जहाँ है लक्ष्मीवाली ।
वहाँ है खुशहाली ॥

Background Note

BIODIVERSITY CONSERVATION

National Environmental Awareness Campaign

2012 – 13

XI Conference of Parties
CONVENTION ON BIOLOGICAL DIVERSITY
HYDERABAD INDIA 2012

Introduction to Biodiversity

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" Therefore, in other words, Biodiversity or Biological diversity includes all the different plants, animals and micro-organisms, the genes they contain and the ecosystems of which they form a part.

India is a recognised as one of the mega-diverse countries, rich in biodiversity and associated traditional knowledge. With just 2.4% of the land area, India accounts for nearly 7% of the recorded species even while supporting almost 18% of human population. India has a long history of conservation and sustainable use of natural resources and is a party to many international environmental conventions including UN Convention on Biological Diversity (CBD).

The current decade (2011-2020) has been declared as the United Nations Decade on Biodiversity and United Nations Decade for Deserts and the Fight against Desertification. India is the host for the Eleventh meeting of the Conference of the Parties (CoP-11) to the Convention on Biological Diversity (CBD), from 8- 19 October 2012 in Hyderabad, India. Therefore, the NEAC programme for 2012-13 has a focus on conserving Biodiversity covering all dimensions.

1. DIVERSITY OF SPECIES

The greatest challenge to mankind is perhaps the estimation of biodiversity. Current biodiversity is estimated at 10 to 100 million species, of which only 1.4 million have been formally catalogued. This number includes one million animal species (predominantly insects), 248,000 higher plants, 69,000 fungi, 31,000 protozoa, 27,000 algae, 5,000 bacteria and 1,000 viruses. According to some recent estimates, the number of insects alone may be as high as 10 million, although many believe it is over-estimated and more likely to be only around 5 million. Most of the species, not fully described, exist in the rain forests.

- Known total world species : approximately 17,70,000
- Estimated total world species : 5 to 100 million

Biodiversity is not evenly spread among the world's countries. Barely a dozen countries lying partly or entirely in the tropical regions constitute 60 to 70 percent of the world's biodiversity. They are referred to as 'Megadiverse Nations'. Species richness or diversity is high in the tropics and the cold depths of the oceans as both these regions are naturally protected from interference due to their inaccessibility.

2. TYPES OF BIODIVERSITY

Biodiversity can be studied at three different levels: genetic, species and ecosystem.

i. Genetic diversity

It is concerned with the variation in genes within a particular species. The genetic diversity gives us beautiful butterflies, roses, parakeets or coral in a myriad hues, shapes and sizes.

ii. Species diversity

It refers to the variety of living organisms on earth. Species differ from one another, markedly in their genetic makeup, do not inter-breed in nature. Closely-related species however have in common much of their hereditary characteristics. For instance, about 98.4 per cent of the genes of humans and chimpanzees are the same.

iii. Ecosystem diversity

This refers to the different types of habitats. A habitat is the cumulative factor of the climate, vegetation and geography of a region. There are several kinds of habitats around the world. Corals, grasslands, wetland, desert, mangrove and tropical rain forests are examples of ecosystems.

Change in climatic conditions is accompanied by a change in vegetation as well. Each species adapts itself to a particular kind of environment. As the environment changes, species best adapted to that environment becomes predominant. Thus the variety or diversity of species in the ecosystem is influenced by the nature of the ecosystem.

BIODIVERSITY IN INDIA

India is the seventh largest country in the world and Asia's second largest covering a total area of 3,287,263 sq.km., with varied landscapes rich in natural resources. India has a great diversity of natural ecosystems ranging from the cold and high Himalayan regions to the sea coasts; from the wet north-eastern green forests to the dry northwestern arid deserts; with different types of forests, wetlands, islands and the oceans. India consists of fertile river plains and high plateaus and several major rivers, including the Ganges, Brahmaputra and Indus. The climate of India is determined by the southwest monsoon between June and October, the northeast monsoon between October and November and dry northern winds between December and February. The climate is dry and hot from March to May.

India is one of the richest nations in terms of biological diversity. India owes this to its position in the tropical and subtropical latitudes. Rapid changes in environment occur at the long coastline and at the peripheral areas of the deserts. India also has islands like the Andaman and Nicobar and Lakshadweep with their own endemic species, mountain ranges like the Himalayas and the Western and Eastern Ghats. These factors contribute to make India a megadiverse nation.

Total no. of plant species recorded

World: 2,50,000 species India: 45,000 species

Total no. of animal species recorded

World: 11,96,903 India: 86,874

3. BIODIVERSITY HOTSPOTS

Hotspots are regions that harbour a great diversity of endemic species (species limited to a specific geographical area) significantly impacted and altered by human activities. There are 34 biodiversity hotspots and they contain 44 percent of all plant species and 35 percent of all terrestrial vertebrate species within barely 1.4 percent of the planet's land area

4. BIODIVERSITY AND ITS IMPORTANCE

Biodiversity is important to maintain the 'web of life'. The building blocks of plants, animals and humans are identical, and are made of the four elements - carbon, oxygen, nitrogen and hydrogen. These elements are present in the environment - in air, water and soil. However, only green plants can absorb nitrogen from the soil through their roots, and use sunlight and water to produce energy by a process called photosynthesis. They are known as producers. Animals and humans, who have plants or other animals as their food, are known as consumers. The chain that links consumers to producers is called the food chain or web of life. Every living creature is found in a food chain. There are several food chains and they can be complex or simple depending on the environment. To cite some examples, grasshoppers eat grass and are in turn eaten by frogs; snakes eat frogs and rodents.

Thus the importance of each and every creature in the web of life is evident. Tampering with the food chain only produces negative results, leading to the destruction of the species. This shows why biodiversity and all its components are essential to maintain ecological balance. Man is only a strand in the delicate web of relationship in the global ecosystem Every time a species becomes extinct, the strand is broken and many species, including humans, move closer to extinction..

5. VALUE OF BIODIVERSITY: some examples

- Forests render the climate more equable, prevent soil erosion and landslides and help in flood control
- Most of today's food crops were domesticated from wild tropical plants
- About 80% of the world's population relies on plants or plant extracts for medicines
- Pollination and seed dispersal by birds, insects and animals are essential for genetic recombination
- Agricultural scientists and genetic engineers require the entire existing stock of species - most of them still unidentified- to develop new crop strains as future source of food.
- Survival of humans and other species is dependent on the producer
- Wildlife serves as a gene library and premature extinction of species leads to an irreversible loss of genetic information pertaining to future evolution of life on earth
- Aesthetic value

Biodiversity and ecological integrity are essential for all forms of life on earth and should not be disturbed by human activities. To conserve the natural world, ecosystems as a whole have to be saved. Unless the entire ecosystem is preserved, the survival of the individual species will be in peril.

6. CAUSES FOR BIODIVERSITY LOSS

Loss of biodiversity occurs when either a particular species is destroyed or the habitat essential for its survival is damaged. The latter is more common as habitat destruction is inevitable fallout of development. The extinction of species takes place when they are exploited for economic gain or hunted as sport or for food. Extinction of species may also occur due to environmental reasons like ecological substitutions, biological factors and pathological causes which can be caused either by nature or man.

i. Natural causes for the loss of biodiversity

Natural causes include floods, earthquakes, landslides, rivalry among species, lack of pollination and diseases.

ii. Man-made causes for the loss of biodiversity

a. Destruction of habitat in the wake of developmental activities like housing, agriculture, construction of dams, reservoirs, roads, railway tracks, etc.
b. Indiscriminate use of toxic chemicals and pesticides and over-exploitation of wild-life resources for commercial purposes are chiefly responsible for the rapid decline in the population of some species.
c. Genetic erosion arising from the loss (due to commercial and anthropogenic pressures) of habitats rich in biodiversity and from the violation of the traditional conservation practices of wild species by the rural and tribal people.

Even the loss of a single species is tragic, because each species is an integral part of the ecosystem, and extinction of any one species will have a big impact on the web of life, the food chain and cause an irreplaceable loss of genetic resources.

7. CONSERVING BIODIVERSITY

In the final analysis, the very survival of the human race is dependent on conservation of biodiversity. The Earth Summit produced a plan of action on a number of issues (Agenda 21) including conservation of biodiversity during the 21st century.

7.1 Biodiversity conservation as indicator of environmental quality

- Conservation of biological diversity leads to conservation of essential ecological diversity to preserve the continuity of food chains.
- The genetic diversity of plants and animals is preserved.
- It ensures the sustainable utilization of life support systems on earth.
- It provides a vast knowledge of potential use to the community.
- A reservoir of wild animals and plants is preserved, thus enabling them to be introduced, if need be, in the surrounding areas.
- Biodiversity conservation assures sustainable utilization of potential resources.

7.2 Modes of Conservation

a. Ex-situ conservation: Conserving biodiversity outside the areas where they naturally occur is known as *ex-situ* conservation. Here, animals are reared or plants are cultivated like zoological parks or botanical gardens. Reintroduction of an animal or plant into the habitat from where it has become extinct is another form of *ex situ* conservation. For example, the Gangetic *gharial* has been reintroduced in the rivers of Uttar Pradesh, Madhya Pradesh and Rajasthan where it had become extinct.

Seed banks, botanical, horticultural and recreational gardens are important centres for ex-*situ* conservation.

b. In-situ conservation: Conserving the animals and plants in their natural habitats is known as *in-situ* conservation. The established natural habitats are:

- National parks and sanctuaries
- Biosphere reserves
- Nature reserves
- Reserved and protected forests
- Preservation plots
- Reserved forests

8. INTERNATIONAL & NATIONAL POLICY ON BIODIVERSITY

The biological wealth of the country is being exploited in multiple ways. There have been a number of legal instruments and policy frameworks to protect and conserve the flora and fauna of the country.

At the international arena, many conventions have been made to protect the biological diversity. The most significant one is the United Nations Convention on Biological Diversity, 1992. Other related & significant conventions are:

- The Ramsar Conservation on Wetlands, 1971
- Convention for the Protection of World Cultural and Natural Heritage, 1972
- Convention on International Trade of Endangered Species of Wildlife Fauna and Flora (CITES), 1973
- Convention on the Conservation of European Wildlife and Natural Habitat, 1979
- World Conservation Strategy, 1980

In India, the Biological Diversity Act, 2002 is most significant policy instrument that provides for conservation of biological diversity, sustainable use of its components and fair and equitable sharing of benefits, resulting from the use of genetic resources. The biodiversity in India is conserved through the establishment of Sanctuaries, National Parks, Biosphere Reserves, Reserved Forests, etc., following the Wildlife Protection Act, 1972 & the Wildlife (Protection) Amendment Act, 1991. Prior to that the Indian Forest Act of 1927 and few other Acts like, Elephant Preservation Act, 1879, The Indian Fisheries Act, 1897, Wild Birds and Wild Animals Protection Act, 1912, The Forest (Conservation) Act, 1980, allowed the setting up of wildlife sanctuaries and for conservation of flora & fauna.

BIOLOGICAL DIVERSITY ACT, 2002

Biodiversity encompasses all varieties of life on earth. India is one of the 12-mega biodiversity countries of the world. Having only 2.5% of the total land area, India already accounts for 7% - 8% of the recorded species of the world.

The main objectives of the Biological Diversity Act (2002) are (i) Conservation of biological diversity; (ii) Sustainable use of its components; and (iii) Fair and equitable sharing of the benefits arising from the utilization of genetic resources.

The Biological Diversity Act (2002) mandates implementation of the Act through decentralized system with the NBA focusing on advising the Central Government on matters relating to the conservation of biodiversity, sustainable use of its components and equitable sharing of benefits arising out of the utilization of biological resources; and advising the State Governments in the selection of areas of biodiversity importance to be notified under Sub-Section (1) of Section 37 as heritage sites and measures for the management of such heritage sites;

The Act envisages a three-tier structure to regulate access to the biological resources, comprising of

- National Biodiversity Authority (NBA),
- State Biodiversity Boards (SBB) and
- Biodiversity Management Committees (BMC) at the local level

The National Biodiversity Authority (NBA) was established in 2003 to implement India's Biological Diversity Act (2002). The NBA is a Statutory, Autonomous Body and it performs facilitative, regulatory and advisory function for the Government of India on issues of conservation, sustainable use of biological resources and fair and equitable sharing of benefits arising out of the use of biological resources.

The State Biodiversity Boards (SBBs) focus on advising the State Governments, subject to any guidelines issued by the Central Government, on matters relating to the conservation of biodiversity, sustainable use of its components and equitable sharing of the benefits arising out of the utilization of biological resources;
The SSBs also regulate, by granting of approvals or otherwise requests for commercial utilization or bio-survey and bio-utilization of any biological resource by Indians.

The local level **Biodiversity Management Committees** (BMCs) are responsible for promoting conservation, sustainable use and documentation of biological diversity including preservation of habitats, conservation of land races, folk varieties and cultivars, domesticated stocks and breeds of animals and microorganisms and chronicling of knowledge relating to biological diversity. Since its establishment, NBA has supported creation of SBBs in 26 States and, facilitated establishment of around 32,796 BMCs. One of the key mandate of BMCs is to prepare Biodiversity Register, which documents the elements of biodiversity in the areas, and issues pertaining to it's sustainable utilization and befit sharing; the traditional knowledge associated with it.

9. COMMUNITIES IN BIODIVERSITY CONSERVATION

Environment and natural resources have been a matter of worship and protection since time immemorial. Continuing this practice over centuries, of nurturing nature, traditional knowledge and practices have flourished worldwide. The community practices are further strengthened by the need to protect the ever-diminishing natural resources which earlier seemed inexhaustible and provided for their existence. Some of the outstanding examples are those of the Sacred Groves (forest fragments which are communally protected, and which usually have a significant religious connotation for the protecting community), the Bishnoi community, etc, Increasing awareness about the benefits from the protecting the environment & the ecosystems have led to the formulation of policy for sustainable use that allows for community engagements in the process.

Local communities and indigenous peoples are the stewards of the natural places and many organizations (including the government, the private and the communities) work in tandem to conserve them. They depend on the environment for their survival, and over generations have developed traditions and practices to sustainably manage their natural resources. Today these communities face growing challenges such as outside competition for land and resources, conflict with wildlife, and human population growth. In developing countries, they often lack economic opportunities and have limited access to social services.

Many grassroots, local and national work with these communities to protect wildlife, preserve habitats and empower the local people to conserve resources. There is a close link between conserving biodiversity and sustaining livelihoods, which needs to be recognized and safeguarded.

10. MAKING A DIFFERENCE:

With reference to the Ministry's NEAC program on Biodiversity, emphasis has been laid on a holistic and all-inclusive approach to biodiversity conservation and restoration. Under the NEAC program, sub-themes have been identified which serves to provide an indication on areas that may be covered through awareness and action programmes, but may not be limited to them only. The indicative list is as follows:

1. Critical, endangered and endemic species conservation
2. Conservation of critical and fragile habitats & corridors
3. Forest conservation
4. Wetlands conservation
5. Conservation of Mangroves & Coral Reefs
6. Land degradation & biodiversity

7. Conservation and promotion of Medicinal plants
8. Renewable energy - solar, wind, biogas, etc
9. Vermi-composting & organic farming
10. Agro forestry
11. Cultivation of Fruit trees
12. Germplasm conservation
13. Restoration of Grasslands
14. Livestock- indigenous breed conservation
15. Biodiversity conservation in Urban & peri-Urban areas
16. Maintaining people's biodiversity registers
17. Biodiversity & traditional knowledge and equitable benefit sharing
18. Biodiversity based traditional crafts
19. Biodiversity and sustainable practices (rain water harvesting, use of eco-friendly bags, etc)
20. Sustainable Tourism
21. Gender in Biodiversity conservation

Recognising the need to conserve pristine and fragile ecosystems for benefit of mankind, it is only through increased awareness and supporting actions that the goals can be achieved. Some of the activities that can be undertaken (but not to be limited to!) in this regard include:

i. Awareness component

1. Workshops/Training Courses/Camps/Yatras/ Rallies
2. Public Meetings/ Exhibitions/ Competitions
3. Demonstration Projects
4. Preparation of Audio Visual Materials
5. Folk Media/ Street Theaters/ Festivals/ Science Fairs
6. Preparation / Use of CD- ROM & Other multi-media tools

The MoEF encourages the participating organizations to make use of Science Express: Biodiversity Special to create awareness on Biodiversity issues. Itinerary of Science Express Biodiversity for 2012-13 could be seen, to see if the awareness activities of participating organization could make use of Science Express: Biodiversity Special

ii. Action Component

As the African proverb goes: "When deeds speak, words are nothing", therefore it is very important to convert ideas into action. Some of the actionable areas for the programme are mentioned below, they are indicative, other activities related to biodiversity at the local level is encouraged.

1. Preparation of biodiversity registers for schools/villages/local areas
2. Promotion of Traditional medicinal practices
3. Establishment of seed banks and encouraging the farmers for in-situ conservation of seed diversity
4. Preparation and promotion of bio-pesticides
5. Promotion of organic manure and vermi-composting
6. Setting up of community reserves
7. Planting bio-diverse mix species/herbal gardens/kitchen garden and its maintenance

Conclusion:

Being a part of the ecosystem that provides for our needs, it is important to contribute to conserve the same for posterity. Conservation of the five elements - land, water, air, fire and space - has an intrinsic value to the existence of mankind. Each of these elements manifests themselves in the varied flora and fauna around us. It is through recognising the value of environment, the awareness to conserve the same that we can secure our future. Indeed, "We do not inherit the earth from our ancestors, we borrow it from our children".

No issue is more compelling than the air we breathe, the food we eat and the water we drink. Let's do our bit and leave behind a thriving planet for generation next!

"Prakruti Rakshati Rakshita" : "Nature Protects if She is Protected"