funding mechanism whereby financial institutions, conservation organisations and debtor governments in developing countries have attempted to use external debt to enhance conservation of biological diversity. Its modus operandi is simple, a conservation organisation buys the debt of a developing country which is then discounted on secondary markets. The debt notes are then presented to the debtor country for local currency in the amount of the face value of the debt, with the local currency being invested in conservation.[58] The basic premise of the mechanism is that a certain amount of foreign debt is cancelled in exchange for local currency investments in programmes that improve natural resource management in the debtor country.

As a source of funds to finance conservation activities, debt-for - nature swaps are a recent innovation. The first experiment was conducted in 1987. The concept was pioneered by the Bolivian government in conjuction with Conservation International, (a Private United States Environmental Organization). In summary, with funds donated by Frank Weeden Foundation, Conservation International purchased USD650,000 face value of Bolivian Commercial Bank debt for USD100,000 from an affiliate of Citibank. In return for the agreement of Conservation International to extinguish the 650,000 dollar debt obligation of Bolivia, the Bolivian government agreed to establish an endowment fund of local currency amounting to US dollars 250,000 to pay for the operating costs of managing Beni Biosphere Reserve in North Eastern Bolivia.[59] In addition, the Bolivian government undertook to take other measures to enhance protection of the reserve. Since 1987, the mechanism has been experimented in Costa Rica, Ecuador, Phillipines, Mexico, Zambia and Malagacy.[60] The latest agreement was signed in February, 1991 between Mexico on the one hand and Conservation International on the other.

4:3:6:4 Viability of Debt-for-nature Swaps as a Source of Finance in Biodiversity Conservation

William K. Reilly, Administrator of the USA's EPA observes that:

"Developing countries where the debt burden means a net flow

of capital to the creditor countries are not able to take long term view of their resources and to invest in sustainable programmes. This is why debt-for-nature swaps even though they affect less than 1% of the total debt are absolutely necessary."[60A]

In the first instance, debt-for-nature agreements represent a new wave of thinking about the link between development, environment and debt. Conservation of biological diversity require debt reduction and long term development, but since long term development is almost impossible without stability in natural systems, ground water, water sheds, forests, fisheries and soils on which developing countries are so heavily and disproportionately dependent, debt-for-nature swaps have a crucial role to play.

Secondly, since developing countries are burdened with large domestic and external debt and are thus ill-prepared to pay for equipment, planning, technology and other measures necessary to protect ecosystems and species, debt-for-nature swaps could alleviate this by generating local currency to be used for conservation purposes, and are therefore, a worthwhile approach at least in the short-run.

The ground-breaking Bolivian case demonstrate both monetary and non-monetary benefits accruing from such transaction. At the very minimum, each debt-for-nature transaction results in the

reduction of the host countries external debt and a commitment of local resources to conservation activities. Although only small amounts have been involved so far, the mechanism has facilitated conservation of biological diversity in many areas and has the potential to finance the conservation of a veritable Noahs' Ark of species the tropical countries have stocked.[61]

Those opposed to debt-for-nature swaps cite inflationary tendencies and foreign ownership of land in the debtor countries as its principal drawbacks. With regard to the former, it is contended that since debt-for-nature swaps increase money supply in the debtor country, it has an inflationary potential. This argument is predicated on the sources of the local currency for conservation, namely,

i) drawing on existing reserves of local currency,

ii) borrowing local currency in the market place, and

iii) printing more local currency.

The fallacy in this argument lies in the assumption that debtor countries expand local monetary supplies without restriction. Undeniably, the inflationary effect is dependent upon the extent to which the debtor country meets its debt exchange obligation by expanding local monetary supply. But experience has shown that the transaction can be adjusted to fit into the monetary arrangements of the country in question and by doing so hold back inflation.[62] In addition, since the amounts involved remain relatively small, for the most part, these transactions have

created little demand for local currency. However, when all is said and done, these transactions have an inflationary potential.

Equally fallacious is the argument that debt-for-nature swaps enable foreign ownership of land in the debtor country. The absurdity of this argument stems from the contention that the conservation organization involved in the transaction "owns" the protected or conservation areas the debtor government undertakes to protect. These agreements are entered into on a willing buyer willing seller basis and parity remains the key word. In any event, conservation organization do not as a general rule dictate how conservation should take place. Pushing this argument to its logical conclusion, infact there are no guarantees that debtor government will comply with the arrangement to the letter and there is no way to enforce this. Since enforcement by either governments or private groups would be inappropriate, it is possible that debt-for-nature swaps could potentially bail out banks with little or no conservation in developing countries.

Although the utility of this mechanism is prime facie reduced by the fact that all past transactions involved commercial debt, which incidentally is very high in Latin American countries and very low in sub-saharan countries,[63] the concept can be extended to cover debts in public finance institutions such as the World Bank and the International Monetary Fund (IMF). Regional financial institutions are also envisaged.

nce programmes require time to build slowly on sound basis and bt-for-nature agreements have been in existence for the last 3 so years, it would appear too early to evaluate their success. should be noted, however, that the debt-for-nature swaps perience demonstrate the creativity, flexibility and dedication debt-burdened countries in resolving natural resource nagement crisis. Although these transactions are neither the lution to the debt and conservation crisis in developing untries nor a new method of conservation imperialism and are, herefore, not intended to provide relief to external debt, their rincipal objective is to provide funds to enhance conservation nd better use of biological resources.

he picture which emerges is that although conservation of the lanets biological diversity for sustainable development cannot e achieved through micro projects financed by debt swaps, which eans the international community still has to forge an agenda hich facilitates coherent and sustainable social order, in the hort-run, debt-for-nature swaps could enhance biodiversity onservation by providing the much needed funds.

he proposed convention should incorporate debt-for-nature swaps s one of its approaches to financing conservation. Although the d-hoc working group on biodiversity has not debated this aspect xhaustively, we think that developing countries should be ncouraged to conclude such agreements.[64]

Thus, a possible protocol on financial regimes for the proposed legal instrument should include inter alia a multilateral fund and debt-for-nature swaps.

4:3:5:5 Other Mechanisms

For comprehensive conservation of the planets biological diversity, other financial mechanisms over and above those incorporated in legal regimes are also envisaged. One of the many outcomes of the Stockholom Conference, 1972, was to inject an environmental conscience into some aid agencies namely the World Bank, IMF and bilateral assistance agencies. These agencies are now more committed to environmental protection than ever before. They prepare environmental impact assessments for all their projects. Although they have been involved in many projects, only a small amount of funds set aside for environmental concerns end up in conservation projects.[65] To increase its contribution in environmental protection generally, the World Bank created the Global Environmental Facility in 1990. It came into operation in 1991. The idea behind the facility is to create a global environmental trust fund to provide grants and concessions to developing countries to assist them implement programmes to protect global environment. It is to be run jointly by the bank, UNEP and UNDP. The facility has targetted four principal areas:

(a) Protection of the ozone layer. In this regard the

facility will assist developing countries effect the translation from ozone depleting substances to ozone friendly susbstances.

(b) Limiting emissions of greenhouse gases. Here, the facility will finance activities aimed at reducing emission of these gases.

(c) Protection of the planets biological diversity. The facility will support efforts of developing countries to conserve specific areas to enhance protection of ecosystems and species.

(d) Protection of international waters. The facility will support programmes to enhance contigency planning for marine oil spills, help abate industrial and waste water pollution that affects international marine and fresh water resources, to improve reception facilities for deballasting in ports of developing countries to prevent and clean up toxic waste pollution along major rivers which affect international water courses, and to conserve unique water bodies.

Although it is designed as a pilot programme, it cannot be doubted that supporting the above areas will enhance biodiversity conservation in developing countries and the world at large.

4:3:6 Technical Assistance

Since the bulk of the planets biological diversity is located in

developing countries while most resources and technology are in developed countries, transfer of these resources should therefore be part and parcel of the north south partnership in environmental concerns.

Technical assistance to developing countries is necessary for the improvement of environmental policy and procedures and in building conservation concerns into project planning. Technical experts, staff and equipment is necessary in natural resource and environmental management.

As a mode of international co-operation, technical assistance to developing countries could facilitate research, carrying out surveys, drawing up of inventories and maintaining the necessary data. In addition it could promote feasibility studies and public awareness raising in biodiversity conservation. In a nutshell, therefore, technical assistance is essential in the conservation and sustainable utilization of components of biological diversity in developing countries.

The proposed convention should oblige developed countries to provide technical assistance to developing countries. The revised draft convention addresses this element and it is hoped that it will be incorporated in the final draft. To facilitate technical assitance to developing countries, a "clearing house mechanism" within the institutions set up by the proposed convention is necessary. For best results, developed countries

should be under an obligation to provide both multilateral and bilateral technical assistance to developing countries over and above their contributions to institutions proposed by the proposed convention. In our view, incorporation of the foregoing obligations would enhance technical assistance to developing countries and therefore promote conservation and sustainable utilization of components of biological diversity.

4:3:8 Access to Biological Diversity

It has been observed aptly that;

> "The full potential of biological diversity can best be realized when genetic resources remain accessible to all users..."[66]

The upshot of the above passage is, it would appear, access to components of biological diversity is crucial for their conservation and sustainable utilization. Whereas the availability of components of biological diversity is not contentious, access to them is. Needless to indicate, whereas the bulk of the planets biodiversity is located in developing countries, developed countries remain its principal users. It therefore follows that maximum use of the components of biodiversity could only be achieved if developed countries had access to these resources. The zone of contention is that whereas developed countries have vigorously lobbied for an articulation that components of biological diversity are part and

parcel of the common heritage of mankind, to facilitate free access by all, they are not keen to make access to germplasm and technology easier or cheaper to developing countries. But the argument runs much deeper.

Although biological diversity is a global resource crucial for survival and development of present and future generations of humanity, its various components are located in individual independent sovereign states which in law have jurisdiction over all resources within their jurisdictional boundaries, components of biodiversity inclusive.[67] Developing countries argue that whereas biodiversity is a global resource, it is not part of the common heritage, of mankind and as such any components thereof within their jurisdictional boundaries are part and parcel of their natural wealth over which they have sovereignty. This then is the dilema facing the negotiators.

In an ideal situation, there ought to be no restrictions on the movement of genetic materials between developed and developing countries unless prohibited by an international agreement. Obviously, bonafide research by states, organizations and individuals should not be denied requisite genetic materials wherever they are. However, because every state has sovereignty over all resources within its territorial boundaries, access to components of biodiversity should not be interpreted as unrestricted taking. States are entitled to guard against over-exploitation and misuse of their resources.

Consensus of opinion in the ad-hoc Working Group of experts on biological diversity is that free access to components of biodiversity does not mean free of charge.[68] The general trend of reasoning is that access to components of biodiversity should be based on mutual understanding between the states concerned. Though reasonable in the circumstances, this approach appear inadequate in view of the strong bargaining position of developed countries. What complicates the issue even further is the fact that in most developing countries, components of biological diversity have not been valued which means their commercial value remains largely unknown. To the extreme, developing countries are to a large extent unaware of what components of biodiversity they have let alone their value. However, in the final analysis access to components of biodiversity is essential and the proposed legal instrument should guarantee the same on terms and conditions favourable to all parties.

Finally, although access to components of biodiversity and transfer of technology are different sides of the same coin, for clarity purposes, we have considered them separately.

4:3:9 Transfer of Technology

Technology transfer entails the movement of environmentally sound technology and biotechnology from developed countries. The international community has long recognized that technology is essential for conservation, sustainable utilization of components

of biodiversity and sustainable developments.

Like its counterpart access to components of biological diversity, transfer of technology remains a thorny issue within and beyond the negotiation process. For purposes of the proposed convention, the issue has been the subject matter of a number of studies.[69] Some delegations have even argued that it should be excluded from the negotiation process.[70] They contend that GATT is the proper forum. This argument is not only absurd and untenable but superflous in view of Governing Council Resolution 15/34 which gave UNEP the mandate to negotiate a convention on biological diversity. But what makes the issue contentious?

At the risk of repeating ourselves, whereas developing countries harbour much of the planets biological diversity, developed countries retain much of the technology necessary to promote sustainable utilization of components of biodiversity, conservation and sustainable development. This has been the basis of the now out dated dichotomy between "gene rich" and "technology rich" states.[71] That each side needs the other is incontrovertible. The issue of technology transfer is both contentious and complex. Remarks Tolba,

> "The challenge is to find technology transfer mechanisms as innovative as technologies themselves. A balance among development objectives, environmental protection and patent rights must be struck. Owners of industrial property cannot be expected to surrender hard-worn technological advantages

freely. Innovative thinking is needed to resolve private claims on patents, trade-marks and industrial property rights and a code of conduct for the transfer of environmentally benign technologies."[72]

This then is the complexity of the issue to be reconcilled. But what compounds the challenge even further is the fact that developed states continue to lobby for increased protection of their technological inventions. Transnational corporations engaged in biotechnological research have also continuously lobbied for the extension of industrial patents to living products and processes.[73] This would mean patenting germplasm. At the present, it is possible in the United States. Most important, although a general consensus has not yet emerged most developed countries would want to see the International Convention on the Protection of New Varieties of Plants, 1961, amended to facilitate patenting of living material. The real picture is captured by one writer in the following words,

"Thus, there are double standards in the industrial worlds approach. Liberalisation, if it suits us, protectionism too if that suits us - the real underlying principle is pure self-interest"[74] (emphasis added)

This double standard approach is explicitly exhibited by the proposed international property rights regime. The hidden agenda in the Uruguay Round of GATT talks is to monopolise by developed countries of the world market. A coalition of developed

countries led by United States has vigorously lobbied for the inclusion of intellectual property rights, services and investments within the framework of GATT. Incorporating trade related intellectual property rights (TRIPS) into the global trade order would facilitate patents, copyrights and trademarks to owners and inventors of all technologies. This appear to be a response to the realization of the inadequacy of existing regimes to cover new technological inventions. It is argued that granting such rights and rewards is necessary to provide incentives for research, development and innovation.[75] Developing countries have echoed genuine fears that they will be at a disadvantage in so far as access to biotechnology and development is concerned if the intellectual property rights system is internationalized under the auspices of GATT. But this is what most developed countries and trans-national corporations are committed to. This could have adverse effects on biodiversity conservation.

4:3:10 Implications of the Proposed Intellectual Property Rights Regime

Internationalization of the intellectual property rights system would prevent diffusion of technology to developing countries which to a large extent depend on imported technology. This would marginalize them technologically. It could also increase royalties paid to transnational corporations tremedously thereby perpetuating the technological monopoly of developed countries.

This is likely to be the case because transnational corporations register patents in developing countries not so much for local use, but to prevent others from copying or using their technology thereby inhibiting local competition for exports.

Finally, patenting life forms could adversly affect the agricultural sector, incidentally, the mainstay of many developing countries. In the first instance,it would lead to higher prices for seeds and accelerate genetic uniformity. On the other hand, it would place global food security in the hands of a few transnational corporations who owned genes and species upon which global food security is based.[76]

In a nutshell, amending the International Convention on the Protection of New Varities of Plants, 1961, ~~to widen~~ Strengthening plant breeders rights ~~patentability of life~~ and adopting uniform patent laws under GATT would make environmentally sound technology and germplasm not only difficult to acquire but expensive for developing countries. The outcome of the Uruguay round of talks is likely to have a major impact on future plans to conserve biological diversity. It is submitted that, action to conserve biological diversity should be taken outside the framework of GATT.

What emerges is that unless an acceptable formulae of technology transfer is agreed upon and incorporated in the proposed instrument, interest in conserving biological diversity in developing countries is likely to decrease.

Basically, technology transfer to developing countries can be effected through any or both of the two principal mechanisms. The first approach entails establishing a multilateral fund to assist developing countries purchase the necessary technology. Tolba appears to advocate this approach. He writes:

> "It would appear however that in the last analysis success in effecting a meaningful transfer of technology will depend upon finding new approaches for ensuring enhanced flow of financial resources to make the sharing of technological options a viable objective"[77]

This approach would facilitate technology transfer through the so called "Clearing house mechanism". The 1990 amendment to the Montreal Protocol on substances which deplete Ozone Layer, 1987, adopted this approach.[78] In view of the exhorbitant prices at which technology is and is likely to continue being offered for sale and inadecuate foreign exchange reserves, this approach appear more favourable to developing countries.

The second approach is reciprocal in character where transfer of technology to developing countries should reciprocate access to components of biological diversity. Developing countries have forcifully argued that access to their genetic materials be made conditional upon obtaining biotechnologies from industrialized countries. The negotiations for a global convention on biological diversity appear to have adopted this approach. In its report the Governing Council states that:

"...the economic dimension including the question of adequate machinery for financial transfers from those who benefit from the exploitation of biological diversity including through the use of genetic resources in biotechnology development to the owners and managers of biological resources and appropriate measures to facilitate the transfers of technical means of utilising biological diversity for human benefit will need to be properly considered in the negotiation of any future legal instrument for the conservation of biological diversity."[79]

The ad-hoc working group on biological diversity has adopted this approach.[80] Developing countries have been gunning for this approach because in their estimation, technology is in private hands. Whereas such stance is understandable, developing countries should realize that a large proportion of the technology they require in return for access to their genetic resources is available in the public domain where they can purchase the same without paying royalties to inventors. This approach assumes that developing countries are the only custodians of all genetic resources needed by developed countries. We think that establishing a multilateral fund and operating a Clearing House Mechanism is the better approach to facilitate technology transfer to developing countries.

According to an official at the UNCTAD headquarters, developing countries are negotiating with the wrong people.[81] He argues

that since technology is predominantly in private hands these are the proper people to negotiate with. His argument demonstrate that technology transfer can only take place in a free market environment. What then should the proposed convention provide to encourage private enterprises to transfer technology to developing countries? Developed states should be obliged to ensure that both domestic policy and legal framework encourage private enterprises to transfer technology to developing countries.

The proposed instrument will have achieved little if it fails to provide an appropriate mechanism to facilitate transfer of technology to developing countries.

4:3:11 Environmental Impact Assessment

As essential ingredient of sustainable development is environmental impact assessment. UNEP has observed that;

> "An essential requirement of sustainable development and sound environmental management is the incorporation into the early stages of planning and decision making of the assessment of potential environmental impacts of activities. It is one of the priority areas for the development and periodic review of environmental Law"[82]

Environmental impact assessment is a study of the possible

effects of proposed activities on the environment generally. It encompasses the study of physical, biological, social, economic and other repercussions and seeks to compare the various alternatives available inorder to determine which one represents an optimum mix of environmental and economic costs and benefits.[83] The study entails breaking down a project into its various benefits and adverse environmental impacts and incorporating proposed alternatives or mitigating measures working towards a final scope and design which creates the least environmental cost while preserving essential economic benefits of the project.

As a decision making apparatus, environmental impact assessment facilitates judgement by ensuring that information necessary for environmentally sensitive decision making is available, a clear picture of the feasible alternatives, predicted changes and the trade-offs of advantages and disadvantages for each alternative.

In its entirety, environmental impact assessment is a means to decision making and not an end in itself. It encourages participation by the public and other interested organizations in the decision making process, fostering disclosure and discussion "opening them to public scrutiny and participation".[84] It presupposes community participation in the decision making process. It may therefore be argued that the explicit consideration of environmental consequences is likey to increase sensitivity to the problem forcing the consideration of

alternatives and thereby improving chances of entering damage costs in the project which makes cost-benefit analysis more accurate.

Environmental impact assessment is predicated on the principle that in accordance with the theory of choice, faced with more complete information on the environmental effects of a project or scheme, together with an appraisal of its alternatives, decision makers will prefer environmentally sound alternatives to bad ones. However, this is not always the case in practice.

At the international level, environmental impact assessment encourages the development of reciprocal procedures for information exchange and consultation between neighbouring states. This is particularly the case when proposed activities are likely to have significant transboundary environmental effects.

As an environmental protection device, environmental impact assessment has several weaknesses. In the first instance, as observed elsewhere, the principal objective of this device is to ensure that ecological parameters are made part and parcel of the decision making process. It would, therefore, appear to follow that projects with most negative environment effects will be discarded in favour of those with least negative effects. Amazingly, this is not always the case. More often than not, imperatives other than ecological parameters prevail. In the

words of Fairfax,

> "Even perfect understanding of all ecological ramifications of a project would not indicate the appropriate cause of action. A wide variety of economic and political variables have at least as much to do with decisions as ecological constraints."[85]

Explicit in the above passage is, it would appear, ecological parameters are an aspect in a multitude of factors to be considered and may not always take precedence over others. It is submitted that to the extent that ecological considerations do not affect a specific decision, the utility of environmental impact assessment as an environment protection device diminishes, it thus becomes "a paper tiger".[86]

Secondly, by almost any reckoning, preparing environmental impact assessment reports is an expensive undertaking. Whereas developed countries have the necessary outlay of financial and human resources and can, therefore, finance such undertakings comfortably, developing countries are perpetually short of funds and often find such undertakings auxillary or luxurious. To illustrate our argument, it cost US dollars 150,000 to prepare an environmental impact assessment report for the Yerba Buena Project in the United States.[87] However, to conservation conscious individuals and governments it is a worthwhile undertaking. It is worthy of note that although enviromental impact assessment is not antithetical to development, the myth

that it was, held sway for many years in developing countries.[88]

Thirdly, since environmental impact assessments are largely predicated on predictions of the would-be ecological consequences, it cannot for one moment, therefore, pretend to be a fullproof manifesto of the same.

Fourthly, if environmental impact assessment is to be truly effective as an environment conservation device, it must of necessity be an integral part of a clearly and normatively articulated conservation policy wherein objectives, procedures and standards are elaborately spelt out. It is submitted that isolated project impact assessments are likely to be irrelevant and inconsistent and, therefore, incapable of enhancing environmental conservation.

Finally, environmental impact assessment presupposes the existence of democracy in the decision making process. This presumption has a number of ramifications. Firstly, the assumption that the communities concerned are well versed in the field of environment is not borne by facts. Secondly, that it presupposes democracy in decision means that it can only operate effectively in situations with accountable apparatus. This presupposes the existence of political democracy which is largely non-existent in many developing countries.

The international community is exceedingly becoming aware that

environmental impact assessment is a necessary tool in environmental management and rational development planning. The ad-hoc Working Group on Biological Diversity has proposed that this mechanism be incorporated in the proposed instrument. This is the reason why, presently, it is necessary to consider how environmental impact assessment could enhance conservation of the planets biological diversity. In the first instance, for purposes of pre-empting the difficulties of eliminating alien species in an environment where they have been introduced, environmental impact assessment should be undertaken prior to their introduction. In such circumstances, the assessment demonstrates the effects of the alien species on ecosystems, natural habitats and indigenous species.

Secondly, the re-introduction of species should also be preceded by an environmental impact assessment to elicit their ecological impact. This should also apply to situations where genetically manipulated species are to be introduced or re-introduced into an environment. In both instances, the assessment will demonstrate the effects of the species on the environment.

Thirdly, environmental impact assessment is necessary to determine the effects on the environment of the introduction of new methods of use of alien species.

Finally, environmenal impact assessment should be carried out where projects or activities within a given jurisdictional

boundaries are likely to affect biological diversity beyond its boundaries adversely. This would ensure that effects on biodiversity within and outside national jurisdiction are known and mitigating measures provided for. It is important to note that this would encourage inter-state co-operation by the exchange of information on national activities likely to affect biodiversity beyond national jurisdiction.

The foregoing examples demonstrate the crucial role that environmental impact assessment could play in enhancing conservation of biological diversity. Most important, this mechanism would enable decision makers to determine whether a particular species can be most effectively conserved through in-situ or ex-situ measures.

Since systematic review and mitigation of development projects and other activities particularly impacts on habitats and ecosystems are important elements in biodiversity conservation, environmental impact assessment should be a principal element of the proposed convention. It cannot be doubted that this mechanism remains the linch pin in environmental protection policy.[89]

4:3:12 Biological Diversity Beyond National Jurisdiction

Effective conservation of the planets biological diversity cannot

be achieved unless states demonstrate concern for biological diversity within and beyond limits of national jurisdiction. Paradoxically, some countries erect tall chimneys to facilitate dispersal of carbon dioxide, sulphur compounds and other pollutants which cause acid rain in other countries.[90] The argument is that states should demonstrate concern for biodiversity beyond their "backyard." But how could states enhance conservation of biodiversity in other states or in areas beyond the limits of national jurisdiction?

On the one hand, the proposed convention should oblige contracting parties to ensure that activities within their jurisdiction or control do not damage biological diversity in other states or in areas beyond national jurisdiction.[91] Equally important, states should be obliged to ensure that persons under their control refrain from activities likely to affect biodiversity beyond national jurisdiction adversely. The revised draft of the proposed convention on biological diversity does not consider such obligation. In our view, this is a serious omission.

4:3:13 Relationship With Other Conservation Conventions, Programmes, and Action Plans

Although no global instrument addresses conservation of biological diversity as its primary objective and hence the

absence of a systematic and comprehensive approach, existing regimes address different aspects of biodiversity. Since the proposed instrument is not intended to replace such regimes, but to build upon them to enhance their utility, the need for a working relationship which catalyses them cannot, therefore, be over-emphasized.

The regime should inter alia avoid duplication and harmonize all conservation programmes under existing regimes. Secretariat of the proposed convention should liase with the secretariats created by existing regimes and with other organizations with similar conservation strategies and action plans acting as the epicentre for co-ordination. But for more closer co-ordination of conservation activities, secretariats established by existing global instruments on biological diversity, for example, the Ramsar and the World Heritage Convention could become parties to the convention. Alternatively, and if appropriate, such conventions could be re-negotiated as protocols to the convention. Whichever approach, the proposed convention finally assumes, it is imperative to facilitate effective co-ordination of conservation activities on a global basis.[92]

Secondly, since shortage of financial resources remain the single most severe problem under existing regimes, the financial arrangements of the proposed instrument are important on account that they could release the much needed funds to finance activities undertaken not only for the sake of its own

implementation but also for other global conventions. By availing additional funds to existing institutions, the proposed regime would go along way in enhancing their utility.

Thus, the proposed instrument should make provision for the fundamental roles of co-ordination and financial support to existing regimes.

4:3:14 The Institutional Framework

As demonstrated in chapter two, inadequate institutional arrangements has plagued existing conservation regimes for many years. Needless to indicate, this is hardly conducive to effective implementation of conservation programmes and activities. Under certain regimes, the institutional framework is either absent or too weak to implement the convention effectively.[93] However, amends have already been made in some instances.[94]

Since a strong, effective and efficient institutional framework is an essential requirement in the implementation of conventions, and that implementation of some existing instruments has suffered severe set backs by reason of absence or inadequate institutions, it can be surmised that the proposed instrument should create a strong and effective framework. This is crucial in view of the co-ordinating role that these institutions should undertake. At

the very minimum, the proposed instrument should provide for a conference of the parties, secretariat, a scientific Advisory committee or panel, a reporting system, clearing house mechanism and a special body to act between the conference of the party meetings.[95] At the municipal level, scientific and management bodies should be established to oversee and co-ordinate national conservation activities and programmes.

4:3:5 Conference of the Parties

This should be constituted by all contracting parties and should be the decision making body of the convention. This institution is very important because it would bring together all contracting parties to deliberate on issues, make decisions on how to implement the convention and review its implementation. For purposes of conserving biodiversity, the conference of the parties should be charged with the responsibilities of (i) devising a criterion for the establishment of protected and conservation areas (ii) reviewing implementation of the convention (iii) making recommendations to states on how to improve biodiversity conservation (iv) approving budgets and funds to other secretariats and (v) determing the overall approach of the conservation programme.

4:3:16 Secretariat

By virtue of being the only full time institution, the secretariat plays a critical role in the implementation of conventions. The convention should aim at a strong and efficient secretariat, manned by qualified and experienced personnel. It must be emphasized that adequacy of personnel is also important. The secretariat could play an important role by way of arranging for and servicing meetings of other bodies established by the convention, liaise with other bodies and secretariats of other regimes to co-ordinate biodiversity conservation, receive and maintain records on national implementation measures, maintain inventories and database of global conservation areas, maintain and service the fund, promote public awareness on the convention and its objectives and act as an information centre for states, organizations and individuals on the status of the planets biological diversity.

4:3:17 Scientific Committee or Advisory Pannel

Because technical issues regarding biodiversity conservation will inevitably arise, it is imperative that a scientific committee be provided for for purposes of the necessary expertise. Appointment to the membership of the committee should be by the

contracting parties and should be based on expertise and experience in conservation. The committee should be charged with the responsibility of advising the secretariat, the conference of the parties and any other body as mandated by the conference of the parties on all technical matters. Although its functions should be determined by the conference of the parties, it should have a free hand in conducting research on the best ways and means of enhancing biodiversity conservation.

4:3:18 Reporting Systems

For purposes of monitoring and evaluating what measures contracting parties have taken to implement the convention and how effective such measures have been and can be, the reporting system is necessary. In addition to filing the necessary reports with the secretariat, contracting parties should be required to report to the conference of the parties what measures they have taken to implement the convention, shortcomings and the results obtained.

This system could operate as a self-censoring mechanism in that it would force parties to demonstrate their commitment to the convention when requesting for financial assistance from the fund.

Finally, for best results, proper and effective co-ordination of

the activities of various institutions is paramount. It is submitted that a strong and efficient institutional framework under the proposed regime would push biodiversity conservation a step forward.

4:3:19 Research and Training

Because of the importance of understanding the dynamics of biological diversity, the best methods of managing protected and conservation areas, how to use components of biodiversity sustainably and the effects of social, cultural, economic and other anthropogenic factors on biodiversity, research and training form the bedrock of biodiversity conservation. Research and training play a central role in the development of technology and biotechnology.[96] Qualified personnel are necessary in carrying out surveys, preparing inventories and monitoring biodiversity. Training of taxonomists, ecologists, technicians, ethnobotanists and other specialists to manage both protected and conservation areas is necessary.

Since research and training are important elements in enhancing conservation and sustainable use of components of biodiversity, the proposed instrument should oblige developed countries to assist research in developing countries. It should also encourage developing countries to increase investment in research and training.

4:3:20 Education and Public Awareness

Since biological diversity occurs everywhere and its loss impoverishes mankind as a whole, it is imperative that all and sundry be made aware of the need to conserve its components. They should be made to appreciate the fundamental role that biodiversity plays in their survival and development.

Raising awareness at all levels, of environmental conditions and management through the provision of information, education and training is essential for environmental protection and improvement. Raising awareness would enhance participation and support for conservation activities by local communities.

The proposed convention should address this issue exhaustively. It should require contracting parties to use all available avenues to promote conservation awareness.[97] Both formal and informal means should be applied to their fullest extent. The essence of this obligation would be to ensure that communities are aware of the need to conserve and sustainable use of components of biodiversity.

Although some existing conservation instruments oblige contracting parties to raise environmental awareness, environmental education has not been a priority in many developing countries.[98] Where attempts have been made, the rural folk are to a large extent ignored.

4:3:21 Adaptation to Changes

To enable the convention adapt to changes in scientific and other fields so as to keep pace with developments, the proposed convention should adopt the protocol and annex system. Such system would facilitate plugging of any Lacuna likely to develop with time and expansion of scientific knowledge. With regard to the protocol system, precedent has already been established by the Convention on Long Range Transboundary Air Pollution, 1979,[99] and other legal instruments in the field of environmental conservation.

4:3:22 Other Aspects

The proposed regime should provide guidelines on conservation methodology to enable states determine their conservation priorities and in establishing protected and conservation areas. Individual parties should be left alone to determine how to implement the convention at the local level, because to be successful, international mechanisms should respect national priorities and generally complement overall development.

With regard to the financial mechanisms, effective modalities to facilitate the transfer of financial resources to developing countries should be provided for. To promote implementation of the convention, the financial regime should operate on a

reciprocal basis whereby funds would be suspended should a state fail to fulfill its obligations under the convention.

Finally, it should oblige contracting parties to incentivise biodiversity conservation.[100] Financial incentives have greatly enhanced faunal conservation in Zimbambwe. It is posited that proper incentives could play a considerable role in biodiversity conservation.

4:4 Conclusion

This chapter set out to examine the emerging principal elements of the proposed convention. Part one demonstrated inter alia that there is an overwhelming case for a new conservation convention on global biological diversity. It was argued that although many instruments address biodiversity, some of which are effective in their specific areas, in their totality they are necessarily sectoral and therefore incapable of enhancing conservation of biological diversity on a global scale. In a nutshell, it has been shown that the only way to treat the problem of biodiversity impoverishment as a global challenge is through a new conservation convention. Such instrument would affirm the global character of the challenge and provide mechanisms for its conservation. The second part attempted an assessment of the elements which should be included in the proposed convention. The discussion demonstrated the complexity

of the issues to be reconcilled before a worthwhile convention can be concluded. It was also illustrative of the unenviable position of the negotiators and, therefore, the future of biological diversity.

On the whole, it has been shown that in addition to addressing shortcomings of existing regimes to enhance their utility, the proposed convention should address conservation of biological diversity as an ecological unity. How far it could successfully accomplish this ambitious goal is beyond the scope of this chapter.

It is submitted that should the elements considered be incorporated in the proposed instrument, the coming into force of the convention would undoubtedly place biodiversity in its rightful place. However, it must be emphasized that the regime would only herald the era of a continous but heightened struggle to save natures brightest torches.

FOOTNOTES

1. UNEP: Environmental Law in UNEP, 1991 UNEP Environmental Law and Institutions Unit, Nairobi, UNEP, 1991 p.25-27.

2. UNEP, IUCN, WWF, World Conservation Strategy, 1980

3. BRAGDON, SUSAN, Draft convention for the protection of Biological Diversity and comments (Unreferenced) P.1.

4. TOLBA, MOSTAFA K. "To Preserve Natures Brightest Torches." Speech to the Second Session of the Ad-hoc Working Group of Experts on Biological Diversity. Geneva, 19-23 February, 1990, Speech 1990/4 p.2

5. ibid p.2

6. See, UNEP Proceedings of the ad-hoc Working Group ont he work of its first session. Geneva, 16-18 Nov. 1988. Doc/UNEP/Bio.Div.1/inf.2. P.6-24.

7. See, African convention on conservation of Nature and Natural Resources, 1968.

8. UNEP: Supra Note 6. P.8

9. ibid p.11 Representative of Malaysia.

10. ibid p. 24

11. Principle 4 Stockholm Declaration, 1972 Stipulates that: "man has a special responsibility to safeguard and wisely manage the heritage of wildlife and its habitat which are now gravely imperilled by a combination of adverse factors. Nature conservation including wildlife must therefore receive importance in planning for economic development".

12. UNEP Supra Note 1 p. 25

13. This is a UNEP, IUCN and WWF Donucment

14. This concept seeks to reconcile conservation and development. It is seen as the only hope for meaningful co-existence between developmental progress and environmental preservation.

15. This is a UNEP and IUCN document. It was solemly proclaimed by the United Nations General Assembly in 1982.

16. U.N.G.A. Resolution A/RES/37/7 of Oct. 29th 1982

17. ibid p.1

18. This programme was launched by UNEP in 1982.

19. See, Resolution 14/26 Rationalization of International Conventions on Biological Diversity, of June 17th 1987.

20. See, UNEP Report of an Ad-hoc Group of Experts to the Executive Director of UNEP on Governing Council Decision 14/26 Nairobi, 29-31 August, 1988. UNEP/Bio.Div.1/inf.1 The finding was based on the response of governments to the Executive Directors Letter of September, 10th 1987.

21. ibid Para 60. P.21

22. ibid Para 51 P. 18

23. ibid Para 60 P. 21

24. TOLBA, MOSTAFA K. Supra Note 4 P.2

25. UNEP: Report of the Governing Council on the Work of its fifteenth Session. Nairobi 15-26 May, 1989 P.91.

26. UNEP: Draft note by the UNEP Secretariat Concerning the Preparation of an International Legal Instrument on the Biological Diversity of the Planet. UNEP/Bio.Div.1/inf 4 Nairobi September, 14th 1989 p.1

27. These included, economic policies and incentive structures, economic values of ecosystems protected areas and endangered species, funding mechanisms and financial transfers.

28. See UNEP Report of the Ad-hoc Working Group of Legal and Technical Experts on Biological Diversity on the workof its first session. UNEP.Bio.Div/WG/2/1/4 Nov. 28th 1990.

29. See UNEP Report of the Ad-hoc Working Group on the Work of Its Third Session in Preparation for a Legal Instrument on Biological Diversity of the Planet. UNEP/Bio.Div.3/12 August 13th 1990.

30. See UNEP Elements to be covered by a Global framework Convention on Conservation of Biological Diversity. UNEP/Doc.0371L Nairobi 17th April, 1990.

31. UNEP Ad-hoc Working Group of Legal and technical Experts on Biological Diversity: Second Session, Nairobi 25th February - 6th March 1991. UNEP.Bio.Div.WG.2/2/2

32. UNEP Draft convention on Biological Diversity UNEP/Bio.Div/WG.2/2/2

33. UNEP Revised Draft Convention on Biological Diversity UNEP/Bio.Div/WG.2/3/3

34. ibid P.10

5. SANCHEZ Speech at the International Workshop on Property Rights, Biotechnology and Genetic Resources: Incentives for Innovation and Conservation. Nairobi, Kenya June 10-14 1991.

6. For other alternatives see UNEP Supra Note. 33 p.6-7.

7. See, UNEP: The Revised Draft of the Proposed Instrument gives equal emphasis to both in-situ and ex-situ conservation measures.

8. UNEP: Supra Note 33 Article 4 (1) (a) P.10

9. ibid Article 4 (1) (c) p.10

9A. ibid Article 4 (2) (b) p.11

0. ibid Articles 6 and 7

1. UNEP: Supra, note 32 p.29

2. Very few instruments address this approach. However Article IV (1) (e) of the African Conventionon the Conservation of Nature and Natural Resources address it.

3. It cannot be doubted that some species necessary for human utilization cannot be conserved by methods other than ex-situ.

4. UNEP: Elements for Possible Inclusion in a Global Framework Instrument on Biological Diversity UNEP/Bio.Div 4/3 Nairobi 19-23 Nov. 1990 p.19.

5. UNEP Supra Note 6 p.9.

6. See, NTAMBIRWEKI, JOHN "The Developing Countries in the Evolution of an International Environmental Law with Particular Emphasis on the Work of the UNEP." (1991) 14 (No.4) Hastings International and Comparative Law Review p.905

7. TOLBA, MOSTAFA K. Transfer of Technology and the Financing of Global Environmental Problems: The Role of Users fees: a note to the meeting on Informal consultations on financial mechanisms. UNEP/OZL.FIN.1/2 of Januray 18th, 1990 para 3 p. 1.

8. UNEP Ad-hoc Working Group of Experts on Biological Diversity: Note by the Executive Director UNEP/Bio.Div.3/2 Geneva, June 9th 1990 p. 4.

9. TOLBA, MOSTAFA K. Evolving Environmental Perceptions: From Stockholm to Nairobi Butterworths, London, 1988 p.84.

0. See, UNEP: Supra Note 26. p.4-6

51. See, UNEP Current Multilateral, Bilateral and National Financial Support for Biological Diversity Conservation (By A. Markadya) UNEP.Bio.Div. 3/inf.2 Geneva 12th June, 1990.

    See, also UNEP Framework Legal Instrument on Biological Diversity: An Analysis of Possible Financial Mechanisms (By Ahmad Yusuf J.) UNEP/Bio.Div 3/inf.3 Geneva 23rd May 1990.

52. Financial regimes under existing arrangements are almost invariably based on mandatory and voluntary contributions by contracting parties organization bodies and private individuals.

53. The 1990 amendments to the Montreal Protocol on Substances that Deplete Ozone Layer, 1987 established a multilateral fund to be administered by a committee. Developing countries are not obliged to contribute to the fund.

54. UNEP Report of the Ad-hoc Working Group on Biological Diversity on the Work of its Second Session in Preparation for a Legal Instrument on Biological Diversity of the Planet. UNEP/Bio.Div.2/3 Geneva 19-23 February 1990 p.6.

55. TOLBA, MOSTAFA K. Supra note 47 p.1

56. UNEP Note by the Executive Director to the Ad-hoc Working Group of Experts on Biological Diversity UNEP/Bio Div.3/2 Geneva 9-13 July, 1990 p. 5.

57. STRONG, MAURICE F. Remarks at the beginning of the First Meeting of the Preparatory Committee for the 1992 United Nations Conference on Environment and Development (unreferenced).

58. PAGE, DIANA "Debt-for-Nature Swaps: Experience Gained Lessons Learned" (1989) 1 (No.4) International Environmental Affairs P.275.

59. ibid P.277-280

60. ibid P.280-285

60A. REILLEY, WILLIAM K. "Debt-for-Nature Swaps: The Time Has Come." (1990) 2 (No.2) International Environmental Affairs P.136.

61. ibid P. 136

62. PAGE, DIANA Loc. Cit. P.277-280

63. See GERRIT, TAMES J. "Debt-for-Nature conversion: What limits their further growth?" (1990) 2 (No.2) International Environmental Affairs p.153 in 1988, the amount of commercial debt in sub-saharan countries was estimated at 25%.

64. Funds likely to be generated by these transactions are necessary to meet conservation needs in the short-run. However, they are inadequate for long-term conservation purposes.

65. See, DURRELL, LEE The State of the Ark Researched by IUCN. The Bodley Head London, 1986 p.196-7

66. UNEP: Elements to be covered by a Global Framework convention on conservation of Biological Diversity UNEP.

67. See: U.N.G.A. Resolution 1803 (XVII)

68. UNEP Report of the Ad-hoc Working Group on the Work of Its Third Session in Preparation for a Legal Instrument on Biological Diversity of the Planet. UNEP/Bio.Div. 3/2 Geneva July, 13th 1990 P. 10.

69. ibid p. 9

70. See, UNEP Report of the Ad-hoc Working Group of Legal and Technical Experts on Biological Diversity on the Work of Its First Session. UNEP/Bio Div/WG/2/1/4/Add.1 Nairobi, February 5th 1991.

71. These phrases were frequently used by negotiators during the initial stages of the negotiation process to refer to developing and developed countries respectively. Their use is now discouraged.

72. TOLBA, MOSTAFA K. "Sustainable Industrial Development" (1989) 12 (No.3-4) Industry and Environment p. 17

73. RAGHAVAN, CHAKRAVARTHI "Recolonization GATT in its Listoical Context" (1990) 20 (No.6) Ecologist 205

74. KHOR, KOK PENG M. "The Uruguay Round and The Third World" (1990) 20 (No.6) Ecologist P.208 at 211.

75. ibid p. 210

76. ibid p. 211

77. TOLBA, MOSTAFA K. Supra Note 47 P. 1

78 (1990) 20 (No.4-5) Environmental Policy and Law p. 169 -171

79. UNEP: Report of the Governing Council on the work of its 15th Session, Nairobi 1989 p. 992.

80. UNEP: Supra Note 32 p. 55-58

81. Mr. Yusuf, Legal Officer incharge. UNCTAD (Geneva)

82. UNEP: Guidelines and Principles on Environmental Impact Assessment UNEP, Nairobi, 1984 p. 2.

83. AHAMAD, YUSUF J. Environmental Impact Assessment in Developing Countries 1984 p. 1-4

84. FAIRFAX, SALLY K. "Disaster in the Environmental Movement: The National Environmental Policy Act has wasted Environmetalists on Processing papers" (1978) 199 Science 743.

85. ibid p. 745

86. AHMED, YUSUF J.. Op. cit. p. 6

87. LEUMAN, BARRY S. "Implementation of the Clean Air Act: Should NEPA Apply to the Environmental Protection Agency?" (1973) 3 Ecology Law Quarterly 597.

88. AHMAD, YUSUF J. Op. cit. p. 6

89. HANSON, JEAN M. "Agency Decision Making Under Wisconsin Environmental Policy Act" (1977) Winsconsin Law Review p. 117.

90. Poisonous substances dispersed by tall chimneys in Britain caused acid rain in Scadinavian Countries for many years before Britain agreed to reduce emissions.

91. UNEP: Supra Note 32. p.23

92. UNEP: Note by the Executive Director UNEP/Bio. Div.3/2 Geneva 9-13 July 1990 p. 9

93. LYSTER , SIMON: International Wildlife Law: An Analysis of International Treaties Concerned With the Conservation of Wildlife. Grotius Publications, Camoridge 1985 p.

94. The 1987 amendments to the convention on Wetlands of International Importance Especially as Waterfowl Habitat, 1971 (Ramsar Convention 1971) streamlined its financial and institutional framework.

95. UNEP Elements for Possible Inclusion in a good framework Instrument on Biological Diversity UNEP/Bio.Div. 4/3. Nairobi 19-23 November, 1990 p. 20.

96. UNEP Supra Note 32. p. 32

97. ibid p. 33

98. In Kenya for example, environmental education is yet to become part of the curriculum in the entire education system.

99. See, FRAENKEL, A. AMY "The convention on Long-Range Transboundary Air Pollution: Meeting the Challenges of International Co-operation" (1989) 30 (2) Havard Journal of International Law. p. 442.

100. See, MCNEELY, JEFFREY A: Economics and Biological Diversity: Developing and using Economic Incentives to Conserve Biological Resources IUCN, NV. Gland 1988.

CHAPTER V

THE FUTURE OF BIOLOGICAL DIVERSITY

CONCLUSIONS AND RECOMMENDATIONS

e primary objective of this study has been to lay bare the egal response by the international community to the challenge osed by loss of biological diversity. Our thesis has been that concerted international regime is imperative in this regard, nd true, the international community is currently involved in he preparation of a global instrument on the conservation of iological diversity.[1]

n chapter one, we demonstrated why international efforts should e marshalled towards conserving dwindling stocks of components f biological diversity and the immediacy of action in that irection. We endeavoured to show that the international ommunity has no choice but to adopt concrete measures to stem urther loss of components of biodiversity not only for the urpose of maintaining ecological balance but for the survival nd development of humankind as a whole. In its entirety, the hapter establishes that components of the planets biological iversity are a conservation imperative.

In the second chapter, we carried out a detailed examination of existing normative and institutional structures relating to the conservation of habitats, ecosystem species and genera. Regimes relating to conservation of, habitats and ecosystems, species and

biodiversity of the marine environment were analysed. Emphasis was laid on the major conservation mechanisms and strategies and their strengths and weaknesses. Briefly, the following were our findings.

i) there is a general consensus at the international level that components of the planets biological diversity should be conserved. The consensus of opinion is that a global approach is long overdue, such approach would reflect the ecological unity of the biosphere.

ii) although no global instrument addresses conservation of components of biological diversity as its primary objective, the international community has attempted to contain the challenge posed by impoverishment of biological diversity previously. There exists over a dozen instruments on various aspects of biological diversity.

iii) the evolution of legal norms relating to conservation of components of biological diversity has for the most part been piece-meal and sectoral in character. The trend has been reacting to specific needs in specific areas at specific times and hence the proliferation of conventions and consequently the emergence of gaps in coverage.

iv) although some existing regimes have the potential to conserve components of biological diversity in their specific areas, they labour under inadequate financial and

institutional mechanisms and their potential is yet to be realized many years since they entered into force.

v) most existing conservation measures have been "stop gap" that is to say, they are measures aimed at saving species or genera and habitats threatened with death and disappearance. National parks and other protected areas have been established in many tropical countries to save wild fauna and forested areas.

vi) because existing and proposed intellectual property rights regimes are fundamentally designed to enhance protection of innovations and inventions they are ill-equiped to promote conservation of genetic resources in developing countries. The regimes will undoubtedly make acquisition of biotechnology and other environmentally sound technologies difficult and expensive for developing countries. Ultimately, the intellectual property rights regime is likely to discourage the conservation of biological diversity in developing countries.

vii) although environmental awareness has grown from strength to strength since the celebrated Stockholm Conference, 1972, and despite many shared perceptions in global environmental concerns, environmental degradation and loss of components of biological diversity in many countries continue almost unabated.

The survey in this chapter reveals that although the international community has striven to conserve components of biological diversity through, treaties, resolutions, declarations, programmes and action plans, it has failed to curb environmental degradation and loss of components of biological diversity. Minimal attempts appear to have been made to address conservation of components of biodiversity systematically, comprehensively and on a planetary scale. Although the approach need not be global, the sectoral approach has performed dismally. It is evident that inherent and functional deficiencies in existing regimes account for their poor performance.

In chapter three, we have attempted to show how existing legal mechanisms attempt to contain the challenge posed by the contamination of the biosphere by pollutants and other influences deleterious to components of biological diversity. We demonstrated that significant global and regional measures have been adopted particularly in the realm of preventing marine pollution. A comprehensive strategy on the protection of stratospheric ozone has also been adopted.

It is evident that despite these efforts, the bioshpere remains contaminated and influences harmful to the planets biological diversity appear to be on the increase. The need to revamp existing measures cannot therefore be over-emphasized.

In chapter four, we attempted to show that the interrational

community now realizes and acknowledges that existing regimes are inadequate and is picking up the loose threads. We also attempted to make a case for a new global convention on biological diversity. Most of the chapter was devoted to the nature and character that the proposed instrument on biological diversity should take. The survey is illustrative of the complexity of the issues to be reconcilled before a meaningful convention can be ready for signature. It also demonstrates how comprehensive such instrument should be.

Having looked at what the proposed convention should contain, it becomes imperative to assess its prospects as a conservation mechanism and the future of biodiversity in developing countries. With regard to scope, it would appear that the proposed instrument will be quite extensive. It covers a wide spectrum of the planets biological diversity and embodies most conservation mechanisms and strategies. It adopts the ecosystem approach and proposes a systematic and comprehensive approach through the establishment of comprehensive systems of protected and conservation areas.

To enhance long term conservation by involving local populations in the sharing of benefits, the proposed convention proposes to incorporate the integrated approach as one of its conservation strategies. This would oblige contracting parties to integrate conservation of biodiversity into their national planning and development strategies. Since this approach involves adopting

anticipatory measures, it is likely to enhance conservation in the long run.

For purposes of supporting an effective and efficient secretariat and conservation activities in individual countries, the proposed instrument proposes an elaborate financial mechanisms.[2] This is an important element, and it is hoped that in addition to the traditional methods of financing conservation, it will incorporate innovative funding mechanisms such as users fees and debt-for-nature swaps. Granted that inadequate financial resources has plagued existing regimes for many years, the necessity of a sustainable financial regime under the regime cannot therefore be over-emphasized.

Although the final formulæ of technology transfer is yet to be articulated in the proposed instrument, this is an important element in view of the importance to the south of the technology harboured by the north. That technology could play a crucial role in sound environmental management and sustainable utilization of components of biodiversity and enhance development in developing countries need no belaboring.[3] Such approach would be consistent with that adopted by the 1990 amendment to the Montreal Protocol on substances that deplete Ozone Layer, 1987.[4] The practical aspects of technology transfer from developed to developing countries remain a contentious issue.

The instrument proposes anticipatory mechanisms, including the

generally accepted environmental impact assessment. This is the epitome of the realization by the international community that development projects, programmes and technology could affect biodiversity detrimentally. The environmental impact assessment mechanism has become a predominant tool in recent years for anticipating and pre-empting environmentally injurious consequences of the development process. It ensures that ecological costs and other adverse effects are taken into account in the decision making process.[5] Undeniably, the mechanism could play an important role in the conservation of biological diversity.

In addition, given that the proposed instrument aims not at replacing existing regimes, but strengthening their operation by filling in gaps in coverage, co-ordination and provision of financial assistance to secretariats and programmes with similar conservation objectives, it would enhance their utility thus boosting global conservation efforts.

To counter institutional inadequacy which characterise existing regimes, the instrument proposes a strong and effective institutional framework. Emphasis is now being laid on efficient international and national institutional structures to facilitate conservation. Most important, the instrument proposes the reporting system. This is an important device for guaging compliance and commitment by contracting parties. We are convinced that a strong, effective and efficient institutional

framework could play a central role in enhancing conservation of biological diversity.

Unlike most existing instruments on conservation, the proposed instruments, it would appear will place equal emphasis on both in-situ and ex-situ conservation measures. Proposed provisions articulate the obligations concomitant thereto.[6] This approach is highly commendable in view of the exceedingly important role that ex-situ conservation measures play and could play global conservation. But above all, this approach is consistent with the need to conserve as much of the planets biological diversity as possible.

Other fundamental aspects that could play a significant role in conservation and have been earmarked for inclusion in the proposed instrument include, education and public awareness and research and training. Raising awareness and encouraging participation at the local level is critical to implementation of conservation instruments.

On the whole, the proposed instrument sets out the basic obligations of contracting parties and major operational themes. Since the causes of biodiversity impoverishment are essentially anthropogenic, the instrument proposes to commit contracting parties to, regulate human activities, adopt anticipatory and corrective mechanisms and promote activities compatible with conservation of biological diversity.

The overall focus of the proposed instrument is to enhance sustainable utilization of components of biological diversity for sound environmental managment and sustainable development.

Ultimately, the effectiveness of the convention when it is finally adopted and comes into force will depend on the commitment of both developed and developing countries. By reason of technological backwardness, inadequate financial resources and expertise, and the gullibility of political leaders, developing countries are unlikely to use access to biodiversity by the north as a bargaining chip effectively. But even if they did so successfully, the amount likely to be obtained is relatively small compared to the amount needed to conserve and maintain biodiversity in these countries. In a nutshell, therefore, an important test of the proposed instrument is to create a sustainable financial mechanism. We are of the view that taxes on users and beneficiaries of genetic materials, debt-for-nature swaps and contributions among others may not provide adequate funding. Additional funds from the north could supplement these sources. Thus, unless developed countries facilitate transfer of technology to developing countries, provide technical assistance and increase investment in conservation, little it appears will have been done to enhance conservation and sustainable utilization of components of biological diversity.

On their part, developing countries will be obliged to adopt appropriate legal and administrative arrangements to demonstrate

commitment to biodiversity conservation. Such national frameworks should be designed to promote implementation of the convention when it finally comes into force. Biologists, environmentalists and economic planners should therefore act in unison to facilitate the establishment and management of protected and conservation areas. and enhance ex-situ conservation.

It must be emphasized that although environmental degradation and loss of biological diversity are yet to be perceived as threats to national security compared to threats of millitary invasion, they are in fact threats to global security. Loss of components of biological diversity has reached a crisis level and everybody including political leaders must realize that the planet is gradually but effectively loosing its capacity to sustain life. The paradox is that political leaders of states threatened with millitary invasion rant about not ceding an inch of their soil while allowing thousands of tonnes of soil to be washed away through deforestation and other inappropriate methods of natural resource exploitation. Developing countries should therefore support the proposed instrument whole heartedly.

In addition, the following measures could be taken to make the proposed instrument a more effective biodiversity conservation device:

i) Provide for a reciprocally operating financial mechanism where funds would be suspended should a contracting party fail to fulfill her obligations under the convention. Such a

procedure would place the burden of proving that a party has met its obligations under the convention on the party itself. We think that this would boost commitment, improve the reporting system by acting as a censoring mechanism and ultimately enhance implementation of the convention.

ii) Provide detailed guidelines on the establishment and management of protected and conservation areas but leave the parties to determine national priorities on the basis of local circumstances. Allowing for such flexibility is crucial in winning support for the instrument and facilitating implementation.

iii) The fund established by the convention should be administered by the world bank.

iv) Provide for an elaborate system of reviewing and monitoring implementation of the convention. The convention should provide for the establishment of a body to oversee implementation of the convention between the conference of party meetings. Such a body would oversee the day-to-day implementation of the convention.

v) Contracting parties should be encouraged to adopt legal and administrative structures which promote land tenure and land use systems, energy, population and settlement policies compatible with the conservation of components of biological

diversity.

vi) Provide for the use of financial and economic incentives at all levels to enhance conservation. Given that incentives have contributed to the depletion of forested areas in many countries, it is submitted that well designed economic and financial incentives could have the opposite effect.[7] Such system is reported to be working well in Brazil.

vii) Developing countries should be obliged to promote awareness rising at all levels. They should be encouraged to incorporate conservation education into their national education curriculums. To enable them fulfill this objective, they should be accorded technical and financial support.

Since conservation of biological diversity demands the adoption of both short-term and long-term measures, it is critical that the proposed instrument address both.

In the short-run what is needed are specific-on-the ground action to preserve and manage components of biological diversity. Since the most effective way to protect ecosystems, habitats and their constituent species is to protect and manage major areas containing them so that they do not deteriorate unnaturally or are not unduly interfered with by outside factors including exploitation by man, it is imperative to establish more protected

and conservation areas and train managers to enhance their sustainable utilization. Indeed, it is submitted that except under catastrophic constraints of impending extinction of species or habitats, the best conservation strategy is to conserve whole ecosystems of sufficient size and habitat diversity to maintain representative trophic structures and critical species.

Over the long-run global conservation of biological diversity will depend on economic development and sustainable use of natural resources, ecosystems and habitats containing them.

The proposed legal instrument on biological diversity should address both short and long-term conservation measures. However, it must be emphasized that although the instrument proposes to address biodiversity systematically and comprehensively, it cannot for a moment pretend to be the panacea to loss of the planets biological diversity. No single conservation convention can conserve all components of biological diversity. Put differently, there can be no silver bullet to the challenge of conserving global biodiversity. But it cannot be doubted that the convention will be a critical addition to the global environmental conservation efforts menu. Heightened publication and the resultant conservation euphoria is likely to lead to the adoption of conservation measures and the establishment of more conservation and protected areas and thereby boost commitment towards conservation.

Conservation of Biological Diversity: An Overall Approach

Unquestionably, no amount of tinkering with legal norms is sufficient to conserve components of biological diversity particularly in developing countries unless fundamental causes of the present unenviable state of this global resource are addressed. Neither will high and nice sounding phrases such as sustainable utilization or sustainable development[8] advance the cause of biodiversity conservation. In order to achieve the very important goal of conserving the planets biological diversity, it is imperative that any measures taken be an integral part of a comprehensive environmental conservation strategy. Conservation of biological diversity should therefore be perceived as an important component of the overall conservation strategy.

Economic Development

One of the most important results of the Stockholm Conference, 1972, was the recognition that the principal threat to biological diversity and environmental degradation in developing countries in particular derive from poverty, and under-development. Much of the environmental degradation being witnessed today is the product of soil erosion, deforestation, desertification and loss of genetic strains on account of the widening and desperate search by rural communities for food and fuel. They simply have nowhere to go but deeper into forested areas, higher up slopes and further into grazing lands and pushing cultivation into even more fragile soils.[9]

Fortunately, the international community recognizes that genuine or sustainable development is possible without ration exploitation of natural resources and sound environment management. There is now a general consensus that a glob attack on environmental challenges cannot be divorced from attack on global poverty. This is critical because, "the majo problem facing the south and the world is the persistence poverty."[10] The imbalance of present world economic conditio make it extremely difficult to bring about sustained improveme in the worlds environmental situation. Poverty, over-populati and the resultant pressure on land drive farmers to over-explo their small holdings and look to the forests for new land.

Logically, since mass poverty lie at the root of environment degradation and loss of components of biological diversity developing countries, its elimination and assuring access people to biological resources appear to be the sine qua non sustainable envircnmental improvement.

Thus, accelerated and balanced global development and lasti improvement in the planets environment require improved wor economic conditions. It is submitted that it is only eradicati or reducing poverty and undevelopment that work to conserv biological diversity can really be secure. Otherwise,

> "How can we speak to those who live in villages and slums about keeping the oceans, rivers and air cle

> when their own lives are contaminated at the source? The environment cannot be improved in conditions of poverty".[11]

Implicit in the above passage, is, the underlying reality that environmental improvement will ultimately depend on breaking the human poverty cycle by dismantling barriers of development and devising ways and means to meet peoples basic needs and greed without excessive destruction or disruption of natural systems. This assertion finds support in the words of a learned writer who posits that,

> "Hardly any other factor would help developing world species and habitats more and probably nothing less will adequately work than speedy economic modernization of the third world within the framework of economic development."[12]

The essential argument is that unless and until economic development is broad enough to ensure minimum living standards for all people, biological resources will continue to be over-exploited and because this occurs and continue to take place unevenly across the globe, some habitats and ecosystems will be irreparably damaged and their component species and genera lost.

Incontrovertibly therefore, the challenge facing the international community is to institute an economic order to eradicate or appreciably reduce poverty, underdevelopment and

greed. Because loss of biological diversity is part of the north-south dialogue and conservation impinges on international economic order, a new economic order appear to be a principal approach in addressing the challenge of biodiversity conservation.[13]

What therefore appear necessary is inter alia the development of a new ethic where conservation and care for the planets biological resources replace the current extravagant consumerism, wasteful and destructive use which characterises exploitation of biological resources. A new economic order through which economic activity is geared towards enabling developing countries meet basic needs of their people would certainly enhance conservation of biological diversity. As has been eloquently put,

> "If people are to be interested in environmental protection, it is essential that their basic needs be satisfied."[14]

What emerges is that the best way to conserve the planets biological diversity is therefore not reprimanding those who cause environmental degradation and extinction of species, but to understand why they do so. Only then can substantive action to eradicate or minimise the causes be taken. In a nutshell, if components of biological diversity are to be effectively conserved, the international community has no choice but to address widespread poverty and underdevelopment in developing countries.

Technology

Developing countries have special requirements in so far as industrial technology is concerned. It is almost the sine qua non to their rapid development. In addition, it cannot be doubted that sophisticated technology is necessary in the development process. Environmentally benign technology on the other hand could lessen the daily burden of rural communities, decrease deforestation and erosion, help in the protection of the ozone layer and reduce the build up of carbon dioxide and other trace gases in the atmosphere.[15] Does this mean that massive application of technology in developing countries would enhance conservation of biological diversity? An affirmative answer to this question depends on the type of technology, mode of application and the presence of other facilitating elements.

Transfer of technology to developing countries has its own limitations. In the first instance, since most of the worlds technology is developed and applied by trans-national corporations in developed countries in response to market demands, it is only coincidental that they correspond to technological needs of developing countries. Studies have shown that developing countries have imported inappropriate technologies.

Secondly, an inherent impendment to technology transfer is the nature of the technology itself. Since technology does not exist

in isolation, the receptive character of the recipient culture or environment is critical for adaptation. A technological infrastructure composed of literate, careful demanding, skilled and innovative technicians is indispensable.[16] This infrastructure facilitates the development of a technology culture.

But when all is said and done, developing countries require appropriate technology, that is to say, technology which serves the quantitative as well as the qualitative needs of the majority of the people. Such technology could play an important role in enhancing sound environmental managment and sustainable development. However, technology alone is not enough. In the words of Tolba,

> "...let us make no mistakes technology alone will not solve our problems."[17]

All in all, technology could play a significant role in enhancing conservation and sustainable utilization of components of biological diversity in developing countries.

Ascribing Value to Species

Since biological diversity has no value under reigning philosophies,[18] environmental degradation and extinction of species are not generally perceived as economically disadvantageous. The logical conclusion of the prevailing philosophy is that destruction of valueless things is of no legal or economic consequences.

But the philosophy that species are free goods with no recognized value affects their conservation detrimentally. We are positing that, ascribing value to species and genera would promote their conservation.[19] But what needs no belaboring is that fact that species have value. Firstly, the fact that species have no recognized value does not mean that they have no value at all. To hold otherwise would be extending logic too far. Secondly, since the market value of individual species derive from certain characteristics and attributes of a species, if such species became extinct so would the attributes that make its individual members valuable. Thirdly, it is indisputable that if genes have value, so have species that contain them. Fourthly, species have value because they are an indispensable source of important scientific informaiton. Finally, tney may also have value for their part in maintaining ecological balance. It is submitted that the usefulness of species to man is their economic and ecological value and should be assessed.

What is therefore needed is a change in humanity's perception of wealth. Natural resource endowments should be included in every country's inventory of wealth. But the task of ascribing value to species is not only enormous but challenging, "finding clear values of species is only part of the challenge."[20] A number of hurdles must be surmounted before the process takes off. In the first instance, a methodology to implement the process is necessary. No such methodology exists at the present. Secondly,

since many species have no recognized value at the present, the challenge likely to face both scientists and economists is how to determine their potential value. Thirdly, there is a problem as to how the value of species likely to evolve in future would be determined. Finally, is the value of species assumed to be static? Undeniably, "many difficulties will undoubtedly arise and a considerable degree of arbitrariness will have to be accepted."[21] Hopefully, given time and experience, a workable approach could be developed.

Though expensive and tedious, ascribing value on natural patrimony is likely to reduce environmental degradation on account that,

> "knowing the value of individual plants and animals, it will be possible to calculate the value of the wildlife contained in a given area. This, together with other factors such as uniqueness, rarity or representativeness should lead to the development of a method to assess the value of natural ecosystems or protected areas."[22]

Unkown values it does appear would have to be estimated.

Increased State Commitment to Conservation Conventions

To many countries, conservation conventions constitute commitments the non-performance of which is of no economic or

legal consequence.[23] There is no motivation to seek compliance or redress.

The nascent spirit of co-operation and voluntary contribution to the protection of global environment has not taken root. Time is long overdue for international law to create a broad standard of legal liability for environmental harms to enforce the growing body of commitments to international environmental protection. Without firm principles and precedents holding states fully accountable for the effects of their activities on the environment beyond national jurisdiction, the resolution of every international environmental problem, such as contamination of a shared river basin or large scale degradation of oceans or the atmosphere gets brokered through a web of reciprocal economic advantage and political expendiency that impairs the effectiveness of resulting agreements.[24] Judge Singh, the president of the International Court of Justice lays down the challenge facing the international community with authority and eloquence in the following words,

> "May I submit that the burning question now confronting jurists in their exercise towards promoting the well being of the law concerns the prevailing political framework which displays a totally inadequate political commitment to any regime of regulation other than one based on reciprocal advantage. The result is that regulation can be translated into enforceable law. The crucial problem is to bring about a crystallization of

> international co-operation into the field of enforceable law- an aspect calling for a great deal more than efforts solely directed towards the formulation of new laws or rights without any method or machinery to enforce them."[25]

Although most conservation conventions contain provisions relating to dispute settlement, these provisions are rarely activated if at all. This is because disputes infrequently arise if economic interests of contracting parties are not directly damaged. Economic interests play a pivotal role in the implementation of conventions.

However, contracting parties must demonstrate increased commitment to existing and future conservation instruments. International and national non-governmental environmental organisations should work hand-in-hand to rally international support for conservation instruments and exert pressure on individual parties to fulfill their international obligations.

Several studies have shown that although conservation of biological diversity is increasingly being viewed in the context of land-use planning and economic development, which means the question is no longer locking up areas, establishment of conservation zones with little intervention or manipulative management remain the principal conservation strategy in the short-run.[26] The prevailing circumstances cannot permit large-

scale conservation of components of biological diversity in ways other than by establishing protected areas and rehabilitating degraded ecosystems and habitats. Undoubtedly, this is why protected areas have been established in many developing countries to protect animals and forested zones.[27] In the long-term, however, success of this mechanisms in the face of increasing human population and demand for natural resources remain uncertain.[28] But states must address both immediate and emergency requirements (endangered parks species, collections and genetic material). In addition, policy and other root causal factors should also be addressed. The dual approach is critical because as elsewhere stated, over the long term conservation of biological diversity will depend on economic development and sustainable use of biological resources, ecosystems and habitats containing them.

The picture which emerges is that over and above the proposed legal instrument, the international community should adopt other additional measures if components of biological diversity are to survive the present generation. Current efforts should be seen in the context of a comprehensive global environment conservation strategy.

Having considered the implications of the proposed legal instrument on biological diversity, the place of economic development and other measures necessary for a comprehensive conservation strategy, the following are our recommendations:

i) Developing countries should have access to appropriate technology in both public and private domains in developed countries. That such technology is necessary not only for promoting industrial development but sustainable utilization of components of biological diversity as well, need no belaboring. Because these technologies will inevitably be offered at exceedingly exhorbitant prices, developed countries should extend financial assistance to the south to enable it purchase them. The proposed instrument should make provision for this.

ii) In order to facilitate sustainable utilization of biological resources at the local level, states should be encouraged to devise appropriate economic and fiscal incentives to influence the behaviour of communities. Such incentives would also strengthen community based resource management activities and thereby boost rural conservation.[29] The proposed instrument should therefore encourage and promote the use of incentives by contracting parties.

iii) Although there already exists a regime geared towards eradicating depletion of stratospheric ozone, for effective conservation of the planets biological diversity, it is imperative that a comprehensive agreement designed to pre-empt the anticipated consequences of the greenhouse effect be concluded not in the too distant future.[30] Such regime would work towards reducing the build up of greenhouse gases

in the atmosphere which cause global warming.

iv) It is also recommended that developed countries increase their investment not only in cosnervation but also in other aspects of the economies of developing countries to facilitate trickling of wealth and affluence to the south. Trade liberalisation and other aspects which are likely to improve the economic stature of developing countries should also be encouraged and promoted. The proposed instrument should make provision for the additional funding by developed countries.

v) Most important, nothing should be given for nothing. Cancellation of existing and mounting debts in developing countries by the north should be made conditional upon firm commitment to environmental conservation. Creditor countries should ensure that for every debt cancelled the environment is conserved. In the long-term such practice is likely to enhance commitment to conservation in developing countries. Practice should be allowed to evolve so as to attain the status of custom.

vi) With regard to intellectual property rights, it is imperative that sustained efforts be made to ensure that such rights do not shape global breeding systems in a manner detrimental to interests of developing countries.[31] This is a complex issue because existing and proposed regimes are designed to strengthen protection of innovations and related

rights.[32] This could have the effect of sealing the monopoly by trans-national corporations in the north of technology thereby marginalizing developing countries technologically.[33] Because a uniform intellectual property rights regime would certainly be detrimental to the interests of developing countries attempts should be made to ensure that traditional breeding systems and other characteristics of developing countries are taken into consideration. Joining in the technological mainstream by developing countries hangs on a balance should the Uruguay Round of Talks of the General Agreement on Tarriffs and Trade (GATT) succeed.

Implementation of the foregoing recommedations would make the international community more responsive to environmental conservation.

We have attempted to demonstrate that the international community has adopted various legal strategies in its attempt at biodiversity conservation. The study shows that existing mechanisms are ill-equiped for purposes of enhancing conservation of biological resources on an international scale. Although the proposed instrument will most certainly adopt a comprehensive and systematic approach, we posit that fundamental issues outside the realm of legal norms should also be addressed. It is only by so doing that conservation efforts could be secure.

FOOTNOTES

1. Chances are that the convention will be ready for signature by June 1992, during the Rio de Janeiro Conference on Environment and Development.

2. Most regimes on biological diversity are characterised by inadequate financial mechanisms.

3. See: UNEP Report of the ad-hoc Working Group on the work of its second session in preparation for a legal instrument on Biological Diversity of the planet. UNEP/BIO.Div.2/3, Geneva 19-23 February, 1990 p.5

4. See: Section 10A of the Amended Protocol

5. See: BONDI,D. OGOLLA:"Water pollution Control in Africa: A comparative Legal Survey." (1989) 33 (No.2) Journal of African Law. P.149 at 153-154.

6. UNEP: Draft Convention on Biological Diversity UNEP/BIO.Div/WG.2/2/2 Nairobi, 25 February - 6 March 1991, p.29-31.

7. See: generally MCNEELY, JEFFREY A. Economics and Biological Diversity: Developing and Using Economic Incentives to Conserve Biological Resources, IUCN, Gland, 1988.

8. These terms are characteristic of the proposed legal instrument on Biological Diversity.

9. TOLBA, MOSTAFA K: Evolving Environmental Perceptions: From Stockholm to Nairobi, Butterworths, London, 1988 p. 209.

10. ibid: P.210

11. ibid: Statement by Srimati Indira Gandhi during the 1982 conference, Nairobi, p.97.

12. MYERS, NORMAN: The Sinking Ark: A new look at the problem of Disappearing Species, Pergamon, Press, Oxford, 1979, p.67

13. NTAMBIRWEKI, JOHN: "The Developing Countries in the Evolution of an International Environmental Law with Special Emphasis on the Work of the UNEP" (1991) 14. (No.4) Hastings Int. & Comparative Law Review p.905

14. TOLBA: op cit., Statement by the Finnish representative at the Nairobi Conference, 1982 p. 170

15. WRITH, DAVID A., LASHOF, DANIEL A. "Beyond Vienna and Montreal: Multilateral Agreements on Greenhouse Gases." (1990) 19 (No.6-7) Ambio P.305.

16. ELLWOOD, PETER: "Advanced Technology for Third World: Modern and Appropriate" Development Forum July 31st 1991 P.1 at 1.

17. TOLBA, MOSTAFA K: Breaking bad Habits" UNEP Information Green Paper (2) P.13

18. See: DE KLEMM CYRILL: "Conservation of Species: The Need for a New Approach" (1982) 9 Environmental Policy and Law P.117 at 122.

19. ibid P. 123

20. UNEP, WWF, IUCN The World Conservation Strategy, 1980 p.2

21. DE KLEMM: loc. cit. P.123

22. ibid P.123

23. ibid P.121

24. This appear to have been the fate of many conservation conventions.

25. See: Experts Group on Environmental Law of the World Commission on Environment and Development: Environmental Protection and Sustainable Development: Legal Principles and Recommendations. (1986 Vol.15 forwarded by N. Singh)

26. In practically all developing countries, faunal species owe their existence to protected areas wherein minimal human activity is allowed. Outside protected areas, attempts to conserve biodiversity appear minimal.

27. In Kenya for example, Gazetted forests cover less than 30% of the total land surface.

28. There is evidence in most developing countries of human encroachment into protected areas.

29. In a discussion with one Dr. J. M. Gopo of the University of Zimbabwe, the writer learnt that the Zimbabwean Government has successfully employed financial incentives to involve local populations in the conservation of wildlife.

30. See: MINTZER, M. IRVING: "A matter of Degrees: Envergy Policy and the Greenhouse Effect" (1987) 17 (No.6) Environmental Policy and Law P.247.

31. See: BARTON, J. H. "The scientific and Commercial Worlds in Genetic Resources Negotiations" Paper Presented at the Workshop on Property Rights, Biotechnology and Genetic Resources, Nairobi, Kenya. June 10-14, 1991 P.10 - 14.

32. See PENKHOR, K. M., "The Uruguay Round and the Third World" (1990) 20 (No.6) Ecologist P.208

33. See RAGHAVAN, CHAKRAVARTHI: "Recolonization: GATT in its Historical Context." (1990) 20 (No.6) Ecologist P.205

BIBLIOGRAPHY

A: BOOKS

1. ANAT, A., DHIRA R., JOHN, E., PHAITOON, I. Thailand Natural Resources Profile, Oxford University Press, London, 1988

2. ANDERSON, D. Conservation in Africa: People Policies and Practices, Cabridge University Press, Cambridge, 1987.

3. ATTENBOROUGH, D. Atlas of the Living World, H. M. and Co. Ltd, Boston, 1989.

4. BHATT, S. Environment Protection and International Law, Radient Publishers, New Delhi, 1986

5. BROOM, HEBERT A selection of legal Maxims: Classified and Illustrated, Sweet and Maxwell, London, 1939.

6. BROWNLIE, IAN Principles of Public International Law, Oxford, Clarendon Press (3rd Edition). 1979.

7. CAHN, R. An Environmental Agenda for the Future, Agenda Press, Washington D. C., 1985.

8. COSTIN, A. B., GROVES, R. H. Nature Conservation in the Pacific, IUCN and Australian National University Press, Canberra, 1973

9. DURRELL, L. State of the Ark, Researched by IUCN, Bookley Head, London, 1986.

10. DWORKIN, J. M. Environment and Development, Scope Miscellaneous Publications, Indianapolis, Indiana, 1974

11. EHRLICH, PAUL R., EHRLICH, ANNE H. Earth, Methuen Press, London, 1987.

12. EVANS, G. H. The World History of Whales and Dolphins, Christopher Helm, London, 1987

13. FITTER, ROBERT Wildlife for Man: How and Why should we Conserve our Species? Collins and Sons Ltd., London, 1965

14. FRANKEL, O. H. Genetic Resources in Plants, I.B.P. London, 197

15. FROME, M. Battle for the Wilderness, Westview Press, London, [illegible]

16. DURLEY, P. A., NEWY, W. W., KIRBY R. P., HOTSON J. G. Geography of the Biosphere: An Introduction to the Nature and Distribution and Evolution of the [illegible], Butterworths, London, 1965.

17. HARGROVES, J.L.(Eds) Law, Institutions and the Global Environment Oceana Publications, New York, 1972.

18. HUNTLEY, B. J. Biotic Diversity in Southern Africa, Oxford University Press, Cape Town, 1989.

19. JOHN, MACKINNON K., CHILD G., THUSSEL J., Managing Protected Areas in the Tropics, IUCN and UNEP 1989

20. JONES, G. E. Conservation of Ecosystems and Species, Groomhelm, London, 1987.

21. JUMA, CALESTOUS Biological Diversity and Innovation: Conserving and Utilizing Genetic Resources in Kenya, African Centre for Technology Studies (ACTS) Nairobi, 1989.

22. LEDEC, GEORGE, GOODLAND, ROBERT Wildlands: Their Protection and Management in Economic Development, World Bank, Washington D.C. 1989

23. LEONARD, H. J. Natural Resources and Economic Development in Central America: A regional Environment Profile, Transaction Books New Brunswick 1987.

24. LYSTER, SIMON International Wildlife Law, Grotius Publications, Cambridge, 1985.

25. MCCORMICK, The Global Environmental Movement, BelHaven Press, London, 1988.

26. MCNEELY, J. A. Economics and Biological Diversity: Developing and Using Economic Incentives to Conserve Biological Resources, IUCN, Gland, 1988.

27. MCNEELY, J. A., KENTON R. M. National Park, Conservation and Development: The role of Protected Areas in Sustaining Society, Smithsonian Institute Press, Washington D.C. 1984.

28. MCNEELY, J. A., KENTON, R. M., REID, V. W., MITTERMEIER, A.R., WERNER, B. T., Conserving the Worlds Biological Diversity, IUCN, WRI, WWF-US, World Bank, Conservation & International. Washington D.C., 1990.

29. NORTON, . G. Why Preserve Natural Variety? Princeton University Press, New-Jersey, 1987

30. MOORE, N. W. The Bird of Time: The Science and Politics of Nature Conservation. Cambridge University Press, London, 1988.

31. MUNRO, DAVID A.(Eds) JACOBS P. Conservation with Equity: Strategies for Sustainable Development, IUCN, Gland, 1987.

32. MYERS, N. The sinking Ark: A new look at the Problem of Disappearing Species, Pergamon Press, Oxford, 1979.

33. NORMAN, CLARK, JUMA CALESTOUS, Biotechnology for Sustainable Development: Policy Options for Developing Countries ACTS PRESS, Nairobi, 1991

34. OECD The State of Environment 1985

35. OLDFIELD, M. L. The Value of Conserving Genetic Resources. Sinauer Associates, INC. Publishers, Massachussets, 1984.

36. PASSMORE, J., Mans Responsibility for Nature Gresham Press, London, 1980.

37. PRESCOTT, ALLEN C., PRESCOTT ALLEN R. The First Resource: Wild Species in the North American Economy Yale University Press, Newhaven, 1986.

38. QUING-NAM, M. Land-based Marine Pollution International Law Development Graham and Trotman, London, 1987.

39. RAMBLER, M. R. Global Ecology towards a Science of the Biosphere Academy Press, San Diego, 1989

40. ROBERT, ALLEN Whats Wildlife Worth: Economic Contributio.. of Wild Plants and Animals to Developing Countries. An Earthscan paperwork.

41. SCHNELDER, J. World Public Order of the Environment Stevens and Sons, London, 1979.

42. TECHLAFF, L. A. International Law and the Protection of the Oceans from Pollution Praeger, New York, 1974.

43. TIMBERLAKE, L. Only one Earth Earthscan Ltd, BBC Books, London, 1987

44. TOLBA, M.K. Evolving Environmental Perceptions: From Stockholm to Nairobi. Butterworths, London, 1988.

45. UNEP State of the Environment, 1983

46. VOGT, W FAIRFIELD OSBORNE Our Plundered Planet Washington D. C., 1948

47. WALSH, DON The Law of the Sea: Issues in Ocean Resources Management Praeger Publishers, New York, 1977.

48. WARD, B., DUBOIS R. Only One Earth: The Care and Maintenance of a Small Planet. Norton New York, 1972

49. WCED Our Common Future: Report of the World Commission on Environment and Development Oxford University Press,

London, 1986.

50. WILKINSON, P. F., WYMAN M. Environmental Challenges, Allhouse Press, University of Western Ontario, 1986.

51. WILSON, E. O.(Eds) FRANCIS M. P., Biodiversity, National Academy Press Washington D.C., 1988.

52. ZISWILLER, V. Extinct and Vanishing Animals (Revised English Edition) F & P. Bunnell Transl, 1967.

B: ARTICLES

1. AMIR, S. "Environment Quality Protection through Land use Planning" (1985) 15 Environmental Policy and Law p. 56.

2. AMY, F.A. "The Convention on Long-Range Transboundary Air Pollution: Meeting the Challenges of International Co-operation" (1989) 30 (2) Harvard Journal of International Law p. 442.

3. ANAND, R. P. "Development and Environment: The case of the Developing Countries" (1980) 20 Indian Journal of International Law P. 1.

4. ARMIN,S., MILLIGAN R. "CFC Abatement: The Needs of Developing Countries." (1990) 29 (6-7) Ambio p. 312.

5. BARRY, S. N. "Implementation of the clean Air Act: should NEPA apply to the Environmental Protection Agency?" (1973) 3 Ecology Lay Quarterly. p.607.

6. BETSAY, V. "The Migratory Bird Treaty Act: Protecting Wildlife in Our National Refugees California Kesterton Reservior: A Case in Point." (1986) 26 (3) Natural Resources Journal p. 609.

7. BHATT, S. "Ecology and International Law" (1982) 22 Indian Journal of International Law p. 422.

8. BIRNIE, P. W. "International Legal Issues in the Management and Protection of the Whale: A review of four decades of Experience". (1989) 29 (4) Natural Resources Journal p.903.

9. BOEHER, C. S. "The Scientific Basis of Marine Pollution Control" (1982) 6 Marine Policy p. 2

10. BONDI, D. OGOLLA "Water Pollution Control in Africa: A Comparative Legal Survey" (1989) 33 (2) Journal of African Law P.149.

11. BONINE, J. E. "Environmental Impact Assessment Principles Developed" (1987) 17 (1) Environmental Policy and Law p. 5.

12. BURHENNE, G. G., DEKLEMM,C., FORSTERS,M., LAUSCHE,B. "Legal Implementation of the World Conservation Strategy" (1986) 16 (6) Environmental Policy and Law p. 189.

13. CALDWELL, L. K. "Concepts in Development of International Environmental Policies" (1989) 29 (4) Natural Resources Journal p. 930.

14. CAMPBELL, R. "Whale Conservation: Role of the International Whaling Commission" (1989) 3 The Pilot p. 14.

15. CARON, D. D. "Liability for Transnational Pollution arising from off-shore oil Development: A Methodological Approach" (1982-3) Ecology Law Quarterly. p.10.

16. CAVES, S."Tropical Forests: Key to the Global Climate?" (1990) 21 (3) Our Planet. p. 8.

17. CHRISTO, DOULOU, M., NACOS, G. "An Approach to Comprehensive Land Use Planning" (1990) 31 (1) Journal of Environmental Management 39.

18. COLLINS, M. CONVIS, C. "Biological Diversity: IUCN Sets its Sites" 20 (1-3) ICUN Bulletin 20.

19. CURREY, D. "Day of the Dolphin: This years meeting of the International Whaling Commission". (1990) 39 (3) Animal Quarterly 1.

20. DAMTOPOULUS, G. A."Comparison of Conservation Attitudes among fisheries in three protected Lakes in Greece". (1990) 31 (1) Journal of Environmental Management. P. 83

21. DE KLEMM,C. "Conservation of Species: The Need for a new Approach" (1982) 9 Environmental Policy and Law p.124

22. DE KLEMM, C. "Migratory Species: A Review of Existing International Instruments" (1985) 15 (3-4) Environmental Policy and Law p. 81

23. DE KLEMM, C. "The Conservation of Biological Diversity: State Obligations and Citizens Duties". (1989) 19 (2) Environmental Policy and Law p. 53

24. DE KLEMM, C. "Migratory Species in International Law" (1989) 29 (4) Natural Resources Journal p. 1017

25. DE KLEMM C. "Bern Convention: Further Accession to Convention" (1990) 20 (1-2) Environmental Policy and Law p. 25

26. EHRLICH, PAUL R. "Tomorrows World: Why Saving Biodiversity is Todays Priority" (1988) April - June World Watch p. 6.

27. FAWCETT, C. W. "Vanishing Wildlife and Federal Protective Laws" (1971) Ecology Law Quarterly p. 520

28. GANTEN, R. H."The International Oil Pollution Compensation Fund." (1984) 12 Environmental Policy and Law p. 5

29. GERRIT, J. T. "Debt-for-Nature Conversion: What limits their further growth?" (1990) 2 (2) International Environmental Affairs p. 153

30. GOBSTER, P. H., "The Dimension of Aesthetic Preference: A Quantative Analysis" (1989) 29 (1) Natural Resources

Journal p. 980

31. GREGORY, R., MENDELSOLM, R., MOORE T. "Measuring the benefits of Endangered Species Preservation from Research to Policy". (1989) 29 (4) Natural Resources Journal p. 903

32. HAHN, R. W., RICHARD, K. R. "The Internationalization of Environmental Regulation" (1989) 30 (2) Havard Journal of International Law p.421

33. HAMSON, J. M. "Agency Decision Making Under Winsconsin Environmental Policy Act" (1977) Winconsin Law Review p. 117

34. HANDL, G. "State Liability for Accidental Transnational Environmental Damage by Private Persons". (1980) 74 American Journal of International Law p. 525

35. HARRIS, A. F., COGGINS G. C. "The Greening of American Law? The Recent Evolution of Federal Law for Preserving Floral Diversity" (1987) 27 (2) Natural Resources Journal p. 247

36. HEMMINGS, A.D. "Antarctica: The Earths Fragile Alarm Bell" (1990) 2 (3) Our Planet p. 4

37. HOFFMAN, J.S. "Replacing CFCs: The Search for Alternatives" (1990) 19 (6-7) Ambio p. 29.

38. HOLT, S. "Lets All Go Whaling" (1985) 15 (3) The Ecologist p. 249

39. IMO "Special Areas in the Sea: Treaty and Legislative Practise" (1986) 16 (6) Environmental Policy and Law p. 179

40. IUCN "IUCN and the Whale" 15 (4-6) IUCN Bulletin p. 37

41. JAIN, I. C. "Legal Control of Marine Pollution" (1971) 13 Indian Journal of International Law p. 411

42. JAMES, J. "The Management of Highly Migratory Species: Some Important Concepts." (1977) Marine Policy p.275

43. JIANMING,JIAN "Protecting Biological Resources to Sustain Human Progress". (1987) 16 (5) Ambio p. 262

44. JOHNSON, H. N. "IMCO: The First Four Years (1959-1962) (1963) 12 International Comparative Law Quarterly p. 31

45. KENNAN, G. "To prevent a World Wasteland" (1970) 48 Foreign Affairs p. 401

46. KUEFNER, E. A. "South East Alaska Council Inc. V. Watson and the future of the Alaska National Interest Lands

Conservation Act". (1984) 12 (1) Ecology Law Quarterly p. 149

47. KUEHN, R. R. "The Coastal Barrier Resources Act and the Expenditures Limitation Approach to Natural Resource Conservation Ware of the future or Island unto belt" (1983-4) Ecology Law Quarterly p. 583

48. LESTER, A. P."River Pollution in International Law" (1963) 57 American Journal of International Law p. 828

49. LUMSDAINE, J. A. "Ocean-Duming Regulations: An overview" (1975) 5 Ecology Law Quarterly p. 753

50. LYSTER, S. "The Convention on the Conservation of Migratory Species of Wild Animals" (The Bonn Convention) (1989) 29 (4) Natural Resources Journal p. 979

51. MAXINE, M. "Lives and Deaths of the Great Whales" (1977) 3 Environmental Policy and Law p. 114

52. MCNEELY,J. A. "How to pay for conserving Biological Diversity" (1989) 1 (4) Ambio p. 308

53. MEEKER, J. W. "The comedy of Survival" (1973) The Ecologist p. 21

54. MEJSTRICK, V. "In-situ Conservation of Genetic Resources of Fungi Species" (1988) 26 (1) Journal of Environmental Management p. 65

55. MCONIGLE, M. R. "The Economizing of Ecology: Why big rare Whales still die" (1980-1) 9 Ecology Law Quarterly p. 120

56. MOLINA, M.J., ROWLAND, F. S. "Stratospheric Sink for Chlorofluoromethane Chlorine Atom Catalyzed Destruction of Ozone" (1974) 249 Nature p. 810

57. MINTZER, M. IRVING "A matter of Degrees: Energy Policy and the Greenhouse Effect" (1987) 17 (6) Environmental Policy and Law p. 247

58. MOSS, C. "CITES 1989: A personal view" (1990) 13 (1) Journal of East Africa Wildlife Society p. 8

59. MOPRIS, M. G. "Sampling" (1990) 27 (2) Journal of Applied Ecology p. 367

60. NANDA, P. N., RISS K. W. "The Public Trust Doctrine: A Viable Approach to International Environmental Protection" (1975) 5 Ecology Law Quarterly p. 10

61. NANDAN, S. "A Constitution of the Ocean: The U.N. Law of the Sea Convention" (1989) 1 Marine Policy p. 1

62. NASA "Present State of knowledge of the upper Atmosphere, 1988: An Assessment Report: NASA Ozone Trends panel" (1989) 94 Journal of Geophysical Research p. 11181 and 16437.

63. NAVID, D."The International Law of Migratory Species ('The Ramsar Convention')" (1989) 29 (4) Natural Resources Journal p. 980

64. NJUGUNA, S. "CITES 1989: A Botanists view" (1990) 13 (1) Journal of East African Wildlife Society p. 15

65. NTAMBIRWEKI, J. "Developing Countries in the Evolution of an International Environmental Law with particular emphasis on the Work of UNEP". (1991) 14 (4) Hastings International and Comparative Review p. 905

66. OKIDI, C. O. "Review of Recent Developments Regarding the Rule of Extra-Territorial Jurisdiction with focus on the control of Marine Polloution." (1976) 12 East Africa Law Journal p. 189

67. OKOTH, O. A. "The legal framework for plant protection" (1989) 19 (2) Environmental Policy and Law p. 59

68. OSLAYTER, R."The Origin and Evolution of the World Heritage Convention" (1983) 12 (3-4) Ambio p. 138

69. OSTERWOLDT, R. "Implementation and Enforcement: Issues of Migratory Species: Two Case studies, waterfowl in North America and Seals in Europe" (1989) 29 (4) Natural Resources Journal p. 1017

70. PAGE, D. "Debt-for-Nature Swaps: Experience Gained" (1989) 1 (4) International Environmental Affairs p. 275

71. PENGKHOR, K. M. "The Uruguay Round and the Third World" (1990) 20 (6) Ecologist p. 208

72. RAGHAVAN, C. "Recolonization: GATT in its historical context." (1990) 20 (6) Ecologist p. 205

73. RAHMATULLA, K. "Marine Pollution and International Legal Controls" (1973) 13 Indian Journal of International Law p. 389

74. RAMAKRISHNAN, K. "UNEP: An Assessment of its Impact". (1984) 24 Indian Journal of International Law p. 346.

75. RAMAKRISHNAN, K. "Environmental Concerns and the New law of the Sea" (1985) 16 (1) Journal of Maritime Law and Commerce p. 1

76. RAVEP, P."The politics of Conserving Biological Diversity". (1990) 40 (10) BioScience p. 769

77. REILLY, K. W. "Debt-for-Nature Swaps: The Time has come". (1990) 2 (2) International Environmental Affairs p. 136.

78. RICHARDSON, B. J."A study of Australlian Practice Pursuant to the World Heritage Convention" (1990) 20 (4-5) Environmental Policy and Law p. 143

79. SALLY, K. F. "Disaster in the Environmental Movement" (1978) 199 Science p. 743

80. SCAFF, J.E. "The International Management of Whales, Dolphins and Popoise: An Interdisciplinary Approach" (1977) 6 Ecology Law Quarterly p. 326

81. SCHACHTER, O., SEWER, D. "Marine Pollution and Remedies" (1971) 65 American Journal of International Law p. 84

82. SHAPIRO, SIDMEY A. "Biotechnology and the Design of Regulation (1990) 17 (1) Ecology Law Quarterly p. 1

83. SHERWOOD, R. "Stratospheric Ozone Depletion by Chlorofluorocarbons" (1990) 19 (6-7) Ambio p. 281

84. SIEDEL, S. R., BLANK, D. P. "The Montreal Protocol: Pollution Prevention on a Global Scale" (1990) 19 (6-7) Ambio p. 301

85. SONJA, A.,BOEHMER, C."Emerging International Principles of Environmental Protection and their Impact on Britain" (1990) 10 (2) Environmentalist p. 95

86. SZE, N.D., RODRIGUEZ ,J.M.,KO, M.K.W., TUNG, K. K. "Are Antarctic Ozone Variations a Manifestation of Dynamics of Chemistry?" (1986) 333 Nature p. 811

87. THORSELL, J."World Heritage Forests" 20 (1-3) IUCN Bulletin p. 20

88. THORNTON, A. "The Ivory Trial" (1989) Greenpeace p. 8

89. TOLBA, M. K. "Sustainable Industrial Development" (1989) 12 (3-4) Industry and Environment p. 12

90. TOLBA, M.K."Our Biological Heritage Under siege" (1989) 39 (10) BioScience p. 726

91. UNEP "Pollution from Land-based Sources" (1983) (11) Environmental Policy and Law p. 88

92. UNGA "The question of Antarctica" (1985) 14 Environmental Policy and Law p. 2

93. VALENTYNE, J. R. "The person-planet Connection in Environmental Education" (1990) 13 (1) Environmental Awareness p. 3

94. VEIT, KOESTER "From Stockholm to Brundtland" (1990) 20 (1-2) Environmental Policy and Law p. 14

95. VERSTEEG, H. "The Protection of Endangered Species: A Canadian Perspective" (1984) 11 (3) Ecology Law Quarterly p. 267

96. WEIS, EDITH B. "The Planetary Trust: Conservation and Intergenerational Equity" (1984) 12 (1) Ecology Law Quarterly p. 495

97. WELLS, S. "Coral Reefs and the Ramsar Convention" (1980) 15 (4-6) IUCN Bulletin p. 56

98. WRITH, D. A., "Beyond Vienna and Montreal: Multilateral Agreements on Greenhouse Gases" (1990) 19 (6-7) Ambio. p. 305

99. ZEPPETELLO, M.A. "National and International Regulation of Ocean Dumping: The Mandate to Terminate Marine disposal of Contaminated Sewege Sludge" (1985) 12 (3) Ecology Law Quarterly p. 619

100. "Ramsar: The Painless Convention" (1975) 1 Environmental Policy and Law p. 1

101. "Ramsar Convention: Progress Achieved" (1987) 17 (5) Environmental Policy and Law p. 179

[illegible]. "Ramsar Convention: Third Meeting of the Conference of the Contracting Parties" (1987) 17 (5) Environmental Policy and Law p. 201

103. "Montreal protocol: Phase out of CFCs Acnieved" (1990) 20 (4-5) Environmental Policy and Law p. 134

104. "Ramsar: Growing International Recognition (1990) 20 (4-5) Environmental Policy and Law p. 137

OFFICIAL DOCUMENTS AND PUBLICATIONS

1. FAO International Undertaking on Plant Genetic Resources, 1983.

2. FAO Introductory Notes to Draft Articles for an International Convention on Biological Diversity.

3. FAO Interpretation of the International Undertaking on Plant Genetic Resources, 1989.

4. IUCN Draft Articles for inclusion in a proposed convention on the conservation of Biological Diversity and for the establishment of a Fund for that purpose, 1989.

5. IUCN Explanatory Notes to Draft Articles prepared by IUCN for inclusion in a proposed convention on the conservation of Biological Diversity.

6. IUCN, UNEP, WRI, Global Strategy for conserving Biological Diversity.

7. IUCN, UNEP, World Charter for Nature, 1982.

8. IUCN, UNEP, WWF, World Conservation Strategy, 1980.

9. UNEP Rationalization of International Convention on Biological Diversity: Note by the Executive Director. Doc/UNEP/BIO. DIV.1/2 Geneva, 3rd October, 1988.

10. UNEP Report of the Ad-hoc Working Group of Experts to the Executive Director of UNEP on Governing Council Decision 14/26. Doc/UNEP/BIO.Div.1/inf.1 Geneva, 16-18 November, 1988.

11. UNEP Ad-hoc Working Group of Experts in preparation for a legal Instrument on Biological Diversity of the planet. UNEP/BIO Div.WG/2/2 Geneva, December 21st, 1989.

12. UNEP Informal Consultations on Financial Mechanisms.

13. UNEP Report of the Ad-hoc Working Group on the work of its second session in preparation for a Legal Instrument on Biological Diversity of the Planet. Doc/UNEP/BIO. Div. WG/2/3 Geneva, 19-23 Feb, 1990.

14. UNEP Framework Legal Instrument on Biological Diversity: An Analysis of Possible Financial Mechanisms. Doc/UNEP/BIO.Div.3/5.

15. UNEP Biotechnology: Concepts and Issues for consideration of a Framework Legal Instrument for the Conservation of Biological Diversity: Executive Summary Doc/UNEP/BIO.Div.3/7. Nairobi 19-23 November, 1990.

16. UNEP Ad-hoc Working Group of Experts on Biological Diversity: Note by the Executive Director. Doc/UNEP/BIO.Div/3/2 Geneva, 19-13 July, 1990.

17. UNEP Biological Diversity: Global Conservation Needs and costs. Doc/UNEP/BIO Div. 3/3 June 12th, 1990.

18. UNEP Current, Multilateral and National Financial support for biological Diversity Conservation. Doc/UNEP/BIO. Div.3/4, June 12th, 1990.

19. UNEP Ongoing Discussions on Intellectual Property Rights in Uruguay Round of GATT Negotiations. Doc/UNEP/BIO.Div.3/5, Geneva 9-13th July, 1990.

20. UNEP Relationship Between Intellectual Property Rights and Access to Genetic Resources and Biotechnology Doc/UNEP/BIO.Div.3/6 June 20th, 1991.

21. UNEP Report of the Ad-hoc Working Group on the work of its Third Session in preparation for a legal instrument on Biological Diversity of the planet. Doc/UNEP/BIO.DIV3/12 13th July, 1990.

22. UNEP Global Conservation: Needs and Costs Doc/UNEP/BIO.Div.WG/3/inf.1

23. UNEP Ad-hoc Working Group of Experts on Biological Diversity Doc/UNEP/BIO.DIV. 3/inf.2 June 12th, 1990.

24. UNEP Biological Diversity Doc/UNEP/BIO.DIV.3/inf.3, May23rd, 1990.

25. UNEP Biological Diversity Doc/UNEP/BIO.DIV.3/inf. 4, June 18th, 1990.

26. UNEP Draft Note of the UNEP Secretariat Concerning the Preparation of an International Legal Instrument on the Biological Diversity of the Planet. Doc/UNEP/BIO.DIV.1/Inf.5, September 14th, 1989.

27. UNEP Relevant Existing Legal Instruments, Programmes and Action Plans on Biological Diversity Doc/UNEP/BIO.DIV. WG/3 Inf.6, June 12th 1990.

28. UNEP Outcome of the Informal Meeting of Secretariat of International Conventions Relating to Biological Diversity Doc/UNEP/BIO. DIV. Geneva, 14-15 December, 1989.

29 UNEP Proceedings of the Ad-hoc Working Group on the Work of its First Session Doc/UNEP/BIO.DIV 1/inf 2. Geneva, November 13th, 1989.

30. UNEP Elements for Possible Inclusion in a Global Framework Legal Instrument on Biological Diversity

Doc/UNEP/BIO.DIV/WG/2/1/3 Nairobi, September 24th, 1990.

31. UNEP Bilateral and Multilateral Funding Mechanisms Initiatives Currently under Consideration in the field of Biological Diversity. UNEP/BIO. DIV. 3/10 Geneva June 20th, 1990.

32. UNEP Report of the Ad-hoc Working Group of Legal and Technical Experts on Biological Diversity on the Work of the First Session Doc/UNEP/BIO.DIV.WG/2/1/4 Nairobi, November 28th, 1990.

33. UNEP Relationship Between the planned Legal Instrument on Biological Diversity and Existing Instruments, Agreements and Action Plans on Biological Diversity. Doc/UNEP/BIO. DIV. 3/9

34. UNEP Ongoing Discussions on Intellectual Property Rights in UPOV, WIPO and GATT as they relate to Access to Genetic Resources Doc/UNEP/BIO. DIV 3/11 Geneva, June 29th, 1990.

35. UNEP Relationship Between Intellectual Property Rights and Access to Genetic Resources and Biotechnology Doc/UNEP/BIO. DIV 3/inf. 4 Geneva, 9-13 July, 1990.

36. UNEP Report of the Ad-hoc Working Group of Legal and Technical Experts on Biological Diversity on the Work of its First Session. Doc/UNEP/BIODIV./WG/2/1/4 ADD I Nairobi, February, 5th 1991.

37. UNEP Draft Convention on Biological Diversity Doc/UNEP.BIO.DIV/WG.2/2/2 Nairobi, January 22nd, 1991.

38. UNEP Excerpt from the Note by the Executive Director to the Third Session of the Ad-hoc Working Group of Experts on Biological Diversity, Geneva 9-13 July 1990 and from the Report of the Ad-hoc Working Group of Experts on Biological Diversity, Third Session, Geneva 9-13 July, 1990 Doc/UNEP/BIO.DIV./WG.2.Inf.2 Nairobi, March 1st, 1991.

39. UNEP Revised Draft Convention on Biological Diversity Doc/UNEP/BIO.DIV./WG/2/3/3 April 3rd, 1991.

40. UNEP Exerpt from the 1991 state of the Environment Report: Chapter III: Biological Diversity Report of the Executive Director Doc/UNEP/BIO.DIV./WG/2/2/inf.1

41. UNEP Explanations of the terms included in the elements for Possible inclusion in a global framework legal instrument on BiologicalDiversity Doc/UNEP/BIO. DIV./WG/2/1/CRP 2 Nairobi 19-23 November, 1990.