

**REMEDIES FOR
INFRINGEMENT UNDER
THE BIO DIVERSITY ACT**

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OBJECTIVES

At the 1992 Earth Summit in Rio de Janeiro world leaders agreed on a comprehensive strategy for sustainable development meeting our needs while ensuring that we leave a healthy and viable world for the generations to come. The key agreement adopted at Rio was the Convention on Biological Diversity wherein the vast majority of the World's Government's set out commitments for maintaining the world's ecological underpinnings as we go about the business of economic development.

The Convention establishes three main goals:

- 1) The conservation of biological diversity.
- 2) The sustainable use of its components.
- 3) The fair and equitable sharing of the benefits from the use of genetic resources.¹

The Biological Diversity Act, 2002 [Act No. 18 of 2003]² is a federal legislation enacted by the Parliament of India for preservation of biological diversity in India which is enacted to meet the obligations under Convention on Biological Diversity (CBD) to which India is a party and this Act provides a mechanism for equitable sharing of benefits arising out of use of traditional biological resources and knowledge. For our better understanding it is important we look into the definition of “Bio- Diversity” in the following chapter.

¹<http://www.cbd.int/convention/guide/default.shtml> (visited on 01/05/2014)

² <http://nbaindia.org/text/12//TheBiologicalDiversityAct2002.html> (visited on 01/05/2014)

INTRODUCTION

A) WHAT IS BIODIVERSITY?

Biodiversity is the degree of variation of life. This can refer to genetic variation, species variation, or ecosystem variation within an area, biome, or planet. Terrestrial biodiversity tends to be highest near the equator, which seems to be the result of the warm climate and high primary productivity. Marine biodiversity tends to be highest along coasts in the Western Pacific, where sea surface temperature is highest and in mid-latitude band in all oceans. Biodiversity generally tends to cluster in hotspots, and has been increasing through time but will be likely to slow in the future.³

In other words, "Biodiversity" is most commonly used to replace the more clearly defined and long established terms, species diversity and species richness. Biologists most often define biodiversity as the "totality of genes, species, and ecosystems of a region". An advantage of this definition is that it seems to describe most circumstances and presents a unified view of the traditional three levels at which biological variety has been identified:

- species diversity
- ecosystem diversity
- genetic diversity

Biodiversity may be broadly thought of as the variability among all living organisms existing on earth in various ecosystems and ecological complexes of which they are a part and includes diversity within species or between species and of ecosystems. This diversity is the basis of continuous evolution of life forms and in turn maintains the life-sustaining systems of the biosphere. Biodiversity is vital for the survival of this planet and for the continuation of evolutionary process. Biodiversity has direct consumptive value in food, agriculture, medicine and industry. The conservation of biodiversity and sustainable use of bio-resources is a common concern at the national as well as the international level and it is vital to

³ <http://en.wikipedia.org/wiki/Biodiversity> (visited on 01/05/2014)

anticipate, prevent and tackle the causes of loss or reduction of biological resources which includes plants, animals and micro-organisms or parts thereof, their genetic material and by-products with actual or potential use or value. A sustainable use of the components of biodiversity in such a manner and at such a rate that does not lead to the long-term decline of biological diversity will help maintain its potential to meet the needs and aspirations of present and future generations. In this context bio-survey and bio-utilization means of survey or collection of species, subspecies, genes, components and extracts of biological resources, characterization, inventurisation activities are important aspects of bio-conservation measures.⁴

In 2003 Professor Anthony Campbell at Cardiff University, UK and the Darwin Centre, Pembrokeshire, defined a fourth level: *Molecular Diversity*. This multilevel construct is consistent with Dasmann and Lovejoy. An explicit definition consistent with this interpretation was first given in a paper by Bruce A. Wilcox commissioned by the International Union for the Conservation of Nature and Natural Resources (IUCN) for the 1982 World National Parks Conference. Wilcox's definition was "Biological diversity is the variety of life forms...at all levels of biological systems (i.e., molecular, organismic, population, species and ecosystem)..." *The 1992 United Nations Earth Summit defined "biological diversity" as "the variability among living organisms from all sources, including, 'inter alia', terrestrial, marine, and other aquatic ecosystems, and the ecological complexes of which they are part: this includes diversity within species, between species and of ecosystems". This definition is used in the United Nations Convention on Biological Diversity.*⁵

Rapid environmental changes typically cause mass extinctions. One estimate is that <1%–3% of the species that have existed on Earth are extinct. The earliest evidences for life on Earth are graphite found to be biogenic in 3.7 billion-year-old metasedimentary rocks discovered in Western Greenland and microbial mat fossils found in 3.48 billion-year-old sandstone discovered in Western Australia. Since life began on Earth, five major mass extinctions and

⁴ http://www.environmental-auditing.org.cn/english/EN/articleshow_ArtID_996.htm (visited on 15/05/2014)

⁵ *ibid*

several minor events have led to large and sudden drops in biodiversity. The Phanerozoic eon (the last 540 million years) marked a rapid growth in biodiversity via the Cambrian explosion—a period during which the majority of multicellular phyla first appeared. The next 400 million years included repeated, massive biodiversity losses classified as mass extinction events. In the Carboniferous, rainforest collapse led to a great loss of plant and animal life. The Permian–Triassic extinction event, 251 million years ago, was the worst; vertebrate recovery took 30 million years. The most recent, the Cretaceous–Paleogene extinction event, occurred 65 million years ago and has often attracted more attention than others because it resulted in the extinction of the dinosaurs.⁶

The period since the emergence of humans has displayed an ongoing biodiversity reduction and an accompanying loss of genetic diversity. Named the Holocene extinction, the reduction is caused primarily by human impacts, particularly habitat destruction. Conversely, biodiversity impacts human health in a number of ways, both positively and negatively.⁷

B) DISTRIBUTION:

Biodiversity is not evenly distributed; rather it varies greatly across the globe as well as within regions. Among other factors, the diversity of all living things (biota) depends on temperature, precipitation, altitude, soils, geography and the presence of other species. The study of the spatial distribution of organisms, species, and ecosystems, is the science of biogeography. Diversity consistently measures higher in the tropics and in other localized regions such as the Cape Floristic Region and lower in Polar Regions generally. Rain forests that have had wet climates for a long time, such as Yasuni National Park in Ecuador, have particularly high biodiversity.

Terrestrial biodiversity is up to 25 times greater than ocean biodiversity. Although a recent discovered method put the total number of species on Earth at 8.7 million of which 2.1

⁶ ibid

⁷ ibid

million were estimated to live in the ocean, however this estimate seems to under-represent diversity of microorganisms.⁸

C) EVOLUTION AND HISTORY:

Biodiversity is the result of 3.5 billion years of evolution. The origin of life has not been definitely established by science, however some evidence suggests that life may already have been well-established only a few hundred million years after the formation of the Earth. Until approximately 600 million years ago, all life consisted of archaea, bacteria, protozoans and similar single-celled organisms.⁹

The history of biodiversity during the Phanerozoic (the last 540 million years), starts with rapid growth during the Cambrian explosion—a period during which nearly every phylum of multicellular organisms first appeared. Over the next 400 million years or so, invertebrate diversity showed little overall trend, and vertebrate diversity shows an overall exponential trend. This dramatic rise in diversity was marked by periodic, massive losses of diversity classified as mass extinction events. A significant loss occurred when rainforests collapsed in the carboniferous. The worst was the Permo-Triassic extinction, 251 million years ago. Vertebrates took 30 million years to recover from this event. The fossil record suggests that the last few million years featured the greatest biodiversity in history. However, not all scientists support this view, since there is uncertainty as to how strongly the fossil record is biased by the greater availability and preservation of recent geologic sections. Some scientists believe that corrected for sampling artifacts, modern biodiversity may not be much different from biodiversity 300 million years ago., whereas others consider the fossil record reasonably reflective of the diversification of life. Estimates of the present global macroscopic species diversity vary from 2 million to 100 million, with a best estimate of somewhere near 9 million, the vast majority arthropods. Diversity appears to increase continually in the absence of natural selection.¹⁰

⁸ ibid
⁹ ibid
¹⁰ ibid

Most biologists agree however that the period since human emergence is part of a new mass extinction, named the Holocene extinction event, caused primarily by the impact humans are having on the environment. It has been argued that the present rate of extinction is sufficient to eliminate most species on the planet Earth within 100 years. New species are regularly discovered (on average between 5–10,000 new species each year, most of them insects) and many, though discovered, are not yet classified (estimates are that nearly 90% of all arthropods are not yet classified). Most of the terrestrial diversity is found in tropical forests and in general, land has more species than the ocean; some 8.7 million species may exist on Earth, of which some 2.1 million live in the ocean.¹¹

D) IMPORTANCE OF BIODIVERSITY:

Biodiversity boosts ecosystem productivity where each species, no matter how small, all have an important role to play. For example:

1. A larger number of plant species means a greater variety of crops.
2. Greater species diversity ensures natural sustainability for all life forms.
3. Healthy ecosystems can better withstand and recover from a variety of disasters.

And so, while we dominate this planet, we still need to preserve the diversity in wildlife.

A healthy biodiversity provides a number of natural services for everyone:

- 1) Ecosystem services, such as:
 - a) Protection of water resources.
 - b) Soils formation and protection.
 - c) Nutrient storage and recycling.
 - d) Pollution breakdown and absorption.
 - e) Contribution to climate stability.
 - f) Maintenance of ecosystems.

¹¹ Ibid

g) Recovery from unpredictable events.

2) Biological resources, such as:

a) Food.

b) Medicinal resources and pharmaceutical drugs.

c) Wood products.

d) Ornamental plants.

e) Breeding stocks, population reservoirs.

f) Future resources.

g) Diversity in genes, species and ecosystems.

3) Social benefits, such as:

a) Research, education and monitoring.

b) Recreation and tourism.

c) Cultural values.

That is quite a lot of services we get for free. The cost of replacing these (if it was possible) would be extremely expensive. It therefore makes economic and development sense to move towards sustainability.

To prevent the well known and well documented problems of genetic defects caused by inbreeding, species need a variety of genes to ensure successful survival. Without this, the chances of extinction increases. And as we start destroying, reducing and isolating habitats, the chances for interaction from species with a large gene pool decreases. While there might be “survival of the fittest” within a given species, each species depends on the services

provided by other species to ensure survival. It is a type of cooperation based on mutual survival and is often what a “balanced ecosystem.”¹²

E) INTERDEPENDENCY VS HUMAN INTERVENTION:

Many people may support environmental causes to help preserve the “beauty” of Nature. However, that is in a strange way, not really a justifiable excuse as it is a subjective human view. For many decades, various environmentalists, biologists and other scientists, have viewed the entire earth as a massive living organism or system due to the interdependent nature of all species within it. Some cultures have recognized this kind of inter-relationship for a very long time. Some have termed this Gaia. While there are disagreements and differences on how this works, it suggests that ecological balance and biodiversity are crucial for all of earth, not just humans.¹³

1) BIODIVERSITY AND HUMAN HEALTH:

Biodiversity's relevance to human health is becoming an international political issue, as scientific evidence builds on the global health implications of biodiversity loss. This issue is closely linked with the issue of climate change, as many of the anticipated health risks of climate change are associated with changes in biodiversity (e.g. changes in populations and distribution of disease vectors, scarcity of fresh water, impacts on agricultural biodiversity and food resources etc.) This is because the species most likely to disappear are those that buffer against infectious disease transmission, while surviving species tend to be the ones that increase disease transmission, such as that of West Nile Virus, Lyme disease and Hantavirus, according to a study done co-authored by Felicia Keesing, an ecologist at Bard College, and Drew Harvell, associate director for Environment of the Atkinson Center for a Sustainable Future (ACSF) at Cornell University.

¹² <http://www.globalissues.org/article/170/why-is-biodiversity-important-who-cares> (visited on 02/05/2014)

¹³ *ibid*

The growing demand and lack of drinkable water on the planet presents an additional challenge to the future of human health. Partly, the problem lies in the success of water suppliers to increase supplies, and failure of groups promoting preservation of water resources. While the distribution of clean water increases, in some parts of the world it remains unequal. According to *2008 World Population Data Sheet*, only 62% of least developed countries are able to access clean water.

Some of the health issues influenced by biodiversity include dietary health and nutrition security, infectious disease, medical science and medicinal resources, social and psychological health. Biodiversity is also known to have an important role in reducing disaster risk, and in post-disaster relief and recovery efforts. Biodiversity provides critical support for drug discovery and the availability of medicinal resources. A significant proportion of drugs are derived, directly or indirectly, from biological sources: at least 50% of the pharmaceutical compounds on the US market are derived from plants, animals, and micro-organisms, while about 80% of the world population depends on medicines from nature (used in either modern or traditional medical practice) for primary healthcare. Only a tiny fraction of wild species has been investigated for medical potential. Biodiversity has been critical to advances throughout the field of bionics. Evidence from market analysis and biodiversity science indicates that the decline in output from the pharmaceutical sector since the mid-1980s can be attributed to a move away from natural product exploration ("bio prospecting") in favour of genomics and synthetic chemistry, indeed claims about the value of undiscovered pharmaceuticals may not provide enough incentive for companies in free markets to search for them because of the high cost of development; meanwhile, natural products have a long history of supporting significant economic and health innovation. Marine ecosystems are particularly important, although inappropriate bio prospecting can increase biodiversity loss, as well as violating the laws of the communities and states from which the resources are taken.¹⁴

¹⁴ <http://en.wikipedia.org/wiki/Biodiversity> (visited on 01/05/2014)

2) BIODIVERSITY, BUSINESS AND INDUSTRY:

Many industrial materials derive directly from biological sources. These include building materials, fibres, dyes, rubber and oil. Biodiversity is also important to the security of resources such as water, timber, paper, fibre, and food. As a result, biodiversity loss is a significant risk factor in business development and a threat to long term economic sustainability.¹⁵

3) BIODIVERSITY, LEISURE, CULTURAL AND AESTHETIC VALUE:

Biodiversity enriches leisure activities such as hiking, bird watching or natural history study. Biodiversity inspires musicians, painters, sculptors, writers and other artists. Many cultures view themselves as an integral part of the natural world which requires them to respect other living organisms. Popular activities such as gardening, fish keeping and specimen collecting strongly depend on biodiversity. The number of species involved in such pursuits is in the tens of thousands, though the majority do not enter commerce.

The relationships between the original natural areas of these often exotic animals and plants and commercial collectors, suppliers, breeders, propagators and those who promote their understanding and enjoyment are complex and poorly understood. The general public responds well to exposure to rare and unusual organisms, reflecting their inherent value. Philosophically it could be argued that biodiversity has intrinsic aesthetic and spiritual value to mankind *in and of itself*. This idea can be used as a counterweight to the notion that tropical forests and other ecological realms are only worthy of conservation because of the services they provide.¹⁶

4) BIODIVERSITY AND ECOSYSTEM SERVICES:

"Ecosystem services are the suite of benefits that ecosystems provide to humanity."

These services come in three flavors:

¹⁵ ibid

¹⁶ ibid

1. Provisioning services which involve the production of renewable resources (e.g.: food, wood, fresh water).
2. Regulating services which are those that lessen environmental change (e.g.: climate regulation, pest/disease control).
3. Cultural services represent human value and enjoyment (e.g.: landscape aesthetics, cultural heritage, outdoor recreation, and spiritual significance).¹⁷

F) THREAT TO BIODIVERSITY:

Extinction is a natural event and, from a geological perspective, routine. We now know that most species that have ever lived have gone extinct. The average rate over the past 200 million years is 1-2 species per year, and 3-4 families per million years. The average duration of a species is 2-10 million years (based on last 200 million years). There have also been occasional episodes of mass extinction, when many taxa representing a wide array of life forms have gone extinct in the same blink of geological time. In the modern era, due to human actions, species and ecosystems are threatened with destruction to an extent rarely seen in earth history. Probably only during the handful of mass extinction events have so many species been threatened, in so short a time.

What are these human actions? There are many ways to conceive of these - let's consider two:

First, we can attribute the loss of species and ecosystems to the accelerating transformation of the earth by a growing human population. As the human population passes the six billion mark, we have transformed, degraded or destroyed roughly half of the world's forests. We appropriate roughly half of the world's net primary productivity for human use. We appropriate most available fresh water, and we harvest virtually all of the available productivity of the oceans. It is little wonder that species are disappearing and ecosystems are being destroyed.

Second, we can examine five specific types of human actions that threaten species:

¹⁷ ibid

- 1) **Hunting:** Over hunting has been a significant cause of the extinction of hundreds of species and the endangerment of many more, such as whales and many African large mammals. Most extinction over the past several hundred years are mainly due to over-hunting for food, fashion and profit. Commercial hunting, both legal and illegal (poaching), is the principal threat. Snowy egret, passenger pigeon, heath hen are USA examples. At \$16,000 per pound, and \$40,000 to \$100,000 per horn, it is little wonder that some rhino species are down to only a few thousand individuals, with only a slim hope of survival in the wild. The pet and decorative plant trade falls within this commercial hunting category, and includes a mix of legal and illegal activities. The annual trade is estimated to be at least \$5 billion, with perhaps 1/4 to 1/3 of it illegal. Sport or recreational hunting causes no endangerment of species where it is well regulated, and may help to bring back a species from the edge of extinction. Many wildlife managers view sport hunting as the principal basis for protection of wildlife. While over-hunting, particularly illegal poaching remains a serious threat to certain species, for the future, it is less important than other factors mentioned next.

- 2) **Habitat loss/degradation/fragmentation:** is an important cause of known extinctions. As deforestation proceeds in tropical forests, this promises to become “THE” cause of mass extinctions caused by human activity. All species have specific food and habitat needs. The more specific these needs and localized the habitat, the greater the vulnerability of species to loss of habitat to agricultural land, livestock, roads and cities. In the future, the only species that survive are likely to be those whose habitats are highly protected, or whose habitat corresponds to the degraded state associated with human activity. Tropical forests are so important because they harbor at least 50%, and perhaps more, of world's biodiversity. Direct observations, reinforced by satellite data, documents that these forests are declining. The original extent of tropical rain forests was 15 million km². Now there remains about 7.5-8 million km², so half is gone. The current rate of loss is estimated at near 2% annually (100,000 km² destroyed, another 100,000 km² degraded). Habitat fragmentation is a further aspect of habitat loss that often goes unrecognized. The forest, meadow, or other habitat that remains generally is in small, isolated bits rather than in large, intact units. Each is tiny islands that can at best maintain a very small population. Environmental fluctuations, disease, and other chance factors make such small isolates highly vulnerable to extinction. Any species that requires a large

home range, such as a grizzly bear, will not survive if the area is too small. Finally, we know that small land units are strongly affected by their surroundings, in terms of climate, dispersing species, etc. As a consequence, the ecology of a small isolate may differ from that of a similar ecosystem on a larger scale. For the future, habitat loss, degradation, and fragmentation combined is the single most important factor in the projected extinction crisis.

- 3) **Invasion of non-native species:** is an important and often-overlooked cause of extinctions. The African Great Lakes - Victoria, Malawi and Tanganyika - are famous for their great diversity of endemic species, termed "species flocks", of cichlid fishes. In Lake Victoria, a single, exotic species, the Nile Perch, has become established and may cause the extinction of most of the native species, by simply eating them all. It was a purposeful introduction for subsistence and sports fishing, and a great disaster. Of all documented extinctions since 1600, introduced species appear to have played a role in at least half. The clue is the disproportionate number of species lost from islands: some 93% of 30 documented extinctions of species and sub-species of amphibians and reptiles, 93% of 176 species and sub-species of land and freshwater birds, but only 27% of 114 species and subspecies of mammals.

Why are island species so vulnerable and why is this evidence of the role of non-indigenous species? Islands are laboratories for evolution (occur when the removal of one species (an extinction event) or the addition of one species (an invasion event) affects the entire biological system. Domino effects are especially likely when two or more species are highly inter-dependent, or when the affected species is a "keystone" species, meaning that it has strong connections to many other species. The seeds of the tree *Calvaria major*, now found exclusively on the island of Mauritius, must pass through the abrasive gut of a large animal in order to germinate. Their tough seed coats are protection against digestion, but also a kind of living coffin, for the seed cannot germinate unless abraded. None of the animals currently on Mauritius have that ability. The dodo (a 25 kg pigeon), hunted to extinction in the late 17th century, probably was the key to recruitment in this species. Some seeds, abraded, roughened, and excreted by dodos, germinated and grew. Today, no seeds germinate, and only a few very old trees now survive. The black footed

ferret was once very abundant in the western prairies. It preyed upon prairie dogs and used their burrows to nest in. Poisoning of prairie dogs has greatly reduced their abundance, and the black footed ferret is now the rarest mammal in North America.

- 4) **Pollution from chemical contaminants:** certainly poses a further threat to species and ecosystems. While not commonly a cause of extinction, it likely can be for species whose range is extremely small, and threatened by contamination. Several species of desert pupfish, occurring in small isolated pools in the US southwest, are examples.
- 5) **Climate change:** A changing global climate threatens species and ecosystems. The distribution of species (biogeography) is largely determined by climate, as is the distribution of ecosystems and plant vegetation zones (biomes. Climate change may simply shift these distributions but, for a number of reasons, plants and animals may not be able to adjust. The pace of climate change almost certainly will be more rapid than most plants are able to migrate. The presence of roads, cities, and other barriers associated with human presence may provide no opportunity for distributional shifts. Parks and nature reserves are fixed locations. The climate that characterizes present-day Yellowstone Park will shift several hundred miles northward. The park itself is a fixed location. For these reasons, some species and ecosystems are likely to be eliminated by climate change. Agricultural production likely will show regional variation in gains and losses, depending upon crop and climate. As a consequence of these multiple forces, many scientists fear that by end of next century, perhaps 25% of existing species will be lost.¹⁸ Climate change is increasingly forcing species away from their habitats in search of more favourable temperatures, and scientists fear not all species will survive the change.¹⁹

¹⁸ <http://www.globalchange.umich.edu/globalchange2/current/lectures/biodiversity/biodiversity.html> (visited on 10/05/2014)

¹⁹ <http://science.howstuffworks.com/environmental/conservation/issues/biggest-threat-to-biodiversity.html> (visited on 10/05/2014)

Earth is a planet of unfathomable biodiversity. Scientists have already identified nearly 2 million individual species, and even conservative estimates state that more than 9 million more remain undiscovered. The planet's amazing variety of life is more than just an academic curiosity; humans depend on it. For instance, farmers rely on worms, bacteria and other organisms to break down organic waste and keep soil rich in nitrogen, processes vital to modern agriculture. Pharmaceutical companies use a wide array of plants and animals to synthesize medications, and we can only guess how many medicinal breakthroughs reside in Earth's undiscovered species. A stable food supply and a source for pharmaceuticals are only a couple of the benefits Earth's biodiversity provides. Earth's plant life mitigates the effect of global warming by absorbing carbon dioxide, yet 90 percent of those plants (and nearly two-thirds of all food crops) depend on the nearly 190,000 species of pollinating insects. Scientists from Cornell even went so far as to add up the value of the different services Earth's plants and animals provide, and after factoring everything from ecotourism to biological pest control, they arrived at a grand total of \$2.9 trillion -- and that was back in 1997.

Clearly, the planet would be a much different place without its rich and diverse ecosystems, and while it's hard to imagine what that place would look like; we may not have to if we can't protect the planet from the looming threats to biodiversity.²⁰

MAIN THREATS	SOME UNDERLYING CAUSES
THREATS IN TERRESTRIAL AREAS	
1) Degradation, destruction and fragmentation of natural habitats	Spread of the urbanised areas, road network and industrial areas and associated problems (noise, pollution); abandon of former agricultural practices that were favourable to biodiversity.

²⁰ <http://science.howstuffworks.com/environmental/conservation/issues/biggest-threat-to-biodiversity.html> (visited on 10/05/2014)

2) Decrease in the capacity of the agricultural areas to host wildlife	Intensification of agricultural practices (yielding pollution and disturbance) and disappearance of landscape elements that provide food and shelter that are exploitable by wildlife (such as hedges, trees, ponds, etc.)
3) Pollution of soils, air and water	Excess of heavy metals (industry, roads), manure and pesticides (agriculture) and other pollutants .
4) Invasions by alien species	International trade and transport (roads, railways, rivers), gardening practices, exotic trees in forestry, exotic pests released in the wild, climate change, etc.
5) Epidemics affecting wildlife	Arrivals of pathogens that are favoured by the introduction of exotic species, pollution and the destruction of habitats.
6) Climate change	Carbon emissions, deforestation and other land use changes due to human activities.
7) Desiccation of soils and wetlands	Excess pumping of underground water tables.
8) Recreation and leisure	Overuse of green open spaces and wild areas, little respect for nature, mountain biking and motor sports in fragile areas, dogs not on leash.

THREATS IN MARINE AREAS

1) Overfishing and decline of species	Industrial fishing, overexploitation of target species, by-catch species.
2) Pollution and eutrophication	Land-based activities (river run-off), atmospheric deposition, maritime traffic.
3) Degradation and destruction of the sea floor	Beam trawling, dredging, sand and gravel extraction.

4) Alien species introductions	Maritime trade (ballast waters, fouling), leisure navigation, mariculture, climate change.
5) Leisure and tourism	Coastal development, water quality in summer (high population), mechanical beach cleaning, noise and other perturbations due to the high population. ²¹

G) BIODIVERSITY IN INDIA:

India is one of the 12 mega biodiversity countries of the world. India has a rich and varied heritage of biodiversity covering ten bio geographical zones-the trans Himalayan, the Himalayan, the Indian desert, the semi-arid zones, the Western Ghats, the Deccan Peninsula, the Gangetic Plain, North-east India and the islands and coasts. India is well endowed at the three levels of biodiversity-the genes, the species and the ecosystem and accounts for 7-8% of the recorded species of the world with only 2.4 % of the global land area. Over 47,000 species of plants and 89,000 species of animals have been inventoried and two regions in India- the Western Ghats and the Eastern Himalayan region are included amongst the 25 global biodiversity hotspots of the world. This biological diversity is reflected in the cultural diversity of the people whose existence is tied to the continued maintenance and sustainable use of biological resources. India has a rich ethos of biological conservation and traditional knowledge systems and these practices have given rise to informal and localized in situ conservation. Traditional farming practices are directly responsible for the country's treasure trove of agro-diversity. This respect for nature continues to date, and the government has institutionalized biodiversity conservation by undertaking several activities for its conservation and sustainable use.

India also has three of 34 “global biodiversity hotspots” - unique, biologically rich areas which are facing severe conservation threats. The rapid rate of hotspot degradation makes it imperative that conservation science be pursued immediately and vigorously in these habitats,

²¹ <http://www.biodiv.be/biodiversity/threats> (visited on 10/05/2014)

to devise effective measures which curtail the rapidly diminishing biodiversity, and to protect its unique biota. The value of this biodiversity for sustaining and nourishing human communities is immense. To take an example, the ecosystem services from the forested watersheds of two great mountain chains, the Himalayas and the Western Ghats, indirectly support several million people in India. Open and free access to biodiversity information is essential to promote conservation, management and sustainable use of biodiversity and has immense potential to increase the current and future value of the country's biodiversity for a sustainable society.²²

Article 48-A and Article 51-A (G) of the Directive Principles of State Policy in the Constitution of India emphasizes that "*the State shall endeavour to protect and improve the environment and to safeguard the forests and wildlife in the country, and to protect and improve the national environment including the forests, lakes, rivers and wildlife and to have compassion for the living creatures.*" A focused articulation of these concerns in programmes and policies was intensified after the 1992 Rio Summit and India's becoming a party to the Convention on Biological Diversity (CBD). The CBD offered opportunities to realize benefits from biological resources and associated traditional knowledge. The contracting parties to the CBD were, therefore required to integrate considerations of conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies. To translate the objectives of CBD, each country is required to bring in suitable legislation to facilitate in-situ and ex-situ conservation, sustainable use, research and training, awareness and education impact assessment, regulating access to genetic resources and transfer of technology.

In India, our policy makers felt that three broad activity areas could help achieve realizing the broad vision of biodiversity conservation and its sustainable use: -

1. Management issues dealing with the development of national level institutions, strategies, legislation, policies, plans and programmes for the conservation and

²² http://thewesternghats.indiabiodiversity.org/biodiversity_in_india (visited on 10/05/2014)

sustainable use of biological diversity; measures to encourage a greater understanding and appreciation of the value of biological diversity; and environmental impact assessments;

2. Data and information needs, that is research, data collection, inventories and the networking and sharing of information through various means, and
3. International and regional cooperation and coordination for strengthening communication, technical and scientific collaboration and promoting co-operation between parties to relevant conventions.²³

We shall look into the Biodiversity Convention more deeply in the following chapter.

²³ http://www.environmental-auditing.org.cn/english/EN/articleshow_ArtID_996.htm (visited on 15/05/2014)

BIODIVERSITY CONVENTION

The Convention on Biological Diversity (CBD), known informally as the *Biodiversity Convention*, is a multilateral treaty. The Convention has three main goals:

1. *conservation of biological diversity (or biodiversity);*
2. *sustainable use of its components; and*
3. *fair and equitable sharing of benefits arising from genetic resources*

In other words, its objective is to develop national strategies for the conservation and sustainable use of biological diversity. It is often seen as the key document regarding sustainable development.

The Convention was opened for signature at the Earth Summit in Rio de Janeiro on 5 June 1992 and entered into force on 29 December 1993. 2010 was the International Year of Biodiversity. The Secretariat of the Convention on Biological Diversity is the focal point for the International Year of Biodiversity. At the 2010 10th Conference of Parties (COP) to the Convention on Biological Diversity in October in Nagoya, Japan, the Nagoya Protocol was adopted. On 22 December 2010, the UN declared the period from 2011 to 2020 as the UN-Decade on Biodiversity. They, hence, followed a recommendation of the CBD signatories during COP10 at Nagoya in October 2010.

The convention recognized for the first time in international law that the conservation of biological diversity is "a common concern of humankind" and is an integral part of the development process. The agreement covers all ecosystems, species, and genetic resources. It links traditional conservation efforts to the economic goal of using biological resources sustainably. It sets principles for the fair and equitable sharing of the benefits arising from the use of genetic resources, notably those destined for commercial use. It also covers the rapidly expanding field of biotechnology through its Cartagena Protocol on Bio - safety, addressing

technology development and transfer, benefit-sharing and bio-safety issues. Importantly, the Convention is legally binding; countries that join it ('Parties') are obliged to implement its provisions.

The convention reminds decision-makers that natural resources are not infinite and sets out a philosophy of sustainable use. While past conservation efforts were aimed at protecting particular species and habitats, the Convention recognizes that ecosystems, species and genes must be used for the benefit of humans. However, this should be done in a way and at a rate that does not lead to the long-term decline of biological diversity. The convention also offers decision-makers guidance based on the precautionary principle that where there is a threat of significant reduction or loss of biological diversity, lack of full scientific certainty should not be used as a reason for postponing measures to avoid or minimize such a threat. The Convention acknowledges that substantial investments are required to conserve biological diversity. It argues, however, that conservation will bring us significant environmental, economic and social benefits in return. The Convention on Biological Diversity of 2010 would ban some forms of geo-engineering.

ISSUES UNDER THE CONVENTION:

Some of the many issues dealt with under the convention include:

- i) Measures and incentives for the conservation and sustainable use of biological diversity.
- ii) Regulated access to genetic resources and traditional knowledge, including Prior Informed Consent of the party providing resources.
- iii) Sharing, in a fair and equitable way, the results of research and development and the benefits arising from the commercial and other utilization of genetic resources with the Contracting Party providing such resources (governments and/or local communities that provided the traditional knowledge or biodiversity resources utilized).

- iv) Access to and transfer of technology, including biotechnology, to the governments and/or local communities that provided traditional knowledge and/or biodiversity resources.
- v) Technical and scientific cooperation.
- vi) Coordination of a global directory of taxonomic expertise (Global Taxonomy Initiative).
- vii) Impact assessment.
- viii) Education and public awareness.
- ix) Provision of financial resources.
- x) National reporting on efforts to implement treaty commitments.

THE CARTAGENA PROTOCOL:

The Cartagena Protocol on Biosafety of the Convention, also known as the Biosafety Protocol, was adopted in January 2000. The Biosafety Protocol seeks to protect biological diversity from the potential risks posed by living modified organisms resulting from modern biotechnology. The Biosafety Protocol makes clear that products from new technologies must be based on the precautionary principle and allow developing nations to balance public health against economic benefits. It will for example let countries ban imports of a genetically if they feel there is not enough scientific evidence the product is safe and requires exporters to label shipments containing genetically modified commodities such as corn or cotton.

INTERNATIONAL BODIES ESTABLISHED BY THE CONVENTION:

- 1) **CONFERENCE OF THE PARTIES:** The convention's governing body is the Conference of the parties (COP), consisting of all governments (and regional economic integration organizations) that have ratified the treaty. This ultimate authority reviews

progress under the Convention, identifies new priorities, and sets work plans for members. The COP can also make amendments to the Convention, create expert advisory bodies, review progress reports by member nations, and collaborate with other international organizations and agreements. The Conference of the Parties uses expertise and support from several other bodies that are established by the Convention. In addition to committees or mechanisms established on an ad hoc basis, two main organs are:

a) SECRETARIAT: The CBD Secretariat. Based in Montreal, it operates under the United Nations Environment Programme. Its main functions are to organize meetings, draft documents, assist member governments in the implementation of the programme of work, coordinate with other international organizations, and collect and disseminate information.

b) SUBSIDIARY BODY FOR SCIENTIFIC, TECHNICAL AND TECHNOLOGICAL ADVICE (SBSTTA): The Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA). The SBSTTA is a committee composed of experts from member governments competent in relevant fields. It plays a key role in making recommendations to the COP on scientific and technical issues. 13th Meeting of the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA-13) held from 18 to 22 February 2008 in the Food and Agriculture Organization at Rome, Italy. SBSTTA-13 delegates met in the Committee of the Whole in the morning to finalize and adopt recommendations on the in-depth reviews of the work programmes on agricultural and forest biodiversity and SBSTTA's modus operandi for the consideration of new and emerging issues. The closing plenary convened in the afternoon to adopt recommendations on inland waters biodiversity, marine biodiversity, invasive alien species and biodiversity and climate change. The current chairperson of the SBSTTA is Dr. Senka Barudanovic.

2) COUNTRY IMPLEMENTATION:

a) NATIONAL BIODIVERSITY STRATEGIES AND ACTION PLANS (NBSAP):

"National Biodiversity Strategies and Action Plans (NBSAPs) are the principal instruments for implementing the Convention at the national level (Article 6). The Convention requires countries to prepare a national biodiversity strategy (or equivalent instrument) and to ensure that this strategy is mainstreamed into the planning and activities of all those sectors whose activities can have an impact (positive and negative) on biodiversity. Up to [2012-02-01], 173

Parties have developed NBSAPs in line with Article 6." For example, the United Kingdom, New Zealand and Tanzania have carried out elaborate responses to conserve individual species and specific habitats. The United States of America, a signatory who has not yet ratified the treaty, has produced one of the most thorough implementation programs through species Recovery Programs and other mechanisms long in place in the USA for species conservation. Singapore has also established a detailed National Biodiversity Strategy and Action Plan. The National Biodiversity Centre of Singapore represents Singapore in the Convention for Biological Diversity.

b) NATIONAL REPORTS:

In accordance with Article 26 of the Convention, Parties prepare national reports on the status of implementation of the Convention.

NAGOYA PROTOCOL:

The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity is a supplementary agreement to the Convention on Biological Diversity. It provides a transparent legal framework for the effective implementation of one of the three objectives of the CBD: the fair and equitable sharing of benefits arising out of the utilization of genetic resources. The Protocol was adopted on 29 October 2010 in Nagoya, Aichi Province, Japan, and will enter into force 90 days after the fiftieth instrument of ratification. Its objective is the fair and equitable sharing of benefits arising from the utilization of genetic resources, thereby contributing to the conservation and sustainable use of biodiversity.

The Nagoya Protocol is intended to create greater legal certainty and transparency for both providers and users of genetic resources by:

- 1) *Establishing more predictable conditions for access to genetic resources.*
- 2) *Helping to ensure benefit-sharing when genetic resources leave the contracting party providing the genetic resources*

By helping to ensure benefit-sharing, the Nagoya Protocol creates incentives to conserve and sustainably use genetic resources, and therefore enhances the contribution of biodiversity to development and human well-being.

COMPLIANCE OBLIGATIONS:

Specific obligations to support compliance with the domestic legislation or regulatory requirements of the contracting party providing genetic resources, and contractual obligations reflected in mutually agreed terms, are a significant innovation of the Nagoya Protocol. Contracting Parties are to:

- 1) Take measures providing that genetic resources utilized within their jurisdiction have been accessed in accordance with prior informed consent, and that mutually agreed terms have been established, as required by another contracting party.
- 2) Cooperate in cases of alleged violation of another contracting party's requirements.
- 3) Encourage contractual provisions on dispute resolution in mutually agreed terms.
- 4) Ensure an opportunity is available to seek recourse under their legal systems when disputes arise from mutually agreed terms.
- 5) Take measures regarding access to justice.
- 6) Take measures to monitor the utilization of genetic resources after they leave a country including by designating effective checkpoints at any stage of the value-chain: research, development, innovation, pre-commercialization or commercialization.²⁴

²⁴ http://en.wikipedia.org/wiki/Convention_on_Biological_Diversity (visited on 10/05/2014)

BIODIVERSITY ACT 2002

Recognizing the sovereign rights of States to use their own biological resources, the Biodiversity Convention expects the parties to facilitate access to genetic resources by other Parties subject to national legislation and on mutually agreed upon terms (Article 3 and 15 of CBD). Article 8(j) of the Convention on Biological Diversity recognizes contributions of local and indigenous communities to the conservation and sustainable utilization of biological resources through traditional knowledge, practices and innovations and provides for equitable sharing of benefits with such people arising from the utilization of their knowledge, practices and innovations. The Biological Diversity Act (BDA) was formulated after India became signatory to the Convention of Biological Diversity. The Biodiversity Act is an important mechanism for regulating access to biological resources and in establishing benefit-sharing arrangements. It was passed by the Parliament of India in December 2002 after a process of consultation among stakeholders. The Act received assent of the President of India on 5th February 2003.

The salient provision of the Act for regulation of access to biological diversity, its conservation and sustainable use are: -

1. Conservation and sustainable use of biological diversity;
2. Conservation and development of areas important from the standpoint of biological diversity by declaring them as biological diversity heritage sites;
3. Protection and rehabilitation of threatened species;
4. To respect and protect knowledge of local communities related to bio diversity;
5. Regulation of access to biological resources of the country with the purpose of securing equitable share in benefits arising out of biological resources and associated knowledge relating to biological resources;

6. To secure sharing of benefits with local people as conservers of biological resources and holders of knowledge and information relating to the use of biological resources;
7. Involvement of institutions of self-government in the broad scheme of the implementation of the Act through constitution of committees; and
8. Development of national strategies, plans, programmes for the objectives of the Act including measures for the identification and monitoring of areas rich in biodiversity, promotion of in situ and ex situ conservation and incentives for research and training.

INSTITUTIONAL MECHANISMS UNDER THE BIOLOGICAL DIVERSITY ACT

The legislation provides for setting up of a *three-tiered structure at national, state and local level:-*

1. the **National Biodiversity Authority (NBA)** which deals with matters relating to requests for access by foreign individuals, institutions or companies, and all matters relating to transfer of results of research to any foreigner; imposition of terms and conditions to secure equitable sharing of benefits and approval for seeking any form of Intellectual Property Rights (IPRs) in or outside India for an invention based on research or information pertaining to a biological resource obtained from India.
2. The **State Biodiversity Boards (SBB)** to deal with matters relating to access by Indians for commercial purposes and restricts any activity that violates the objectives of conservation, sustainable use and equitable sharing of benefits.
3. The **Biodiversity Management Committees (BMC)** at the local level to be set up by institutions of self-government in their respective areas for conservation, sustainable use, documentation of biodiversity and chronicling of knowledge relating to biodiversity. Biodiversity Management Committees are to be consulted by the National Biodiversity Authority and State Biodiversity Boards

on matters related to use of biological resources and associated knowledge within their jurisdiction.

The law sets up a new forum — the National Green Tribunal (NGT) — to redress and remedy environment-related matters. It is thereby intrinsically linked with the environment, water, forest, air and biodiversity legislations. On June 2, India's Green Tribunal law saw the light of day. The country was supposed to make such a law after agreeing to the decisions of the United Nations Conference on Environment and Development at Rio in 1992. This requirement, backed with the Planning Commission's recommendations, finally saw the tribunal's birth despite several questions in Parliament. For instance, there are some sections of the new legislation that specifically deal with the Biological Diversity (BD) Act, 2002. The import of these needs to be understood. The BD Act has a three-tier institutional structure: a National Biodiversity Authority (NBA), State Biodiversity Boards (SBBs) in every state and Biodiversity Management Committees (BMCs) at local village/urban levels. The Green Tribunal has been given appellate jurisdiction over orders and benefit-sharing decisions of the NBA and SBBs. The BD Act is being duly amended to that effect by the NGT Act, 2010.

Thus after the Green Tribunal what changes is that no appeals can be taken under the BD Act to the High Court. This in effect repeals Section 52 of the BD Act, replacing it with a new Section 52A. Post-NGT any person aggrieved by the NBA or SBB must approach the NGT. Previously, any aggrieved person could challenge any order by the NBA or SBB before a High Court. Appeals and petitions of this nature can now only be filed before the Green Tribunal.²⁵

All foreign national/organizations require prior approval of the NBA for obtaining biological resources and/or associated knowledge for any use. Indian individuals/entities require approval of the NBA for transferring results of research with respect to any biological resources to foreign nationals/ organizations. Indian citizens and organizations are required to

²⁵ <http://www.deccanherald.com/content/79531/with-green-tribunal-biodiversity-appeal.html> (visited on 10/05/2014)

give prior intimation to the concerned SBB about obtaining any biological resource for commercial use, and the SBB may prohibit or restrict the activity if found to violate the objectives of conservation, sustainable use and benefit-sharing.

Another function of the NBA is to take measures to oppose the grant of IPRs in any country outside India on any biological resource obtained from India or knowledge associated with such a biological resource. For ensuring equitable sharing of benefits arising from the use of biological resources and associated knowledge, the Biodiversity Act, stipulate prior approval of the National Biodiversity Authority (NBA) before their access. While granting approval, NBA will impose terms and conditions that secure equitable sharing of benefits. Local people and communities of the area will have free access to use biological resources within the country. Issues relating to protecting, recognizing and rewarding traditional knowledge (TK) associated with biological resources are very complex. The modalities of protecting Traditional Knowledge are still emerging and evolving. The nature of entitlements and share in benefits is also a grey area. Realizing the need to ensure that the holders of Traditional Knowledge which is not still in the public domain should be able to get the benefits arising from the use of such knowledge, an enabling provision has been made for protecting the Traditional Knowledge in the Biodiversity Act. The Act provides for protection of knowledge of local people relating to biodiversity through measures such as registration of such knowledge, and development of a *sui generis* system. While granting approvals for access, NBA will impose terms and conditions so as to secure equitable sharing of benefits. These benefits inter alia include:-

1. Grant of joint ownership of intellectual property rights to the National Biodiversity Authority, or where benefit claimers are identified, to such benefit claimers;
2. Transfer of technology;
3. Location of production, units in such areas;

4. Association of Indian scientists, benefit claimers and the local people with research and development in biological resources and bio-survey and bio-utilization;
5. Setting up of a venture capital fund; and
6. Payment of monetary compensation and other non-monetary benefits to the benefit claimers as the National Biodiversity Authority may deem fit.

The legislation provides for setting up of biodiversity funds at central, state and local levels. Benefits are to be given directly to individuals or group of individuals only in cases where biological resources or knowledge are accessed directly from them. In all other cases, monetary benefits will be deposited in the Biodiversity Fund which in turn will be used for the conservation and development of biological resources and socio-economic development of areas from where resources have been accessed.

NATIONAL POLICY AND MACRO LEVEL ACTION STRATEGY ON BIODIVERSITY:

India has also prepared a *National Policy and Macro Level Action Strategy* on Biodiversity through an extensive consultative process. This document is a macro level statement of policies, gaps and further actions needed for conservation and sustainable use of biological diversity. The main goals of the National Policy and Macro Level Action Strategy on Biodiversity are: -

1. Achieving conservation and sustainable use of biological diversity through consolidation of ongoing efforts and initiating new steps;
2. Securing participation of State Governments, communities, people, NGOs, industry and other stakeholders including women in the conservation and sustainable use of components of biodiversity;
3. Realizing consumptive and non consumptive value of biodiversity through necessary investments in R&D and biotechnology development;

4. Ensure benefits to India as country of origin of biological resources and to local communities and people as conservers of biodiversity, creators and holders of indigenous knowledge systems, innovations and practices; and
5. Ensure consideration of biodiversity concerns in other sectoral policies and programmes.

NATIONAL BIODIVERSITY STRATEGY AND ACTION PLAN:

In a major advancement for the cause of biodiversity conservation in the country and in compliance with requirements of the Convention on Biological Diversity, the National Biodiversity Strategy and Action Plan is being drafted with funding support from the Global Environmental Facility. The strategy and action plan are very broad in scope and comprehensive in coverage and detailed action plans are proposed at sub-state, state, regional and national levels based on the framework Policy and Action Strategy on Biodiversity. NBSAP is India's biggest planning and development process aiming at conservation and sustainable use of biological diversity. A decentralized approach has been adopted for developing the NBSAP. Under the NBSAP, about 20 local micro-planning process at village to district levels, 33 state and union territory level processes, 10 planning exercises at ecological regions cutting across states, are engaged in collecting a variety of area specific information and perspectives. In addition, national working groups are preparing action plans on 14 themes. The process is participatory, tapping into the knowledge of diverse stakeholders and incorporating a variety of strategies for its development such as workshops and public meetings, consultations, expert inputs, etc. The expected outcome of the NBSAP project is an implementable and realistic action plan, which can be easily translated into a number of projects at ground level in areas of priority that would contribute significantly towards conservation and sustainable use of biodiversity in the country.²⁶

²⁶ http://www.environmental-auditing.org.cn/english/EN/articleshow_ArtID_996.htm (visited on 15/05/2014)

Biodiversity has been defined under **Section 2(b)** of the Act as *"the variability among living organisms from all sources and the ecological complexes of which they are part, and includes diversity within species or between species and of eco-systems"*. The Act also defines, *"Biological resources"* as *"plants, animals and micro-organisms or parts thereof, their genetic material and by-products (excluding value added products) with actual or potential use or value, but does not include human genetic material."*

REGULATIONS:

A *foreigner, non-resident Indian* as defined in clause (30) of section 2 of *The Income-tax Act, 1961* or a *foreign company or body corporate* need to take permission from the NBA before obtaining any biological resources or associated knowledge from India for research, survey, commercial utilisation. Indian citizens or body corporate need to take permission from the concerned State Biodiversity Board. Result of research using biological resources from India cannot be transferred to a non-citizen or a foreign company without the permission of NBA. However, no such permission is needed for publication of the research in a journal or seminar, or in case of a collaborative research made by institutions approved by Central Government. No person should apply for patent or other form of intellectual property protection based on the research arising out of biological resources without the permission of the NBA. The NBA while granting such permission may make an order for benefit sharing or royalty based on utilisation of such protection.

BENEFIT SHARING:

Benefit sharing out of usage of biological resources can be done in following manner:

1. Joint ownership of intellectual property rights.
2. Transfer of technology.
3. Location of production, research development units in the area of source.
4. Payment of monetary and non-monetary compensation.
5. Setting up of venture capital fund for aiding the cause of benefit claimers.

The application of the prior approval system is limited to foreign citizens, foreign corporations and Indian citizens who are non-resident. Indian citizens and Indian companies are expressly excluded from this provision. The Biodiversity Act provides a lesser degree of regulation to Indian citizens and corporations registered in India by requiring prior intimation from the State Biodiversity Board. There is a significant difference between 'prior approval' and 'prior intimation'. Foreign citizens and companies have to wait until they get permission from the National Biodiversity Authority. At the same time their Indian counterparts have to just intimate and do not have to wait for the permission.

This differential treatment would likely to have implications on farmers' rights. Regulation at the point of access could be considered as an effective measure through which the scope and extent of benefit sharing can be determined. Moreover, this is the stage where key norms of prior informed consent and mutually agreed norms can be effectuated fruitfully. This is apparent in the Biodiversity Act where it gives power to the National Biodiversity Authority to put terms and conditions in the prior approval including terms and conditions regarding benefit sharing. While this differential treatment can be justified on the ground that the most serious breaches will occur when biological resources or traditional knowledge are transferred to foreign countries without regulation, this does not seem to make much sense so far as the rights of the traditional farmers and local communities are concerned.

Equitable sharing of benefit is another important area where the Biodiversity Act is linked to farmers' rights. The Biodiversity Act makes it a mandatory duty of the National Biodiversity Authority to ensure that the terms and conditions subject to which approval is granted secure equitable sharing of benefits. The Biodiversity Act also provides that the benefit sharing arrangement shall be in accordance with mutually agreed terms and conditions between the person applying for approval, local bodies concerned and the benefit claimers.

The Biodiversity Act gives an illustrated list of benefits that could be shared. This includes joint ownership of intellectual property rights, transfer of technology, establishment of research and development units in the area of benefit claimers and monetary compensation. As a general strategy, the Biodiversity Act provides that the compensation amount is to be deposited in the National Biodiversity Fund. It is further envisaged that the amount may be

paid to claimers directly if it is possible to identify precisely the claimers. However, this is subject to the discretion of the National Biodiversity Authority.

The idea of equitable sharing of benefits is further facilitated under the Biodiversity Act by making it mandatory for any person intending to apply for intellectual property rights, in or outside India, for any inventions based on biological resources obtained from India to get prior approval from the National Biodiversity Authority. One of the purposes of this provision is to ensure equitable benefit sharing by empowering the National Biodiversity Authority to put conditions in this regard on approval. This provision does not distinguish between foreign citizens and corporations and their Indian counterparts. However, this provision is not applicable to the registration of plant varieties under the PVP Act.²⁷

PENALTIES:

If a person, violates the regulatory provisions he will be "*punishable with imprisonment for a term which may extend to five years, or with fine which may extend to ten lakh rupees and where the damage caused exceeds ten lakh rupees such fine may commensurate with the damage caused, or with both.*"

Any offence under this Act is non-bailable and cognizable.²⁸

MAIN

PROVISIONS:

The NBA deals with all matters relating to requests for access by foreign individuals, institutions or companies, and transfer of results of research to any foreigner. While granting approvals, NBA imposes conditions which secure equitable sharing of benefits arising out of the use of biological resources and associated knowledge. These benefits could include monetary gains; grant of joint ownership of Intellectual property Rights (IPRs), transfer of technology, association of Indian scientists in research and development, setting up of

²⁷ http://www.lawcollegedehradun.com/lawreview/vol4_issue1_nov12/article3.html (visited on 10/05/2014)

²⁸ http://en.wikipedia.org/wiki/Biological_Diversity_Act,_2002 (visited on 10/05/2014)

venture capital funds etc. Further, NBA's approval is also required before seeking any IPR based on biological material and associated knowledge obtained from India. The NBA also has power to oppose grant of IPRs in any other country on biological resources or associated knowledge obtained or derived from India.

The State Biodiversity Boards (SBBs), constituted by the State Governments, deal with all matters relating to access by Indians for commercial purposes. The Indian industry is required to provide prior intimation to the concerned SBB about the use of biological resources. The SBB has the power to restrict any such activity which violates the objectives of conservation, sustainable use and equitable sharing of benefits. The institutions of self- government are required to set up Biodiversity Management Committees (BMCs) in their respective areas for conservation, sustainable use, documentation of biodiversity and chronicling of knowledge relating to biodiversity. The NBA and SBBs are required to consult the concerned BMCs on matters relating to use of biological resources and associated knowledge within their respective jurisdictions. This mandatory consultation of BMCs by NBA and SBBs ensures formulization of prior informed consent by the communities through involvement of BMCs in decision making process. The BMCs may also levy collection fee for collecting biological resource from their respective areas.

The legislation provides for exemptions : to local people and community for free access to use biological resources within India; to growers and cultivators of biodiversity , and vaidis and hakims to use biological resources; through notification by Central Government of normally traded commodities as not to adversely affect trade of these items; for collaborative research through government sponsored or government approved institutions subject to overall guidelines and approval of the Central Government; and to value added products. ²⁹

²⁹ <http://pib.nic.in/newsite/erelease.aspx?relid=67509> (visited on 10/05/2014)

BIODIVERSITY ACT/RULES AND INTELLECTUAL

PROPERTY RIGHTS

The biodiversity legislation provides for a regulatory system by which access to knowledge relating to biodiversity can be granted. Providing for an approval procedure for a patent or any other intellectual property right based on any Indian biological material and knowledge is seen by several groups campaigning against “patents on life” as a significant departure from the earlier stance of the Government of India. The Act does not prohibit IPRs and therefore the criticism is that it facilitates the privatization of India’s traditional knowledge. The Act only forbids an application for any IPR in or outside India without prior approval of the NBA (Section 6). The NBA may either allow or disallow an application for a patent or any other IPR. Neither the procedure in the relevant Rule 18 nor the Form III for seeking such approval factors in consultation of communities.

On occurrence of an instance of biopiracy, the NBA is empowered by the Act to take any necessary action to oppose the grant of IPR in any country outside India on behalf of the Government of India [Section 18(4)]. In the absence of a globally agreed single forum wherein such cases can be challenged the NBA may have to only engage in fire-fighting at different patent and or trade mark offices overseas.

Indian trade negotiators have at international fora agreed that patents will be allowed on such resources or knowledge only if there is:

1. Disclosure of source and country of origin of the biological resource and of the traditional knowledge used in the invention.
2. Disclosure of Evidence of prior informed consent.
3. Disclosure of Evidence of benefit sharing.³⁰

³⁰ ibid

The IPR provisions in Biodiversity Act must also be seen in the light of the growing pro-IPR trend of the Government of India, more visible in other IPR-related laws & policies such as:

1. The Protection of Plant Varieties and Farmer's Rights Act, 2001 which introduces plant breeder's rights.
2. Amendments in the Patent Act, 1970 towards compliancy of WTO TRIPS' standards.

An IPR sought under the PVP law does not come under the purview of the Biodiversity Act, in other words a person seeking a plant breeder right does not require approval of the NBA. The PVP Authority is only to keep the NBA informed of such grant of rights.

Therefore all the three legislations (Biodiversity Act, Protection of Plant Varieties and Farmer's Rights Act, and Patents Act) move in tandem towards a pro-IPR regime, and in that sense are not "incompatible".

So even though an international convention like the Convention on Biological Diversity (Article 16.5), states that *intellectual property rights must not conflict with the conservation and sustainable use of biodiversity*, the biodiversity law is apparently based on the premise that IPRs & biodiversity conservation are not antithetical! It is important to note that is only after India became a signatory to this convention that the process of drafting the legislation begun in India.

This is how the IPR philosophy or rather politics (contained in the Patents & PVP Legislation) has even corrupted a supposedly conservation oriented legislation.

REMEDIES FOR INFRINGEMENT

India enacted the Biological Diversity Act in 2002 to lay down a framework for biological resources and related traditional knowledge. It established the do's and don'ts vis-à-vis use, access and conservation of plants, animals, micro-organisms, their genetic material or their parts, or traditional knowledge. Since this Act there is enacted a list of activities including research, commercial utilization and patenting, that cannot be undertaken on any of the above resources either without prior permission of the National Biodiversity Authority (NBA) or the knowledge of the concerned State Biodiversity Board (SBB). Each of these bodies also needs to “consult” the Biodiversity Management Committees (BMCs) at the local level, before grant of any approvals. Apart from its regulatory regime the Act also spells out the offences and violations and lays down mechanisms to resolve disputes and provide redressal. The provisions under this Act are in addition to the provisions of the forest and wild life laws in India and do not override those provisions.

“Redressal” is the relief that a legislation provides for violations. It could be in the form of some remedy, compensation for loss or punishment for wrong doing. For that one needs to know what is ILLEGAL under the Biological Diversity Act, the ACTIONS that can be taken under it and by whom.³¹

THE MECHANISMS FOR SETTLING DISPUTES:³²

These mechanisms come into play when permission for accessing biological resources has been granted by a concerned National Biodiversity Authority or State Biodiversity Board and there are reasons for it to be challenged. For instance, one or more SBBs might not agree with the decision of the NBA to grant permission in their state; or the BMCs would not have been consulted or might see ill-effects of approvals given or

³¹ ibid

³²

http://awsassets.wwfindia.org/downloads/offences__disputes_and_remedies_under_indias_biodiversity_law.pdf

might want to challenge any benefit sharing arrangements so determined. Disputes could also arise between two BMCs if only one of them has been consulted and agreed to grant of access to biological resource or traditional knowledge which is not “exclusively” held within the area or practice of that community, e.g., the use of a particular forest produce which has medicinal value etc.

a) Between NBA and SBB: The SBB and/or NBA needs to appeal to the Central Government i.e. Ministry of Environment and Forests (MoEF), New Delhi.

b) Between two SBBs: Concerned SBBs to appeal to MoEF, New Delhi which will refer it to the NBA. These need to be filed in the form of a memorandum of appeal along with authenticated” facts within 30 days of date of the order. Another 15 days time is there in case it can be proved by the appellant that there is sufficient cause for delay.

NBA as a Civil Court The National Biodiversity Authority shall have the same powers as are vested in a civil court under the Code of Civil Procedure, 1908. The NBA can summon or enforce attendance of any person; receive evidence of affidavits; issue commissions for examination of witnesses and or documents; review its decisions etc. *Every proceeding before the NBA will be a judicial proceeding.*

c) Between BMC and NBA or SBB: No procedure prescribed.

d) Between two or more BMCs: No procedure prescribed.

In the above two instances, when communities are involved, despite being part of the institutional structure of the legislation there is no special provision. The BMCs and local communities would need to use mechanisms which are prescribed for any common citizen, i.e. before the High Court.

e) Any person: If any person is aggrieved by any order of the NBA or SBB, they can file an appeal within 30 days of the order or the date of communication to him/her (i.e. rejection, conditions for approval). The High Court can extend the time to 60 days, if it can be proved that there was sufficient cause for the delay.

PENALTIES:

Under Section 55(1) of the Biodiversity Act 2002 states that, “Whoever contravenes or to or abets the contravention of the provisions of section 3 or section 4 or section 6 shall be punishable with imprisonment for a term which may extend to five years, or with fine which may extend to ten lakh rupees and where the damage caused exceeds ten lakh rupees such fine may commensurate with the damage caused, or with both.”

Section 55(2) of the Biodiversity Act 2002 states that, “Whoever contravenes or attempts to contravene or abets the contravention of the provisions of section 7 or any order made under sub-section (2) of section 24 shall be punishable with imprisonment for a term which may extend to three years, or with fine which may extend to five lakh rupees, or with both.”

Penalty for contravention of directions or orders of Central Government, State Government, National Biodiversity Authority and State Biodiversity Boards under Section 56 of the Act shall be punished with a fine which may extend to One Lakh Rupees and in case of a second or subsequent offence, with fine which may extend to Two Lakh Rupees and in the case of continuous contravention with additional fine which may extend to Two Lakh Rupees everyday during which the default continues for which offences the punishment has not been provided anywhere else in the Act.

OFFENCES BY COMPANIES:

Section 57(1) of the Biodiversity Act 2002 provides that:

Where an offence or contravention under this Act has been committed by a company, every person who at the time the offence or contravention was committed was in charge of, and was responsible to, the company for the conduct of the business of the company, as well as the company, shall be deemed to be guilty of the offence or contravention and shall be liable to be proceeded against and punished accordingly:

Provided that nothing contained in this sub-section shall render any such person liable to any punishment provided in this Act, if he proves that the offence or contravention was committed without his knowledge or that he had exercised all due diligence to prevent the commission of such offence or contravention.

Section 57(2) of the Biodiversity Act 2002 provides that:

Notwithstanding anything contained in sub-section (1), where an offence or contravention under this Act has been committed by a company and it is proved that the offence or contravention has been committed with the consent or connivance of, or is attributable to, any neglect on the part of any director, manager, secretary or other officer of the company, such director, manager, secretary or other officer shall also be deemed to be guilty of the offence or contravention and shall be liable to be proceeded against and punished accordingly.

Explanation. -For the purposes of this section,–

(a) "*company*" means any body corporate and includes a firm or other association of individuals; and

(b) "*director*", in relation to a firm, means a partner in the firm.³³

OFFENCES BY INDIAN CITIZENS:

For Indians–citizens, corporations, associations or organisations registered in India, it is *illegal*:-

³³ http://www.wipo.int/wipolex/en/text.jsp?file_id=185798#LinkTarget_322

a) To obtain any biological resource for bio survey, bio-utilisation and commercial utilisation without prior intimation to the concerned State Biodiversity Board [local people and communities, including growers and cultivators of biodiversity, vaidas and hakims are exempt].

b) To go against any order of the State Biodiversity Board passed after consultation with local bodies prohibiting or restricting any activities when it receives intimation.

The punishment for the above mentioned illegality is prison term up to three years and fine up to Rs.5 lakhs.³⁴

OFFENCES BY FOREIGNERS:

Under this law it is *illegal for foreigners* to obtain any biological resource or knowledge for research, commercial use, bio - survey or bio - utilisation without the permission of the National Biodiversity Authority.

The punishment for the same is imprisonment up to five years or fine up to Rs.10 lakhs and where the damage exceeds Rs.10 lakhs fine will be equal to the damage caused.³⁵

OFFENCES BY ANY PERSON:

It is *illegal and an offence* under the Biodiversity Act for any person:-

a) To transfer the results of any research relating to biological resources to any foreign person or organisation without the prior approval of the National Biodiversity Authority (this does not include publication of research papers or dissemination of knowledge in any seminar/workshop).

³⁴

http://awsassets.wwfindia.org/downloads/offences__disputes_and_remedies_under_indias_biodiversity_law.pdf

³⁵ *ibid*

b) To apply for Intellectual Property Rights (like patents, geographical indications, etc.) in or outside India without the prior approval of the National Biodiversity Authority.

The punishment provided by the Biodiversity Act for this illegal act is imprisonment up to five years or fine up to Rs.10 lakhs and where the damage exceeds Rs.10 lakhs fine will be equal to the damage caused. The above punishments also apply to persons/ entities who attempt to contravene or abet such actions.³⁶

DISOBEDIENCE OF THE ORDER OR DIRECTIONS:

Under this law there is also *penalty for any person going against any order or direction of the Central Government, State Government, NBA or SBB* for which no separate penalty is prescribed under this law other than punishments mentioned under above. i.e. fine up to Rs.1 lakh for the first offence, extendable to Rs.2 lakhs in case of the second offence. If this is continuous then it can go up to Rs.2 lakhs every day of the default continuing.³⁷

COGNIZANCE OF OFFENCES:

According to Section 61 no Court shall take cognizance of any offence under this Act except on a complaint made by:

- (a) The Central Government or any authority or officer authorized in this behalf by that Government; or
- (b) Any benefit claimer who has given notice of not less than thirty days in the prescribed manner, of such offence and of his intention to make a complaint, to the Central Government or the authority or officer authorized as aforesaid.³⁸

³⁶ *ibid*

³⁷ *ibid*

³⁸ http://www.wipo.int/wipolex/en/text.jsp?file_id=185798#LinkTarget_322

PROTECTION OF ACTION TAKEN IN GOOD FAITH:

Section 54 of the Biodiversity Act 2002 states that, “No suit, prosecution or other legal proceedings shall lie against the Central Government or the State Government or any officer of the Central Government or the State Government or any member, officer or employee of the National Biodiversity Authority or the State Biodiversity Board for anything which is in good faith done or intended to be done under this Act or the rules or regulations made there under.

CRITICISM

Its key provisions aimed at achieving the Biodiversity Act 2002 are:

1. Prohibition on transfer of Indian genetic material outside the country, without specific approval of the Indian Government;
2. Prohibition on anyone claiming an Intellectual Property Right (IPR), such as a patent, over biodiversity or related knowledge, without permission of the Indian Government;
3. Regulation of collection and use of biodiversity by Indian nationals, while exempting local communities from such restrictions;
4. Measures for sharing of benefits from the use of biodiversity, including transfer of technology, monetary returns, joint Research & Development, joint IPR ownership, etc.;
5. Measures to conserve and sustainably use biological resources, including habitat and species protection, environmental impact assessments (EIAs) of projects, integration of biodiversity into the plans, programmes, and policies of various departments/sectors;
6. Provisions for local communities to have a say in the use of their resources and knowledge, and to charge fees for this;
7. Protection of indigenous or traditional knowledge, through appropriate laws or other measures such as registration of such knowledge;
8. Regulation of the use of genetically modified organisms;
9. Setting up of National, State, and Local Biodiversity Funds, to be used to support conservation and benefit-sharing;
10. Setting up of Biodiversity Management Committees (BMC) at local village level, State Biodiversity Boards (SBB) at state level, and a National Biodiversity Authority (NBA).

While some of the above provisions are progressive, there remain important weaknesses, including the following:

1. It exempts those plants that are registered under the Protection of Plant Varieties and Farmers' Rights (PVPFR) Act, 2001. This Act provides corporations and scientists who are breeding new varieties of crops, to gain intellectual property rights (see more on the relationship between the Biodiversity and Plant Varieties laws, below). Such an exemption means that the progressive provisions listed above, many of which are absent from the PVPFR Act, would not apply to plant varieties registered under PVPFR Act.
2. It does not provide citizens the power to directly approach the courts; such power is restricted to an appeal in the High Court against any order by the NBA or the SBB.
3. It is unnecessarily soft on Indian corporate and other entities, requiring only "*prior intimation*" to a SBB for the commercial use of bioresources, rather than *permission* from the NBA as in the case of foreigners. This is unjustified, given that Indians (especially industrial corporations) are not necessarily any more responsible towards the environment or towards local communities, also some Indian companies could just be local fronts for foreign enterprises.
4. It does not fully empower local communities, to protect their resources and knowledge from being misused, or to generate benefits (except charging collection fees). It has very weak or no representation of local community members on the State Biodiversity Boards or National Biodiversity Authority.
5. The power of declaring a Biodiversity Heritage Sites lies with the state government (Article 37 of the Act): It is important that the heritage sites should be designated only after consultation and moreover consent of the affected communities. Further, these should be in the control/management of local communities, and the provision for compensation made in the State Biodiversity Fund (see Section 32) be applied only where

there is a mutually agreed to dislocation/curbing of rights. Else we will have the people-parks conflict recurring in another form, as decisions for which areas need to be conserved would be top-down.

Several organisations and people feel that the basic framework of the Act is problematic, since it accepts intellectual property rights on biodiversity, could be used to further commercialise biodiversity, and does not truly empower communities. Others feel that the Act provides some potential for checking biopiracy, achieving conservation, and facilitating community action. They stress that a combination of strong rules, and amendments related to the above points, would help strengthen this potential.³⁹

RECOMMENDED ACTIONS:

There is space and time for people to lobby for better rules and Act, for the two following reasons:

1. Every rule made under the Biodiversity Act is to be placed in the Parliament for a period of thirty days and the houses can make changes in the rules (sec 62(3)). This gives the space to make suitable changes in rules, by asking members of Parliament to raise issues in the Parliament.

2. Section 65 of the Biodiversity act gives the “Power to remove difficulties” “(1) If any difficulty arises in giving effect to the provisions of this act, the Central government, may, by order, not inconsistent with the provisions of this Act, remove the difficulty: provided that no such order shall be made after the expiry of a period of two years from the commencement of this Act”

³⁹ cgvanoushadhi.gov.in/Bio_act.doc (visited on 10/05/2014)

We can use this section to ask for requisite changes in the Act. This can be done in various ways:

1. Interaction with members of the National Biodiversity Authority, raising concerns and critical issues with them.
2. Educate and lobby with MLAs/MPs, by a series of discussion workshops
3. Pass Resolutions/memorandums at district, state and national level.
4. Immediate protest during next winter session of Parliament – Delhi Action; demand MPs meet with protestors (to be a part of National Coordination of Farmer’s Movement)
5. Mobilisation of panchayats and gram sabhas to oppose setting up of Biodiversity Management Committees under current Rules
6. Spreading awareness regarding these issues amongst communities, NGOs and govt. officials
7. The local, regional and national media can be tapped to raise awareness of these issues, stressing on the gravity of the situation.⁴⁰

⁴⁰ cgvanoushadhi.gov.in/Bio_act.doc (visited on 10/05/2014)

CONCLUSION

Habitat destruction, overexploitation, pollution and species introduction are some of the major causes of biodiversity losses in India. Besides these there are gaps and lacunae in economic, policy, institutional efforts and governance systems. Timely evaluation of efforts in conservation of biodiversity made by concerned government agencies is a requirement as the above audit case study indicates. Updated information and progress of conservation efforts by the scientific institutes need to be made available to the policy makers, the scientific and socio-economic agencies to support the evaluation and constant revision of the policies and legislations related to biodiversity conservation. There could be knowledge and information gaps of the magnitude, patterns, and efficacy of biodiversity laws at the ecosystem and landscape levels. These gaps could be filled in by timely audit studies and in this lays the importance of conducting environmental audits with a biodiversity focus.⁴¹

Legal regime in India relating to farmers' rights consists of two major statutes – the Protection of Plant Varieties and Farmers' Rights Act, 2001 and the Biological Diversity Act, 2002. The Protection of Plant Varieties and Farmers' Rights Act, 2001 addresses farmers' rights directly. The rights of farmers provided under this Act are registration of farmers' variety, right to claim compensation for default seeds purchased from breeders, benefit sharing and recognition of traditional rights of farmers. The Biological Diversity Act, 2002 is linked to farmers' rights as it regulates access and benefit sharing. This Act provides norms of prior informed consent and mutually agreed terms for accessing biological resources in India. These norms are crucial for farmers' rights as it facilitates fair and equitable sharing of benefits arising from the use of plant genetic resources.

The existence of more than one statutory framework makes farmers' rights in India a subject of 'regime complex'. There are several overlapping areas between the existing statutory regimes. For instance, both the Protection of Plant Varieties and Farmers' Rights Act and the

⁴¹ http://www.environmental-auditing.org.cn/english/EN/articleshow_ArtID_996.htm

Biological Diversity Act deal with benefit sharing. However, the scope of benefit sharing is significantly different under these two statutes. While the Plant Variety Protection Act talks only about monetary compensation, the Biological Diversity Act provides a number of benefits other than monetary compensation.

A probable solution to these overlapping and conflicting regimes is an effective co-ordination between two statutory frameworks. This could be facilitated by a new regulation or guideline in this regard by the Central Government by incorporating all relevant norms. The poor socio-economic conditions of farmers and local communities could be addressed by envisaging a pro-active role for statutory bodies to ensure that relevant norms are followed in meaning and spirit. In fact the Biodiversity Act already follows this approach by entrusting the duty on the Biodiversity Authority to ensure mutually agreed terms between the user, local communities and claimers.

Legal regime of farmers' rights is still evolving. Two major challenges in this regard are the proposed Seeds Bill, 2004 (latest amendment in February 2011) and the evolution of the legal framework for the protection of traditional knowledge. It is too early to analyse these ongoing developments. However, it is very important that the evolving statutory framework needs to be brought in harmony with the existing statutes. Otherwise the presence of multiple legal and institutional frameworks will weaken the implementation and thereby affecting the interests of farmers. Moreover, adequate care and attention must be taken to ensure that protection of the commercial rights of seed companies is not at the cost of food security of the country and the livelihood of farmers.⁴²

With the introduction of the Bio Diversity Act 2002, which curtails availability of genetic materials from India to the rest of the world is bound to influence the free exchange of scientific valuable research. The National Biodiversity Act whose main objective is equitable sharing of benefits, even after several years of its establishment, is neither known to have

⁴² http://www.lawcollegedehradun.com/lawreview/vol4_issue1_nov12/article3.html (visited on 10/05/2014)

delivered any benefits to the stakeholders of biodiversity in the country nor have contributed to the conservation of biodiversity. Intellectual Property Rights and Patents are vital instruments for securing economic benefits which can lead to the sustainable development of the local community and also the sustainable development of the bio resource. Bio Diversity Act 2002 is counterproductive to India's position on IPR's and Patent Bill.

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