British Journal of Environmental Sciences
Vol.5, No.1, pp.1-17, February 2017
Published by European Centre for Research Training and Development UK (www.eajournals.org)

Approaching Twenty Five Years of the Convention on Biological Diversity: A Retrospective and Plea for Reinvigoration

R.N. SHUKLA
School of Environmental Biology, APS University, REWA (M.P.) 486003

NALINI MISHRA
Dept. Of Chemistry
Govt. M.H. College of Home Science & Sciences for Women, Jabalpur (M.P.) 482001

RN SHUKLA,
a-101, ROHAN Lehar, Baner Pune – 411045

ABSTRACT: *The convention on Biological Diversity (CBD) was agreed upon in UN conference on Environment and Development (Earth Summit) at Rio de Janeiro, Brazil in 1992, as a response to the alarming and accelerating rate of extinction of world's species and ecosystems. This convention had acquired ratification from approximately 197 parties. In pursuance to the CBD INDIA has enacted the biological Diversity Act in 2002 (took 10 years), and Biological Diversity Rules 2014, and formed Biological Diversity Committees.This review paper is an attempt to retrospect the achievements sought, the problems encountered in the implementation and the future course of actions required to be undertaken to meet the goals that originally motivated its creation.*

KEYWORDS: Biodiversity, Ecosystem services, CBD

INTRODUCTION

(1) Perception of Biodiversity and Ecosystem services:

The twenty fifth anniversary of the convention of biological diversity (due in 2017) is an opportunity to review what has been learned and accomplished and what more has to be done. The most unique component of the Earth is the existence of life and the most extraordinary feature of life is the diversity. Biodiversity is not only the beauty of life and nature, but also very basis of living beings including human on the Earth. More than 7 billion people inhabit the Earth along with the varieties of plants, animals, protists and fungi (Cardinale et al, 2012). Wilcox (1984) defined biodiversity as the varied life forms, the ecological roles they play and the genetic diversity they contain. Potvin and Gotelli (2008) referred diversity at many levels from genes of landscapes and including diversity of human culture and practices. Biodiversity as per the convention on Biological diversity (Earth Summit 1992) means the variability among living organisms from all sources including inter-alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and ecosystems. Biodiversity is also at the centre of many economic activities, including those related to agriculture, forestry, cultural uniqueness and diversity and tourism etc. in essence providing ecosystem services.

ISSN 2055-0219(Print), ISSN 2055-0227(online)

The species may not always be the best ecological unit for measurements of diversity, as the variability in life history stages (for example, a caterpillar and a butterfly of the same species have more different roles in the community), stratification patterns, activity patterns, food web patterns, reproductive patterns, social patterns, etc result in unique dimensions. (Pielou 1966, Huston 1979 Ulanowicz 1997, Odum and Barrett 2004).

A healthy ecosystem, emerges from a particular configuration of interacting biotic and abiotic components capable of performing variable ecosystem functions (Tansley 1935, Machlis et al, 1997, Force and Machlis 1997, Odum and Barrett 2004). The ecosystem functions are ecological processes that control the fluxes of energy, nutrients and organic matter at multiple places and times require higher level of biodiversity. (Daily 1997, Costanza et al, 1997, DeGroot et al, 2002). Biodiversity is both the cause of ecosystem functioning and response to changing conditions. (Hopper et al, 2005). The importance of biodiversity and ecosystem is reflected in many sustainable Development Goals (SDGs) and targets.

Ecosystem services are the conditions and process through which natural ecosystem provide quantum of benefits (directly/indirectly) to all organisms more particularly to human beings (Pimental 1980, De Groot 1987, Dally 1997, Stern 2006, Boyd and Banzhaf 2007, De Groot et al, 2010, Braat and De Groot 2012, Swanson 2013, Hudson et al, 2014).The complex interactions between structure, processes and services become further complicated by the fact that ecosystems are not linear phenomenon, but rather systems with feedbacks, time lag and nested interactions (Limburg et al, 2002).Different stackholders perceive different benefits from same ecosystem services, they can at times be conflicting (Turner 2001, Hein et al, 2006). The significance of the concept has been highlighted after the publication of Millennium Ecosystem Assessment (MA2005), involving over 1300 scientists from 95 countries as authors. The assessment started in 2001 at the initiative of the UN Secretary General Kofi Annan. One of the key findings of MA (2005) had been that globally 15 of 24 ecosystem services investigated, reached to a state of decline and the trend had continued to accelerate impacting negatively the future human welfare.

There is a long list of ecosystem services, but several efforts to classify services proved futile. (Costanza et al, 1997, DeGroot et al, 2002, MA 2005 b, Wallace 2007, Money 2010,In Box – A an improved description of the services is presented. A further revision can always be made) few significant reasons for the inability to classify being-

i. The MA classification dividing ecosystem services into supporting, provisioning and cultural services do not fit for all purposes such as ecological accounting and landscape management (Boyd and Banzhof 2007, Wallace 2007).
ii. There happens to be limited data on most of ecosystem services.
iii. Not only themethods of assessing conditions vary among assessments so also the temporal and spatial variability between which tends have to be assessed.
iv. Lack of historical data in the study areas with which to assess the conditions and trends of ecosystem services.
v. Ecosystem services are dynamic i.e. cannot be stock piled. Society has little control over the rate at which they are generated. (Fisher et al, 2008, Farley and Costanza 2010).
vi. Discrete ecosystems can deliver several ecosystem services jointly and provide multiple benefits for human welfare.

ISSN 2055-0219(Print), ISSN 2055-0227(online)

vii. Ecosystem services are interdependent (Heal et al, 2001). The trade off among ecosystem services occur temporarily or long term and may have far reaching influences, (Camron 2002).

Box – B includes a comprehensive list of drivers which have direct impact on biodiversity, profiles and ecosystem services. It is to be realized that the negative impacts on any one or few of these, change the sustenance and viability of natural system.

Magnitude of Biodiversity

No one has yet been able to catalogue the species in any sizable areas, what to claim the total biodiversity in a successional and constant way. The lack of historical data for population size is even of greater concern. (Ceballo and Ehrilich 2002).Simple species lists (for species inventories and associated measures such as species richness and diversity indices) are in most case inadequate. Imperfect detection has predictable consequence when species are common, the missed ones would result in underestimation of population and when species are rare missed individuals result in false absences. The probability of detecting an individual can vary due to multiple variables- survey methods (efforts, observer's keenness, time of day and year), site (habitat, noise, elevation), individuals (sex, age, distance), species (behavior life history, rarity and sudden spurt in population). The spatial replication improves the resolution of diversity estimates for the meta community due to patchiness of occurrence across the landscape. (Mugurran 2004, Dewan and Zipkin 2004, Ikanayan et al, 2014).

Estimates of the number of Earth's species range from 10 millions to 14 millions. (Miller and Spoolman 2012), of which about 1.7 millions has been documented and a lot required to be described. (Mora et al, 2011). More recently in May 2016, Scientists of National Science Foundation reported that 1 trillion species are estimated on Earth and only one thousandth of one percent have yet been described. (Science News letter May 5, 2016). It is most essential to understand the magnitude of biodiversity at different levels, since the real estimate is crucial for utilization, management and for evolving strategies for the conservation of biodiversity. It is a thumb rule that "what is not measured, cannot be managed".The biota of many of the world's parks, refuges, wilderness areas, marine protected areas and nature reserves are poorly inventorized assuming that these areas are already protected. (Nielsen et al, 2007). A few of these areas are rich in "endemics"- which are sensitive and face the threat of extinction due to the so called anthropocentric and anthropogenic development initiatives.

Species loss rate

Since the rateof extinction has increased several folds despite the availability of approximately 180 legal agreements to deal the problem. (Makie 2005). About one-eighth of known plant species are threatened with extinction. Estimates reach as high as 140,000 species per year based on species – area theory (Pimmet at, 2014). As of 2012, some studies have revealed that 25% species of mammals could be extinct in 20 years (Winnipeg Free Press 2012).India is one of the mega diversity country of the world with only 2.4% of the land area, accounts for 7.8% of recorded species of the world. One study has identified India as an ecological blackspot with 50% of its wildlife facing danger of extinction.

WWF's Living Planet Report 2016, which tracked over 14,000 vertebrate populations belonging to 3076 species from 1970 to 2012, world had lost 58% of wildlife in 42 years. The main drivers were related to human activities- habitat loss and degradation, human food systems, climate change and exploitation of animals. The wild life could decline by 67%

ISSN 2055-0219(Print), ISSN 2055-0227(online)

between 1970 and 2020. UN convention on Biological diversity concluded based on computer modeling that every day upto 150 species are lost. Extinction rates are poorly quantified. (Castello, May and Stock 2013),

One estimate claimed that between 0.01 and 0.1% of all species become extinct each year. If the low estimates of the number of species out there have any validity i.e., out of 2 millions of different species, between 200 to 2000 extinction occur every year. But if upper estimation of species numbers have to be adjudged as true- out of 100 million different species coexisting with us- than between 10,000 and 100,000 species are becoming extinct each year. Recent claim of about 1 trillion species present on Earth, just imagine the rate of losing species becoming that many fold. It is meaningless to claim that we cannotafford to save life on Earth. (Ryding 2012).Newbold and his team (2016) University college of London reported that global biodiversity have dropped below suggested save threshold (84.6%) for maintaining healthy ecosystem. Some researchers however feel that reduction can safely be as much as 70%.

The convention on Biological Diversity (CBD) - Achievements and Ambiguities.

Conscious of the intrinsic value of biological diversity and of the ecological, genetic, social, economic, scientific, education, cultural, recreational and aesthetic values of biological diversity and its components, the conservation of biological diversity is a common concern of humankind.The CBD is considered to be a key international convention that got approval in 1992 during the Earth Summit in Rio de Janeiro, Brazil. The CBD provides a specific set of policy prescription intended to facilitate the development of institutional obligations within the

ISSN 2055-0219(Print), ISSN 2055-0227(online)

Box -A Ecosystem services and Biodiversity: Implications

Services

Supporting Services

- Nutrient cycling
- Primary Production
- Soil formation
- Habitat provisioning

Provisioning Services

- Food, Agricultural Crops
- Vegetation, fruits, honey, species
- Medicinal substances
- Fuel wood, resin &fibre
- Bioactive substances (Toxic products, colour products Tannins)
- Fresh water

Regulating Services

- Runoff regulation
- Flood protection, soil protection
- Water quality, air quality
- Climate regulation
- Disease regulation

Cultural Services

- Spiritual
- Educational
- Recreational

Ethics and aesthetics

- Enriching cultural life
- Inspiring artists, painters
- Poets, writers, sculptors, musicians
- Photographers, bird watchers, tracking,
- Waterfall, Landscape
- Botanists, Zoologists, Naturalists

* Improved and updated by authors.

Implications

- Security
- Personal safety
- Secure resources access
- Security from disasters

Basic material for good life

- Adequate livelihood
- Sufficient food
- Shelter and shade
- Access to clean goods

ISSN 2055-0219(Print), ISSN 2055-0227(online)

- Secondary productivity
- Economic wellbeing, equality Vs inequality.

Health

- Strength
- Healthy life
- Access to clean air & water

Social relations

- Social cohesion
- Mutual respect/disrespect
- Ability to help others
- Disproportionate access may result in angularities
- Opportunity to be able to achieve what is sustainable for

Box -B Drivers Impacting Biodiversity and Ecosystem services

wellness

I. Anthropocentric

(A)
- Human population growth
- Life style changes
- Over exploitation and erratic consumption of resources
- Consumerism

(B)
- **Behavioural traits**
- Corruption, crime rate
- Unemployment
- Unauthorized use of resources
- Changes in household size

(C)
- Illiteracy & ignorance of Biodiversity & ecosystem Services.

II. Human controlled/mediated.

ISSN 2055-0219(Print), ISSN 2055-0227(online)

(A) • Land use changes
- Deforestation (Loss of forest cover)
- Harvest pressure (Agricultural practices, tilling, & crop rotation)
- Loss of Habitats, wet lands.

(B) • Landscape changes, Urban sprawl
- Hunting

(C) • Water extraction techniques
- Water use efficiency, Land Stalinization

(D) • External inputs- irrigation, fertilizers, pesticides, Herbicides

(E) • Ill-conceived development projects

(F) • Pollution- air, water, noise

(G) • Tourism

(H) • Insurgency/war

III. Natural, Biological, Physical, Chemical

(A) • **Climate change**
- **Floods, drought, earthquakes, landslides**
- **Volcanoes, frequency and intensities of fire**
- **Soil erosion, soil fertility and loss of organic matter**
- **Deterioration of water and air quality**

(B) • **Invasion and alien species**
- **Crop failures**
- **Loss of important species**
- **Hybridization**
- **Introduction of species, agricultural varieties including tree species, fish sp**
- **Polymorphism**
- **Bio-fuel plantation in agricultural lands and forest lands**

IV. Technological Development

- Mining, Refineries, Power generation
- Industrialization, Mechanization
- Dam construct and Inter basin transfer
- Transportation

V. Market/Economics

- Food security, Access to essentials
- Governance & Policy implications
- Adhoc& ill perceived decisions
- Imperfections & limitation of economics
- Pollution- Plastic, e-waste etc.
- Corporate Environment responsibility
- Poverty.

ISSN 2055-0219(Print), ISSN 2055-0227(online)

international community, which had to give real effect to the aspiration of the convention and ensure that it provided some real effects at ground level. The CBD comprised of three main goals – conservation of biodiversity, sustainable use of its components and the fair and equitable sharing of the benefits from the use of genetic resources.The CBD has 23 preambular paragraphs and 42 articles along with some appendices. (www.cbd. in). The signatories to the CBD adopted various commitments that happened to be in line with the goals.-

- Conserving biological diversity, the habitats and ecosystems.
- Preventing the foreign invasive species phenomenon.
- Spreading the awareness regarding the importance of biodiversity and encourage people's participation in the biological conservation measures.
- Monitoring the component of biodiversity.
- Using biotechnology with care and prudence by being careful in the international transport of genetically modified organisms and preserving traditional indigenous knowledge.

The comprehensive review of the original document of the CBD and many other legal, texts, (about 200), real progress in solving the environmental challenges have been much less comprehensive. The question haunts as to why the aims and goals have often fallen short of their original ambitions and intensions. Some reasons appear that many goals are simply not specific enough as majority of goals are found to be aspirational in nature and the lack of commitments of implementing parties. Since the adoption of the CBD in 1992, a number of provisions have been thought of and incorporated to make the contentions more result oriented, we still find some ambiguity which hinder our attempts to reduce, if not completely halt the losses to the biological diversity. The following account highlights the achievements made in the ensuing twenty five years and the gaps still left to be addressed. This description is not in chronological order and open to improvements.

i. The creation of governing body of the convention (conference of the parties- (COP) taking input from the contracting parties as per the provisions of the convention (Article 23). A total of 13 meetings had been held till 2016.
ii. The CBD included the provision of framing a subsidiary body on Scientific, Technical and Technological Advice (SBSTTA),a committee composed of experts from contracting parties to play a key role to make recommendation to COP and as appropriate its other subsidiary bodies with timely scientific, technical and technological advice for the implementation of the convention. Para 1 of Article 25 states that this body shall be multidisciplinary and open to participation by all parties. Parties felt that SBSTTA should respond to, but not lead to COP.
iii. National biodiversity strategies and Action Plans (NBSAP) are the principal instruments for implementing the convention at the National level (Article 6). The convention requires countries to prepare national biodiversity strategy or equivalent instruments and ensure that strategy is mainstreamed into planning and decision making for the conservation and sustainable use of biological diversity. Till 2015, only 125 parties have developed NBSAP in line with Article 6.
iv. In accordance with Article 26, contracting parties prepare national reports on the status of the implementation of the convention. Although the convention affirms that all forms of life are covered by its provisions, examinations of reports and NBSAP submitted by contracting parties exhibit that in practice this is not happening. Frequent reference to important animals

ISSN 2055-0219(Print), ISSN 2055-0227(online)

and plants are made. None of the documents could be assessedas good or adequate, less that 10% as nearly adequate or poor and rest as deficient, seriously deficient or totally deficient.

v. Not enough significance have been accorded to (a) Biodiversity in sea (b) commercial products including pharmaceuticals, seed crop protection, horticulture, cosmetics and personal care, spices, fragrances and flavors botanicals (mere mention of plants and animals diversity do not cover most of these) (c) Gender equality.

vi. Cartagena protocol on bio-safety had been adapted in Feb 1999 (came into force in January 2003) in the extraordinary meeting or COP, seeks to protect biodiversity from potential risks posed by living modified organisms resulting from modern biotechnology.

vii. This has been further supplemented by Nagoya, Kulalumpur protocol on liability and redness in 2010 (entered into force in 2014). The adoption of Nagoya protocol on access and benefit sharing was a significant leap forward in the fight against "biopiracy" a term referred to corporate patenting and profiting from genetic resources used in for example pharmaceutical and cosmetic products without permission from the people or nations, who are rightful owners of these resources (18 years after 1992 Earth Summit). Since many governments have not yet ratified the protocol, it still has not entered into force effectively- a problem that governments must deal with urgently.

viii. In view of Global strategy for plant conservation (Gram Canaria declaration adopted 16 point plan in April 2002) to slow down the pace of plant extinction around the world by 2010. A number of parties have not yet ratified the treaty.

ix. Articles 3, 6, 10, 15 and others emphasized the sovereign right of states (contracting parties) to exploit their own biological resources pursuant to their own environmental policies, particular condition and capabilities and integrate as far as possible and as appropriate the conservation and sustainable use of biological diversity into relevant plans and policies.

The anomaly arises when each contracting party enjoys the freedom to enter into bilateral agreement with other nations in the trade of biological diversity. Wealth and inequality has increased among countries and among citizens within many countries both rich and poor (Kates and Parris 2003, M.A. 2005). The priorities and policies of governments always change with the change in ruling parties.

Government and authorities of each contracting party have their own perceptions and policies in this regard. (Article 15) precipitating distorted picture. Differing emphasis are partially related to the socioeconomic development of the region being assessed. Issues of equality and production versus demand have not been the main focus of industrial- country assessment.

Decision makers worry a lot about economic recession but an ecological recession can have even worse consequences.

High income countries use five times more the ecological resources of low income countries which could be explained as a result of processes whereby wealthy nations are outsourcing resource depletion to poorer nations, which are suffering the greatest ecosystem losses (Cardinale et al, 2012).

x. Parties have been required to monitor through sampling and other techniques the components of biological diversity, paying particular attention to those requiring urgent conservation measures and those appear to have greatest potential for sustainable development. (Article 7) The contentions have been found contradiction to the basic air for which the CBD came into existence.

Global biodiversity information facility (GBIF) is an international non-profit organisation to provide free and universal access to data regarding the world's biodiversity. GBIFaims to bring all kinds of natural history information held dormantin organisations around the world so as to ensure that the data do not remain forgotten in the back of filing cabinet.

ISSN 2055-0219(Print), ISSN 2055-0227(online)

Global Taxonomy Initiative (GTI)- Effective conservation and management of biodiversity depends in large part on our understanding of taxonomy. The declining expertise hindersour ability to make informed decision about conservation sustainable use and sharing of benefits.The CBD have developed the GTI to remove and reduce the "taxonomic impediment". Only few governments are engaged seriously in this venture

xi. Each contracting party as far as possible and appropriate shall introduce appropriate procedures requiring EIA (Environmental Impact Assessment) of its developmental proposals leading to fragmentation and degradation of nature.There are no well developed methods for quantifying and predicting impacts of fragmentation in many of the developmental projects on biodiversity. I have examined more than 50 EIA reports - quite voluminous- prepared in ample number of copies -all prepared in English -none in regional language- to get a feel by villagers (stakeholders). The chapter on biological components ironically narrates Botanical and Zoological names not understood by the stakeholders particularly villagerand at timesall the members of the EIA team.There are instances when projects like Power Projects, dams, airports, etc.are sanctioned on political pressures or so called 'energy needs' of the country and where funds are received from planning commissions, World Bank etc.and they require timely completion and submission of utilisation certificates.Manyof the projects are completed on Papers and never see the light of day (Article 14).

xii. Each contracting party undertake to provide in accordance with its capabilities financial support and incentives in respect of those National activities which are intended to achieve the objective of the convention.The contradictions creeps up when the developing country parties have different overriding priorities with particular reference to the economic and social development and programs from eradication of poverty and development of agricultural sector.Urbanization is another priority in this list. (Article 20).

xiii. Life on earth as we know it is under siege. Itis an undisputed fact that we are losing wild species in nature to extinction at a faster rate. The CBD adopted in 2002 (Johannesburg plan of implementation)a target of reducing the rate of biodiversity loss by 2010.There are lack of operational indicators to perceive the status of biodiversity.Severalmethods had been proposed (Reid et al, 1993 ,Mugurran 2004,Saterson et al, 2004, Perira and Cooper 2006,Soberson and Townsend Peterson 2009),but none could yield desirable outcome.

Scholes and Biggs (2005) developed Biodiversity Intactness Index (BII) based on estimates of baseline species richness and area of different land use and the abundance of different species under different land uses.subsequentlyHui et al, (2008)emphasised that an important component of indicator is a measure of the

uncertainty in the estimates its process is produces. Hui et al, (2008) used original data of Scholes and Biggs (2005) of Southern Africa for the year 2000.TheBII estimates the mean change in the abundance of terrestrial plants and vertebrates (Birds, mammals, reptiles and amphibians) relative to the reference populations in a particular ecosystem.Changesin the population abundance are dynamic and assumed to be the function of various land use practices, inter and intraspecific interactions, abiotic variables and combinations of sources. Scholes and Biggs (2005) erroneously considered terrestrial plants and few vertebrates for BII. Are we not required to consider periodic and systematicspatial and temporal data for accessing the status of biodiversity- more particularly the small sized vertebrates (mongoose, otters, rabbitshyenas, foxes, squirrels, bats, birds nocturnal fauna etc.) and invertebrates (spiders, ticks, mites, butterflies, beetles, mosquitoes, flies, pollinators, etc), vegetation – seasonal, annuals, perennials, climbers, agro-biodiversity, rangeland species, horticulture, flora, spices, etc), since each species has a particular niche in the community complex. Biological diversity covers all life on Earth from forest and mountains to deserts and seas, lakes, rivers, ponds,

ISSN 2055-0219(Print), ISSN 2055-0227(online)

plants, animals and microorganisms alike. (Ryding 2012) and none can be ignored or underestimated. Lack of data could result in underestimation of threats in the regions and thus overestimation of a condition.

Despite the agreement to bring down species loss rate, evidence gathered in 2010 indicated that biodiversity loss at global scale continued at increasing rates. This has let to set a new targets for 2020 (The Aichi targets).

xiv. Government had been negotiating the formation of IPBES (intergovernmental Science Policy platform on Biodiversity and Ecosystem Services) in 2012 in panama, to perform regular and timely assessment of knowledge on biodiversity. Placed under FAO, UNDP, and UNESCO and administered by UNEP and guided by a number of operating principles - a program to bring global assessment in 2015. It has to evaluate progress towards the CBD's Aichi targets of strategic plan of biodiversity 2010-2020. The initiative of the CBD has formulated new plan of action by 20 SMART (Specific, Measureable, Ambitious Realistic and Time bound) targets for 2020.

xv. The CBD work on protected areas adopted in Kualalumpur in 2004 promoted a increase of funding and political action to establish more and better managed nature reserves. Since 1992, protected areas have increased by more than third area, but only 7% of world coastal areas and 1.4% of oceans are protected. In 2008 COP, adopted scientific criteria for indentifying Ecologically or Biologically significant (EBSAs) marine areas. With the fast magnifying consequences of global warming world alter substantially the scenarios in marine and coastal areas and this inclusive of biodiversity.

xvi. The contracting parties are required to promote and encourage understanding of importance of, and the measures required for conservation of biological diversity- propagation through media and inclusion of topics in educational programs (Article 13), however there lacks a concerted effort and uniformity of approach amongst the contracting parties. Larger public must be enlightened about the services and benefits providing by biodiversity.

xvii. Articles 11 and 12 addresses the problem of incentives and financial obligations in accordance with the capabilities and financial support in respect of their nation activities which are intended to achieve the objectives of this convention in accordance with national plans, priorities and programs.

The developed country parties shall provide new and additional financial resources to enable developing country parties on mutually agreed terms. Naturally "takers" cannot be "choosers". The onus rests on the developed countries to take full account of specific needs and special situations of least developed countries (as per their perception and policies), in their actions with regard to funding and transfer of technology.

xviii. Article 12 (c) narrates that in keeping with provisions of articles 16, 27 and 18, parties have to promote and cooperate in the use of scientific advances in biological diversity research by exchange of information. Again many riders are there tofulfilthis obligations.

xix. Most of the times, changes in ecosystems and their services are incremental. However some changes in ecosystem services are larger in magnitude as well as difficult, expensive or impossible to reverse (Carpenter 2003). Such changes are important, massive and hard to predict (monitored) and they often come as surprise.

Natural disaster that affect at least 1 million people (other biota excluded) per event have increased four-six fold in frequency since 1960). This trend is likely to continue as growing population occupies more vulnerable areas. The number of nations engaged in armed conflict have increased. May people particularly environmental refugee consume economic resources via larger supply chains and they experience greater separation from nature "Access to service and security of access are important".

ISSN 2055-0219(Print), ISSN 2055-0227(online)

xx. At fine scale ecosystem services consumed in a given area are often produced some where else (Naidoo and Admowicz 2001, Mikkelson, Gonzalez and Peterson 2007). A significant number of species are threatened as a result of international trades (both legal and illegal). Consumers in developed countries cause threat to species of developing countries. The analysis such as "ecological foot prints" become necessary. (Wackernagel et al, 2002, Lanzen et al 2012). Consumers in developed countries capable of paying and influencing by all "means" cause inadvertent consequences on nature's bounty of developing countries. Forest dwellers and small holders tend to lose to rich and more powerful groups.

Market demand and willingness to pay arecentral issues in economics. Marketed and not marketed ecosystem services have their role. Prices of basic amenities doubled to quadrupled times in last few years due to decrease in supply and speculation. Loss of ecosystem services tend to affect the poor people most directly as they are most dependent on local ecosystem. For poor people necessities could not be met within the income while wealthy societies can continue to waste large quantities of goods and services (Gustavson et al, 2011) Ecological economists are of the view that most ecological services cannot and should not be intetegrated into market framework. (Martinez – Alier 2002, Biggs et al 2004.)

xxi. All natural capital are critical and hard to replace/substitute. It is now essential to reduce resource extraction below absorption rates until stocks are restored to level compatible with ecological and economic sustainability.

"Earth Overshoot Day (EOD) earlier known as "Ecological Debt Day (EDD) is the date on which humanity"s resources consumption for the year exceeds Earth's capacity to regenerate those resources that year. EOD is calculated by global Footprint Network and a campaign supported by a number of non-profit organization .EOD reached on Aug 8, 2016 (five days earlier than 2015 Aug 13) this year. In just over seven months humanity used up a full years allotment of natural resources- such as water, food, clean air, etc.

Challenges lie ahead for reinvigoration.

We are aware that till this date the life is present only on earth and we cannot afford to compromise with the life support system- neither for the current biota nor for the sustenance of the future generation.

A. Given the finite resources (available on Earth) and unmet needs, it is important to use resources efficiently to satisfy both needs of all and judicially the wants of the few.

B. Ensure the rapid ratification of the convention on biological diversity by all parties small or big at the earliest.

C. The CBD requires a strong Holistic governance response to halt the loss of biodiversity.

D. Environmental variability and services cannot be stockpiled- society has little control over the rate at which they are created (Fisher et al, 2008, Farley and Costanza)2010.

E. Biodiversity bank cannot be lending Bank.

F. Ecological systems that provide the services, the economic systems that benefits from them and institutions that need to develop for effective code for sustainable use must be integrated. (Bennett, Peterson and Gordon 2009).

G. It is equally clear that more lands and waters you need to come under conservation management if future losses are to be prevented. The urgency of the conservation plans based on the best available scientific information and methods to be implemented now while explicitely acknowledging the limitations and working their improvements.

ISSN 2055-0219(Print), ISSN 2055-0227(online)

H. Consistent systematic monitoring and periodic reviews of progress on the agreed Universal goals would promote continuous improvement and social learning as well as institutional accountability is required.

I. Government must ensure the funding and political actions to achieve the commitments of various protocols, conventions, treaties and commitments such as the Aichi target, Nagoya protocol UNFCCC, UNCCD, EBSAs etc.

J. Respond urgently and adequately to recommendations as delivered through Intergovernmental science policy platform on biodiversity and Ecosystem services (IPBES) and ensuring at National level.

K. Nature has everything to meet the needs of men but not to satisfy the greeds. One should keep one's want to minimum for the sustenance of nature.

Appendix 1

Some important Bodies Convention indices, Days etc.addressingEnvironmental concern.

1. United Nations Economic and Social Council (ECOSOC) serves as the central forum for formulating policies, recommendations interest to member states and UN system.
2. UN Framework convention on climate change (UNFCCC): A treaty negotiated at Earth Summit 1992 to stabilize Greenhouse gases (GHG) concentration in atmosphere to arrest to global warming.
3. UN convention to combat Desertification (UNCCD) the (1992).
4. UN convention on the Law of Seas (UNCLO) also called law of sea treaty - defines the rights and responsibilities of nation with respect to the use of world's Ocean (came into force in 1994).
5. Protected AreasDowngrading,Downsizing andDegazettement (PADDD)- National Park, nature reserves and other protected areas (PAs) are experiencing significant and wide spread downgrading downsizing and degazettement. To assess the extent, patterns, trends, causes and consequences.
6. Commission on Sustainable Development (CSD) has been a body under UNECOSOC tasked with overseeing the outcome of UN conference on Environment and Development, it has been replaced in 2013 by High Level Political Forum on Sustainable Development (HLPF).
7. The Nature Conservancy (TNC) is a charitable Environmental organisation to conserve the lands and waters on which all life depends. It has undertaken a program in 2008 to plant one billion Trees by 2025.
8. The Convention on the Conservation of Migratory Species of Wild Animals (CMS – also known as Bonn convention) – aims to conserve terrestrial, marine and avian migratory species.
9. Green Cross International (GCI) is a global independent, non profit and non government organization to address the interconnected global challenges of security, poverty eradication and environmental degradation. It was founded by former Soviet Union President and Nobel Prize laurite Mikhail Gorbachov in 1993, taking inspiration from Earth summit 1992.
10. Biodiversity Habitat Index (BHI) uses biologically scaled environmental mapping and modelling to estimate potential impacts of habitat loss, degradation and terrestrial fragmentation on retention of terrestrial biodiversity globally from remotely sensed forest change and land cover change data set.
11. Biodiversity Hot spots: are bio geographic region with significant levels of biodiversity that is under threat from humans. It must contain at least 0.5 or 1500 species of vascular plants

ISSN 2055-0219(Print), ISSN 2055-0227(online)

as endemic and it has lost 70% of its primary vegetation. These sites support nearly 60% of world's plants, birds, mammals, reptiles and amphibians (and many invertebrates) with a very high share of those species as endemics.

12. Environmental Performance Index (EPI) is a method of quantifying and numerically marking the environmental performance of a states policies. Designed to supplement the environmental targets set forth in UN Millennium Development goals (2002).
13. International Convention for Prevention of the sea by oil 1954.
14. International convention for regulation of Whaling (ICRW) 1946.
15. Ramsar convention on wet lands of international importance specially as water foul habitat 1971.
16. Stockholm convention on Persistent organic pollutants. (2004).
17. MinamataConvention on Mercury 2013.
18. Barcelona convention for Protection against Pollution in Mediterranean Sea 1976.
19. Basel convention on the control of transboundary movements of hazardous wastes and disposal 1992.
20. Biological Weapon convention 1975.
21. Chemical Weapons Convention 1997.
22. Convention on Nuclear Safety, Vienna 1994.
23. Vienna Convention for the Protection of Ozone layer 1988.
24. Aarhus Convention on access to information, Public participation in decision making and access to Justice in Environmental matters, 2001.
25. Espoo convention on EIA in a Transboundary context 1991.
26. Biodiversity Day 22nd May.

CONCLUSION

Biodiversity and ecosystem services are important for the continued well being of the earth and its inhabitants. The maintenance of moderate To high diversity is important not only to ensure that all key functional niches operating specially to maintain redundancy and with the resilience in the ecosystem. Greater diversity also means greater possibilities for selection from natural resources.Despite the growing number of multilateral environmental agreements - The Convention of Biological Diversity (1992(being one of them the losses that are being incurred of Earth's Biological diversity at all levels are now staggering. The trend lines for future losses of biodiversity and ecosystem services are steeply upward as new drivers of change come into play.Greater attention is needed in forecasting likely diversity scenarios in the near term and strategies for alleviating detrimental consequence. It is aurgently required that the CBD must be visited at the international level to make it more powerful.Biodiversity and resultant ecosystem services are not only necessary but possible and deserves more attention, investment and opportunity for wider and sustainable impacts around the world.

REFERENCES

Bennett, H.M.; Peterson G.D. and Gordon, L.S. (2009) Understanding relationship among multiple ecosystem services. Ecology letters 12:1-11.

Biggs, R. et. al. (2004) Nature supporting people: the southern Africa Millennium Assessment CSIR. Preetoria South Africa (On line) URL.http://www.maweb.org

Boyd, J. And Banzehaf, S. (2007) What are ecosystem services? The need for standardized environmental accounting units. Ecological Economics 63: 616-626.

ISSN 2055-0219(Print), ISSN 2055-0227(online)

Braat, L.C. and De Groot, R. (2012) The Ecosystem Services Agenda: bridging the world's of natural science and economics conservation and the development and public and private policy. Ecosystem services 1 (1): 4-15.

Camron, T. (2002) The year of diversity – ecosystem function debate. Trend in Ecology and Evolution.Elsevier.

Cardinale, B. et al. (2012) Biodiversity loss and its impact on humanity,Nature 436 (7401) 59-67.

Carpenter, S.; Bennett, E. and Peterson, G. (2006) Scenarios for ecosystem services; an overview. Ecol. Soc. 11:29

Castello, M.J.; May, R.M. and Stock. N.E. (2013) can we name Earth's species before they go extinct.Science (6118): 413-416.

Ceballo, G. And Ehrilich P.R. (2002) Mammal population losses and extinction crisis. Science, May 3, 296 (5569): 904-907.

Costanza, R. Et al. (1997) The value of the world's ecosystem services and natural capital, Nature 38:7: 253-260.

Daily, G.C. (1997) Nature's services: Societal dependence on natural ecosystems. Washington D.C., Island Press

Dally, G. (1997) What are ecosystem Services: In Nature's services: Societal dependence on natural ecosystems. Daily G.C. (ed.) Washington. D.C., Island Press.

De Groot, R., (1992) Functions of nature: Evaluation of Nature in Environmental planning, management and decision making. WoltersNoordhoff B.V. Groningen 345 PP.

De Groot, R. et at, (2010) Integrating the ecological and economic dimensions on Biodiversity and Ecosystem services valuation; in Kumar,P (Ed.TEED Foundation Earth scan.London)

De Groot, R.; Wilson, M.A. and Bouman, R.M.J. (2002) A typology for the classification description, and valuation of ecosystem functions, goods and services. Ecological Economics 41: 393-408.

Dewan, A. and Zipkin, K. (2010) An integrated sampling and analysis approaching for improved biodiversity monitoring, Envron. Manag.45: 1223-12230.

Farley, J. and Costanza, R. (2010) Payments for ecosystem services: from local toglobal. Ecological Economics 69 (11): 2050-2068.

Fisher, B. et al, (2008) Ecosystem services and economic theory: Integration for policy relevant research. Ecological Applications 18 (8): 2050-2061.

Force, J.E. and Machlis G.E. (1997) The human ecosystem. Part 2. Society and Natural Resources 10: 369-382.

Gustavson, J. et al. (2011) Global food losses and food waste: Extent causes and prevention, Food and Agricultural Organization of United Nations, Rome.

Heal, G. et al. (2001) Protecting natural capital through ecosystem service districts. Stan. Envirotl. L.J. 20: 39-364.

Hein, L. et al. (2006) Spatial scales stakeholders and valuation of ecosystem services. Ecological Economics.57 (2): 209-228.

Hopper, D.U. et al, (2005) Effects of biodiversity on ecosystem functioning: A consensus of current knowledge. Ecological Monogr.75: 3-35.

Hudson, L.N. et al. (2014) The PREDICT database of global database of how local terrestrial biodiversity respond to human impacts. Ecology and Evolution4: 4701-4735.

Hui, D.; Biggs, R. And Scholes, R.J. (2008) Measuring uncertainty in estimate of biodiversity loss: The example of biodiversity intactness index variance. Biological conservation 141: 1091-1094.

Huston, M. (1979) A general hypothesis of species diversity. American Naturalist 113: 81-101.

ISSN 2055-0219(Print), ISSN 2055-0227(online)

Ikanayan, K.J.; Tinley, M.W.; Furnas, B.J. and Beissinger, S.R. (2014) Detecting diversity: emerging method to estimate species diversity. Trend in Ecology and Evolution; 29 (2): 97.

Kates, R.W. and Parris, T.M. (2003), Long term trends and a sustainable transition.Proceedings of National Academy of Science.100 8062-8067.

Lanzen, M.; Moran, D.; Kanemoto, K., Foran, b.; Lobefaro L. Geschke, A (2012) International trade drivers biodiversity threats in developing nations. Nature 486: 109-112.

Limburg, K.E.; 'O' Neill, R.V.; Costanza, R. And Farber, S. (2002) The dynamics and value of Ecosystem services: Integrating economics and ecological perspective – a complex systems and valuation. Ecological Economics 41: 409-420.

Machlis, G.E.; Force, J.E. and Burch, W.R., (1997) The human ecosystem. Part I. The human ecosystem as an organizing concept in ecosystem management Society and natural Resources 10: 347-367.

Makie, R. (2005) Discovery of new species and extermination at high rate. (2005-09-25) The Guardian of London.

Martinez – Alier, J. (2002) Environmentalism of the poor: a study of ecological conflicts and valuation. Edward Elgar, North Hampton Massachusetts, USA.

M.A. (2005a) Ecosystems and wellbeing scenario. Washington D.C. Island Press, USA.

MA (2005b) Ecosystems and Human wellbeing.Current states and Trend Washingtong, D.C., Island Press USA.

Mikkelson, G.M., Gonzalez, A. and Peterson, S.D., (2007) Economic inequality predicts biodiversity loss .PLOS, ONE 2e 444.

Miller, G. and Spoolman, S. (2012) Environmental Science – Biodiversity is a crucial part of the Earth's natural capital.Cenage learning P-62, ISBN 1-133-70787-4.

Mooney, H.A. (2010) The ecosystem service chain and biological diversity crisis. Philo Transection of Royal Society B 265"1537

Mora, C.; Tittensor, D.P.; Simpson, A.G.; Worm, B. (2011) How many species are there on Earth and in the ocean? PLOS Biological ie 1001127 doi: 10:1371.

Mugurran, A.E. (2004) Measuring Biological Diversity, Blackwell

Naidoo, R. and Adonowicz, W.L. (2001) Effects of economic prosperity on number of threatened species conservation Biology 15: 1021-1029.

New bold, T. and his team (2016) Has land use pushed terrestrial biodiversity beyond the planetary boundary? A global assessment Science.

Nielsen et al. (2007) A new method to estimate species and biodiversity intactness using empirically derived reference conditions. Biological conservation 137: 40-414.

Odum, E.P. and Barrett, G.W. (2004) Fundamentals of Ecology V ed. Thomson Brook/Cole U.K.

Perira, H.M. and Cooper H.D. (2006) Toward the global monitoring of biodiversity change, Trends in Ecology and Evolution 21: 123-129.

Pimentel, D. (1980) Environmental quality and Natural Biota, Bioscience 30 (11) 750-755.

Pimm, S.L; Jenkins, C.N;Abell, R.; Brooks T.M. et al. (2014).The biodiversity of species and their rates of extinction, distribution and protection science 344:6187.

Pielou, E.C. (1996) The measurement of diversity in different types of biological collections, Journal of Theoretical Biology 13: 131-144.

Potvin, C. and Gotelli, N.J. (2008) Biodiversity enhances individual performance but does not affect survivorship in tropical areas. Eco. Letter, 11: 217-223.

Reid, W.V, et al (ed) (1993) Biodiversity prospecting World Resources Institute Washington, D.C. 223-254.

ISSN 2055-0219(Print), ISSN 2055-0227(online)

Ryding, T. (2012) 20 years of the CBD – Born at Rio 1992- what achievements have the last 20 years brought, June 2012, tove, ryding @ green peace. org

Saterson, K.A.; Christensen, N.L.; Jackson, R.B.; Kramer, RA.; Pimm, S.L. Smith, MD.; Wiener, JB. (2004) Disconnects in evaluating the relative effectiveness of conservation strategies.Conservation Biology 18: 597-599.

Scholes, R.J. and Biggs, R. (2005) A Biodiversity Intactness Index.Nature 434: 45-49.

Scientists of National Science Foundation (2016).Science News letter 5th May 2016.

Soberson, J. and Townsend Peterson (2009) Monitoring biodiversity loss with primary species occurrence data toward National level Indicators for 2010 target of the convention in biodiversity. Ambio: A Journal of Human Environment 38(1): 29-34.

Stern, N. (2006) Stern review on the Economics of climate change UK (Available – stern review _ index.htm)

Swanson, T. (2013) Global action for biodiversity: An international framework for implementing .208 pages, Routledge.

Tansley, A.G. (1935) The use and abuse of vegetational concept and terms. Ecology 16: 284-301.

Turner, M.G., Gardner, H and O'Neill, R.V. (2001) Landscape ecology in theory and practice; Pattern and Process Springer Verlag New York.

Ulanowicz, R.E. (1997) Ecology, the ascendant perspective. New York, Columbia University Press.

Wallace, K.J. (2007) Classification of ecosystem services: Problems and Solutions, Elsevier.

Wackernagel, M. and Rees, W.E. (1998) Our ecological foot print reducing human impact on the earth. Books google.com.New society Publishers.

Wilcox, B.A. (1984) In situ conservation of genetic resources.Determinants of minimum area requirements. In National Parks: conservation and development. J.A. Neeley and K.R. Miller (Eds), Washington D.C., Smiths union Institute Press 639-647.

www.winnipegfreepress.(2012-06-07) ,Repeated massive biodiversity losses classified as mass extinction events.

ACKNOWLEDGEMENTS

I am sincerely grateful to Professor J.S.Rathore former vice chancellor for valuable suggestio ns and encouragement and I am indebted to Professor R.S.Saini, who taught me the fundamen tals of Ecology.

ISSN 2055-0219(Print), ISSN 2055-0227(online)