

BIODIVERSITY



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INTRODUCTION

The term Biodiversity was first coined by Walter G. Rosen in 1985.

The biosphere comprises of a complex collections of innumerable organisms, known as the Biodiversity, which constitute the vital life support for survival of human race.

Biological diversity, abbreviated as biodiversity, represent the sum total of various life forms such as unicellular fungi, protozoa, bacteria, and multi cellular organisms such as plants, fishes, and mammals at various biological levels including gens, habitats, and ecosystem.

BIODIVERSITY

What does “Bio” Means

Bio = Life

BIODIVERSITY

What does “Diversity” Means ?

Diversity = Variety

CONCEPT AND TYPES OF BIODIVERSITY

- Biodiversity is the variety of life forms on earth and the essential interdependence of all living things.
- As defined in convention on Biological diversity signed at Rio De Jenerio (Brazil) in 1992 by 154 countries, the Biodiversity defined as "the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic eco-systems and the ecological complexes of which the area part- this include diversity with in species, between species and of ecosystem.
- " According to IUCN in 1998, "the variety and variability of species of their population, the variety of species of their life forms, the diversity of the complex association with species with their interaction and their ecological process which influences perform."

There are three types of Biodiversity



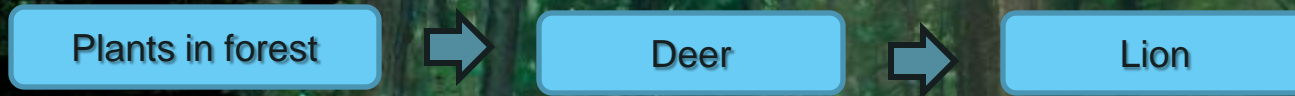
Diversity of species

Diversity of Ecosystem



BIODIVERSITY AND BALANCE OF NATURE

- **Tropic Level:-** Elimination of species from tropic level can cause destruction of ecosystem as well as biodiversity.



- **Complex Ecosystem:-** In a complicated ecosystem having several tropic levels, loss of one or more species do not cause any serious problem because the alternative available
- **Keystone Species:-** Loss or addition of species causes detectable changes in ecosystem rates i.e. species make unique contribution to ecosystem functioning.

A lush forest scene with a rocky stream, tall trees, and glowing blue particles. The scene is filled with green foliage and tall, slender trees. A stream flows over rocks in the foreground. Several glowing blue particles are scattered throughout the scene, adding a magical or ethereal atmosphere.

TYPES OF BIODIVERSITY

Genetic biodiversity

Species biodiversity

Ecological biodiversity

BENEFITS OF BIODIVERSITY

Consumptive value:

- Food/Drink
- Fuel
- Medicine
- Better crop varieties
- Industrial Material

Non-Consumptive value:

- Recreation
- Education and Research
- Traditional value

Ecological services:

- Balance of nature
- Biological productivity
- Regulation of climate
- Degradation of waste
- Cleaning of air and water
- Cycling of nutrients
- Control of potential pest and disease causing species
- Detoxification of soil and sediments
- Stabilization of land against erosion
- Carbon sequestration and global climate change
- Maintenance of Soil fertility

THREATS TO BIODIVERSITY

Natural causes:

- Narrow geographical area
- Low population
- Low breeding rate
- Natural disasters

NATURAL CAUSES OF DEFORESTATION



Anthropogenic causes:

- Habitat modification
- Overexploitation of selected species
- Innovation by exotic species

THREATS TO BIODIVERSITY

- Pollution
- Hunting
- Global warming and climate change
- Agriculture
- Domino effect




RECENT ISSUES ON BIODIVERSITY

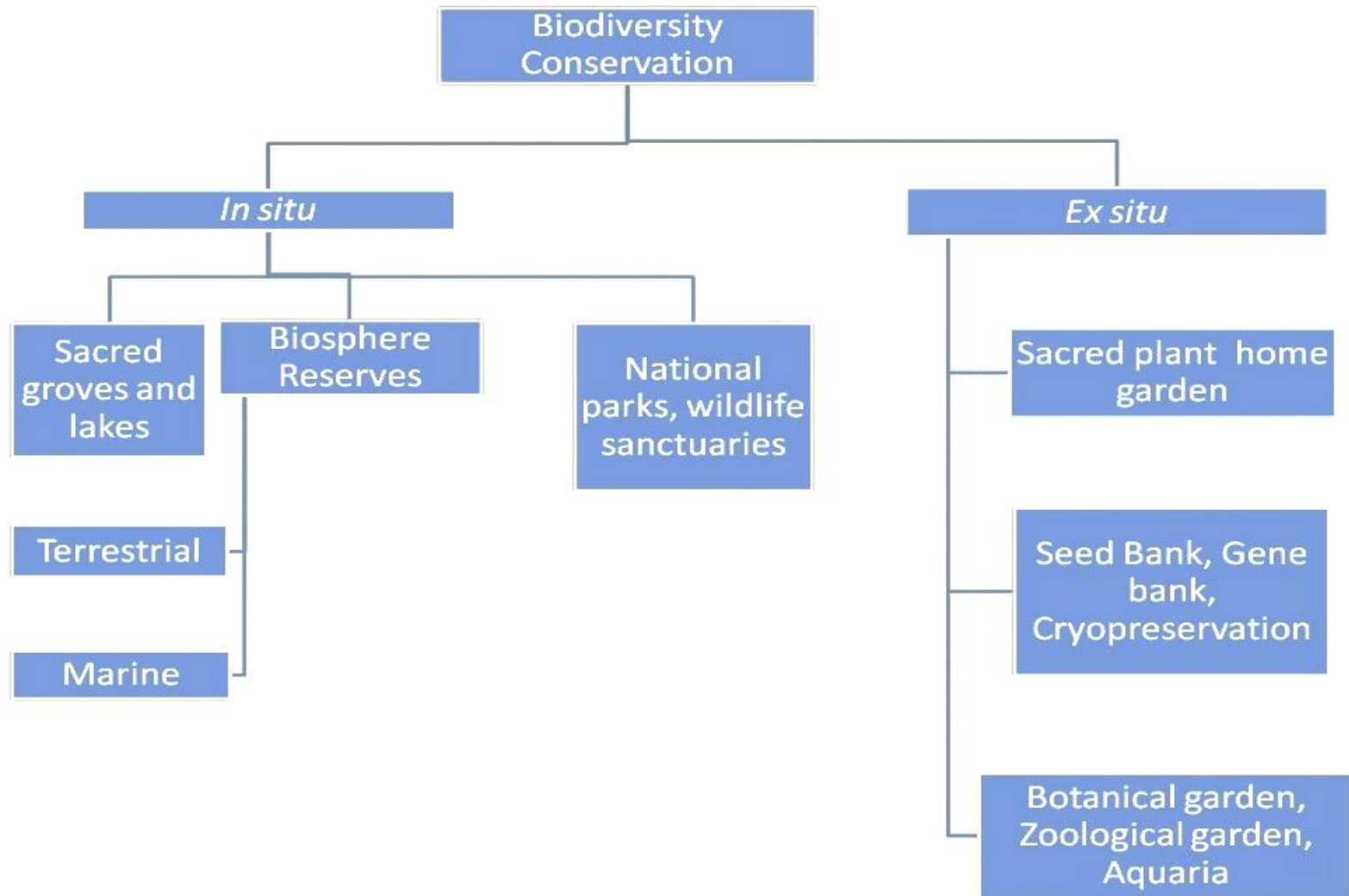
- **Some** 75 per cent of the genetic diversity of crop plants been lost in the past century.
- Some scientists estimate that as many as 3 species per hour are going extinct and 20,000 extinctions occur each year.
- Roughly one-third of the world's coral reef systems have been destroyed or highly degraded.
- About 24 per cent of mammals and 12 per cent of bird species are currently considered to be globally threatened.
- More than 50 per cent of the world's wetlands have been drained, and populations of inland water and wetland species have declined by 50 per cent between 1970 and 1999.

CONSERVATION OF BIODIVERSITY

- Biodiversity inventories
- Conserving Biodiversity in protected Habitats
 - In situ conservation
 - Ex situ conservationSeed Bank,
 - Gene Bank, Pollen Bank, DNABank



- 
- **Restoration of Biodiversity**
 - **Imparting Environmental Education**
 - **Enacting, strengthening and enforcing Environmental Legislation**
 - **Population Control**
 - **Reviewing the agriculture practice**
 - **Controlling Urbanization**
 - **Conservation through Biotechnology**



BIODIVERSITY CONVENTIONS

- The first convention on biodiversity organized at Rio De Janeiro, capital of Brazil from June 3 to 14, 1992 named as United Nation Conference On Environment and Development(UNCED), better known as Rio Summit to maintain ecological balance and enrich biodiversity. The agreement on biodiversity signed by 150 countries including three programs (eco dev & eco respons)
- ❖ To ensure conservation of biodiversity
- ❖ Sustainable use of biodiversity
- ❖ Rational and equitable share of profit to accrue from use of genetic resources.
- The second convention organized at Johannesburg in 2002 called World Summit On Sustainable Development (WSSD) where the Biodiversity and Sustainable Ecosystem Management was the issue.

- The International Conference held on Biodiversity in Relation to Food & Human Security in a warming planet 15-17 February, 2010 in Chennai.
- International Conference on Wildlife & Biodiversity Conservation held on 3 to 5 June, 2010 at Dal lake, Srinagar, Kashmir.
- Indian Biodiversity Congress (IBC) & Indian Biodiversity Expo (IBE) will be held on 27-31 December at Thriuvananthapuram, Kerala.

Biodiversity is life
Biodiversity is our life



- Biodiversity is our life. If the Biodiversity got lost at this rate then in near future, the survival of human being will be threatened. So, it is our moral duty to conserve Biodiversity as well our Environment. Long term maintenance of species and their management requires co-operative efforts across entire landscapes.

International
Biodiversity

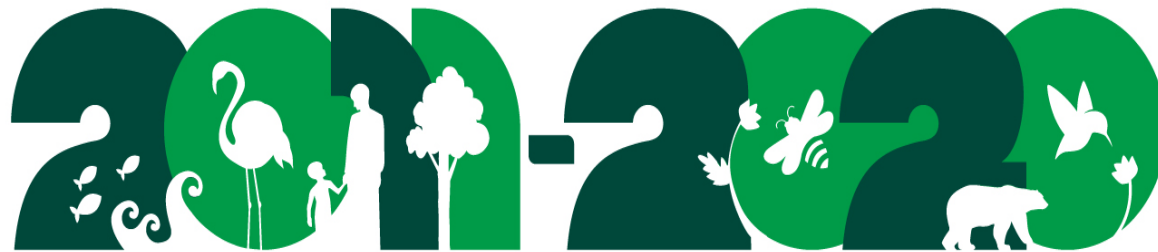
— Day —

22 May





2010 International Year of Biodiversity



United Nations Decade on Biodiversity

Endemism in India's Biodiversity



Mammals 12%



Birds 4.5%



Reptiles 45.8%



Amphibians
55.8%

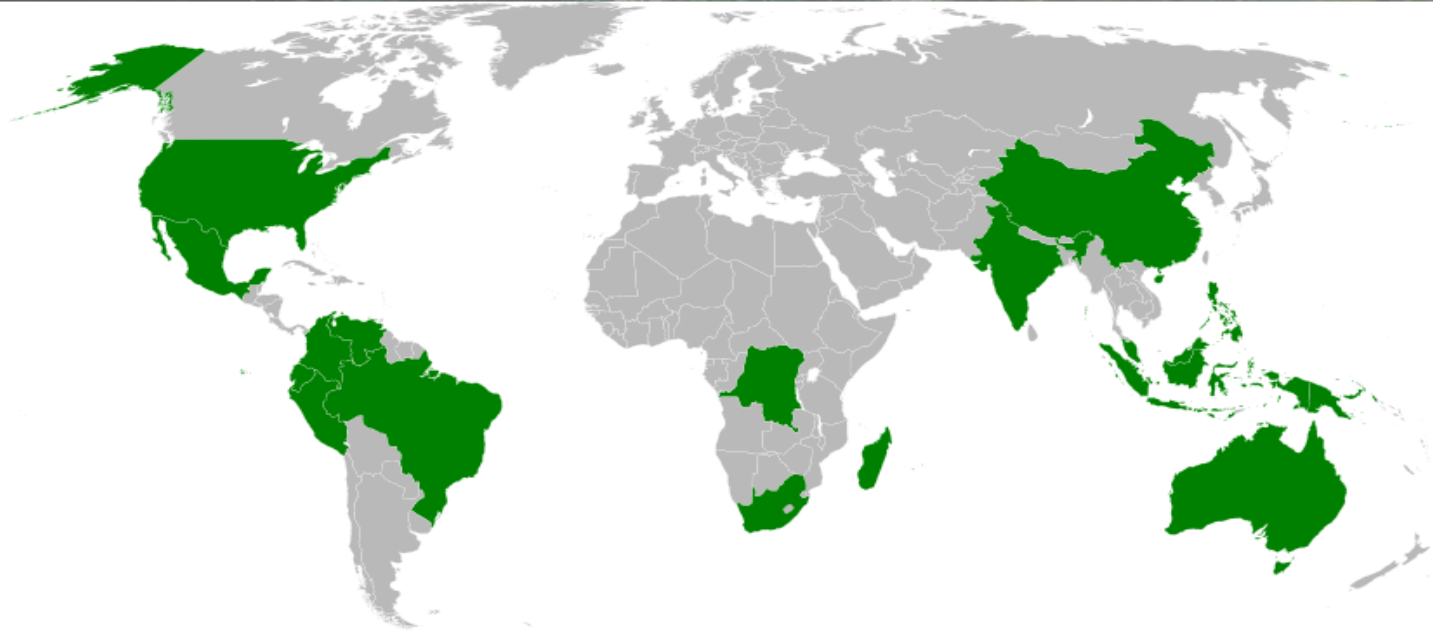


Plants 33%



Megadiverse Country

- among the 17 Megadiverse Countries
- Criteria
 - diversity
 - endemism-5000 plant species



- US, Mexico
- Venezuela, Columbia, Equador, Peru, Brazil
- D.R.Congo, South Africa, Madagascar
- India, China, Malaysia, Philipines, Indonesia
- Australia, Papua New Guinea

- **Hotspot Criteria**

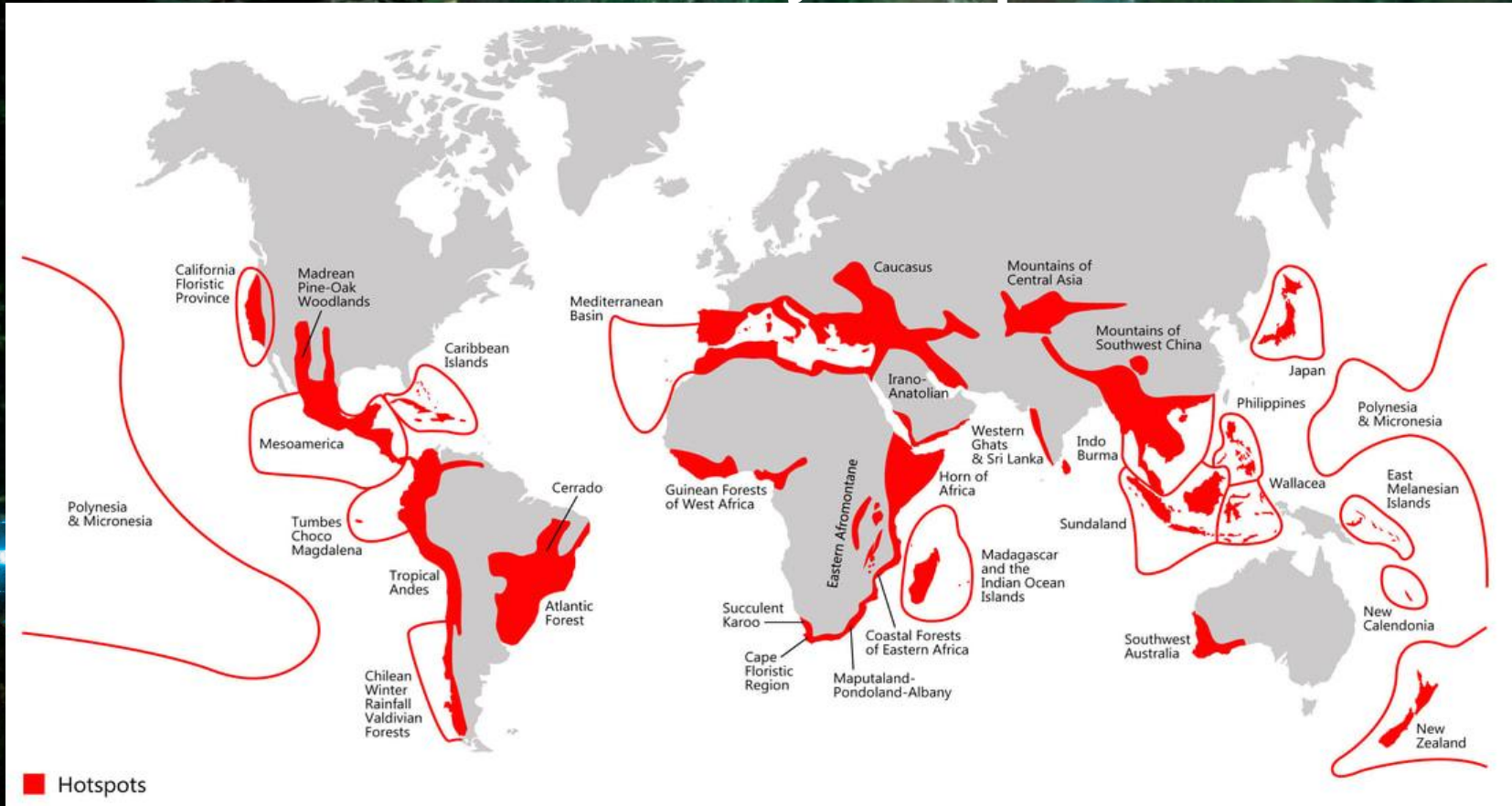
- a) 1500 species of Vascular Plants as endemics
- b) lost at least 70% of its original habitat

- **36 Biodiversity Hotspots**
- **4 in India**

1. Himalaya
2. Western Ghats (and Sri Lanka)
3. Indo Burma
4. sundaland

- Andaman & Nicobar Islands

Biodiversity Hotspot





**ENDANGERED
CRITICALLY ENDANGERED
THREATENING
VULNERABLE
RARE / ENDEMIC**

Causes of Biodiversity Depletion

a) Natural Causes

a) Man-Made

■ Main Causes

- Habitat destruction/fragmentation
- Pollution
- Introduction of Exotic Species
- Population Overgrowth
- Hunting for Commercial Exploitation
- Hunting for Sport
- Agriculture

Biodiversity-related Conventions

- Convention on Biological Diversity (CBD)
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- Convention on the Conservation of Migratory Species of Wild Animals (CMS)
- The International Treaty on Plant Genetic Resources for Food and Agriculture (International Seed Treaty)
- Convention on Wetlands (Ramsar Convention)
- World Heritage Convention (WHC)

Convention on BIOLOGICAL DIVERSITY (CBD)

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

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

CITES

CITES (shorter name for the **Convention on International Trade in Endangered Species of Wild Fauna and Flora**, also known as the **Washington Convention**) is a multilateral treaty to protect endangered plants and animals

Convention on the Conservation of Migratory Species of Wild Animals (CMS)

The agreement was signed under the auspices of the United Nations Environment Programme and is concerned with conservation of wildlife and habitats on a global scale.

intergovernmental organization established exclusively for the conservation and management of terrestrial, aquatic and avian migratory species.

The International Treaty on Plant Genetic Resources FOR FOOD and AGRICULTURE (International Seed Treaty)

comprehensive international agreement in harmony with the Convention on Biological Diversity, which aims at guaranteeing food security through the conservation, exchange and sustainable use of the world's plant genetic resources for food and agriculture.

- 2006

Convention on Wetlands (Ramsar Convention)

- It is named after the city of Ramsar in Iran, where the convention was signed in 1971.
- 1975
- 3 principles

Wise use, list, international cooperation

- 171 members
- 42 sites

- forest & wildlife in the **Concurrent list**
- The Constitution (Forty-second Amendment) Act, 1976.
 - DPSP - Article 48 A
 - ✓ "The State shall endeavor to protect and improve the environment and to safeguard the forests and wild life of the country"
 - Fundamental Duty - Article 51 A (g)
 - ✓ "it shall be the duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wild life, and to have compassion for living creatures"

- ❖ The Wild Life (Protection) Act, 1972•
 - **National Park & Wild Life Sanctuary**

- ❖ The Wild Life (Protection) Amendment Act, 2002
 - **Conservation Reserve & Community Reserve**

- ❖ The Wild Life (Protection) Amendment Act, 2006
 - **Tiger Reserve**

- ❖ The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006
 - **Critical Wildlife Habitat** (within existing protected areas)

- ❖ The Wild Life (Protection) Act, 1972
 - empowers the state government to declare an area National Park or Wildlife sanctuary

- National Park > 100
- Wild Life Sanctuary > 500

- Among those, 43 are tiger reserves managed by NTCA

NP

vs

WLS

- Vesting of rights



- Certain

- Removal or exploitation of wildlife or forest produce

- Nat. Board for Wildlife recommendation required

- State Board for Wildlife recommendation

- Grazing



- Regulated/ prohibited by Chief Wildlife Warden

- Permanent residents



- Maybe allowed to continue, but bound to perform certain

Biosphere Reserves

- UNESCO-
- Man and Biosphere (MAB) Program
 - 1971
 - Inter - Governmental Scientific Program
- functions
 - a) conservation
 - b) sustainable economic development
 - b) logistic support

- Biosphere Reserves **Zonation**

- Core

- Buffer

- Transition

- 621 Biosphere Reserves – 117 countries

Civil Service Preliminary 2010

Q) Consider the following statements:

1. Biodiversity hotspots are located only in tropical regions.
2. India has four bio-diversity hotspots i.e. Eastern Himalayas, Western Himalayas, Western Ghats and Andaman and Nicobar Islands

Which of the statements given above is/are correct?

- a) I only
- b) 2 only
- c) Both 1 & 2
- d) Neither 1 or 2

Civil Service Preliminary 2011

Q) Three of the following criteria have contributed to the recognition of Western Ghats, Sri Lanka & Indo Burma as hotspots of Biodiversity:

1. Species Richness
2. Vegetation density
3. Endemism
4. Ethno-Botanical importance
5. Threat Perception
6. Adaptation of flora & fauna to warm & humid conditions

which three of the above are correct criteria in this context?

- a) 1, 2 & 6
- b) 2, 4 & 6
- c) 1,3 & 5
- d) 3, 4,& 6

Civil Service Preliminary 2012

Q) Which of the following can be threats to the biodiversity of a geographical area?

1. Global Warming
2. Fragmentation of Habitat
3. Invasion of Alien Species
4. Promotion of Vegetarianism

Select the correct answer using the codes given below:

- a) 1, 2 & 3
- b) 2 & 3
- c) 1 & 4
- d) 1, 2, 3 & 4

Civil Service Preliminary 2011

Q) Biodiversity forms the basis for human existence in the following ways:

- 1. Soil Formation**
- 2. Prevention of Soil Erosion**
- 3. Recycling of Waste**
- 4. Pollination of Crops**

Select the correct answer using the codes given below.

- a) 1,2 & 4
- b) 2, 3 & 4
- c) 1 & 4
- d) 1,2,3 & 4