1 ENVIRONMENT

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Environment is the sum total of all biotic (living) and abiotic (non-living) factors that surround and potentially influence an organism. Some components of the environment serve as resource, while others act as a regulatory factor. The different components of the environment are interlinked and interdependent. The environment can be understood both at large and small scales. This is reflected in regional and global climatic patterns, as well as the local climatic conditions, the microclimate.

GREEN ECONOMY

There is no one agreed definition of Green Economy. India has viewed the concept of Green Economy in the context of sustainable development and poverty eradication; which was one of the themes of Rio+20. Green Economy is one of the means to achieve sustainable development. The concept should not lead to any form of green protectionism, imposition of conditionality or any intrusion in the domestic policy space. The document affirms that there are different approaches, visions, models and tools available to each country, in accordance with its national circumstances and priorities, to achieve sustainable development in its three dimensions which is the overarching goal. Green economy in the context of sustainable development and poverty eradication is one of the important tools available for achieving sustainable development and that it could provide options for policy making but should not be a rigid set of rules. The outcome of summit firmly rejects the unilateral measures and trade barriers as well as unwarranted conditionalities on ODA and finance under the guise of Green Economy.

Spatial and Time Scales of Environment

Most organisms interact with their environment at several spatial and time scales. A single bacterium in soil, for example, interacts with air and water within a fraction of a cubic centimeter space. On the other hand, a tree interacts with a large volume of air, water and soil at a large spatial scale. The environment varies from place to place due to variations in climate, soil type and topography?TJie activities of organisms influence the hydrosphere, the lower atmosphere and the near-surface part of the lithosphere, through exchanges of matter and energy. Organisms have to cope with the external environment over a range of time scales, varying from few minutes to days, seasons or over a much longer period of geological time scale. For example, phytoplankton populations may change within a few days with the change in light conditions in aquatic systems. On the other hand, the variations in lithosphere occur very slowly over a long period of time.

Climate

The short-term properties of the atmosphere (such as temperature, pressure, humidity, rainfall, sun shine, cloud cover and wind), at a

given place and time, are what we call weather. Climate is the average weather of an area, including general patterns of atmospheric conditions, seasonal variations and weather extremes averaged over a long period. Thus, while weather reflects the hourly, daily or weekly changes in the above properties, climate entails longer periods, such as seasons, or years. Temperature and rainfall are the two most important factors which determine the climate of an area. Global variations of temperature and rainfall result from differential input of solar radiation in different regions, and from the redistribution of heat energy by winds and ocean currents. Variations in temperature, rainfall, and humidity in different regions of the globe form global climate patterns, which govern all life on earth.

Climatic zones: On the basis of variation in mean temperature along latitude, the main climatic regions are:

(i) Tropical (0°-20° latitude)

(ii) Subtropical (20°-40° latitude)

(iii) Temperate (40°-60° latitude)

(iv) Arctic and Antarctic (60°-80° latitude).

The mean temperature declines as we move from tropical to arctic region. A similar climatic zonation occurs with increasing altitude in the mountains. A mountain located in a tropical region will successively have tropical, subtropical, temperate and alpine zones with increasing altitude. Similarly, in temperate zone, the high altitudes will have alpine climatic conditions.

Within each temperature-based climatic zone, the annual precipitation (rainfall and/or snowfall) varies considerably. These two factors, temperature and precipitation, together determine the vegetation and soil types.

LIFE/ENVIRONMENT INTERACTION

All life that has survived must have adapted to conditions of its environment. Temperature, light, humidity, soil nutrients, etc., all influence any species, within any environment. However life in turn modifies, in various forms, its conditions. Some long term modifications along the history of our planet have been significant, such as the incorporation of oxygen to the atmosphere. This process consisted in the breakdown of carbon dioxide by anaerobic microorganisms that used the carbon in their metabolism and released the oxygen to the atmosphere. This led to the existence of oxygen-based plant and animal life, the great oxygenation event. Other interactions are more immediate and simple, such as the smoothing effect that forests have on the temperature cycle, compared to neighboring unforested areas.

ECOLOGICAL NICHE

Ecological niche of an organism include the physical space occupied by it, its functional role in the community i.e. trophic position and its position in environment gradients of temperature, moisture, pH of soil, etc. and the conditions of existence. Organisms that occupy the same or similar ecological niche in different geographical regions are known as Ecological Equivalents.

Microclimate

The microclimate represents the climatic conditions that prevail at a local scale, or in areas of limited size, such as the immediate surroundings of plants and animals. Microclimate generally differs from .the prevailing regional climatic conditions. For example, in a forest, dense foliage reduces the amount of light reaching the ground. This also results in a changed air temperature profile. The day-time air temperature inside the forest is lower than outside. Also, the interior of a forest may be more humid than a nearby non-forested area.

Habitat and Niche

The place where an organism lives is called its habitat. *Habitats* are characterised by conspicuous physical features, which may include the dominant forms of plant and animal life. We may also understand that habitat may refer to the place occupied by an entire biological community. For example, a large

number of species are found in a forest habitat. Plants and animals, as influenced by the environmental conditions of a particular habitat, indicate some specific traits. For example, plants growing on saline soils have several characteristics that are not found in other plants.

A habitat can contain many ecological niches and support a variety of species. The *ecological niche* of an organism represents the range of conditions that it can tolerate, the resources it utilises, and its functional role in the ecological system. Each species has a distinct niche, and no two species are believed to occupy exactly the same niche.

Atmosphere

Atmospheric layers: The atmosphere is divided into a series of concentric shells or spheres, due to variations in temperature and pressure at various altitudes. These spheres are: troposphere, stratosphere, mesosphere and thermosphere.

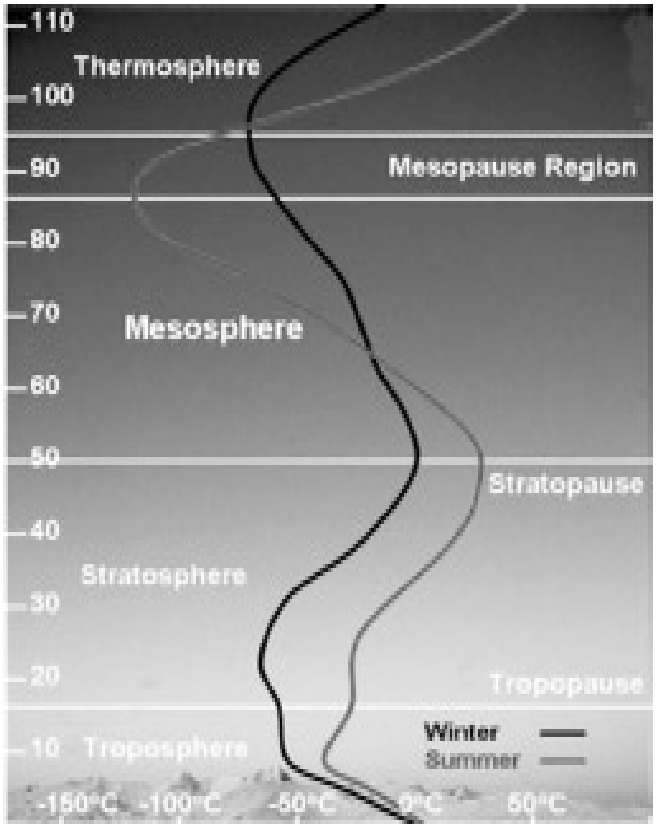
***Troposphere*:** The lower portion of the atmosphere, extending to about 8-16 km height from the earth surface, is known as troposphere. It contains more than 90 per cent of gases in the atmosphere. Generally, temperature decreases with increasing height up to *tropopause* (top of troposphere).

The temperature averages 15°C near the soil surface, and it lowers down to -57°C at the mpopause, which marks the transition to the stratosphere.

Stratosphere : It extends up to 30-50 km. There is little mixing of gases between the troposphere and stratosphere. A thin layer of ozone is present in the stratosphere at the height of 15 to 30 km. Stratopause is the transition layer between stratosphere and the mesosphere.

Mesosphere : Beyond stratosphere, it mends up to an altitude of 80 km and shows r leirease of temperature with height.

Air composition: Nitrogen and oxygen are the most abundant gases in the troposphere co6nstituting 78 per cent and 20.9 per cent of the total gaseous volume, respectively. The remaining i percent is Argon, water vapour, carbon dioxide, ozone and other gases. Water vapour, CO_2 and ozone occur in minute



quantities in the atmosphere, but are essential for maintaining life on the earth. Water vapour regulates the hydrological cycle sustaining life in both terrestrial and an aquatic ecosystem, as well as it absorbs infrared radiation from the earth. Carbon dioxide, water vapour and ozone play an important role in maintaining the heat balance of the earth. The composition of the atmosphere is a product of the activities of living organisms.

***Gases in water*:** In the aquatic systems, oxygen, carbon dioxide, and other gases are partially dissolved in water. Oxygen may be a[v] limiting factor for the growth of phytoplankton and other aquatic organisms, generally in deep lakes, or in waters receiving heavy load of organic materials.

The oxygen supply in water is regulated through diffusion from the air and from photosynthetic activity of aquatic plants. Carbon dioxide is highly soluble in water and may be present in variable amounts. It combines with water to form carbonic acid (H_2CO_3), which, in turn, reacts with available limestone to form carbonates (CO_3) and bicarbonates (HCO_3)

ENVIRONMENTAL SCIENCE

The ecosystem of public parks often includes humans feeding the wildlife. Environmental science is the study of the interactions within the biophysical environment. Part of this scientific discipline is the investigation of the effect of human activity on the environment. Ecology, a sub-discipline of biology and a part of environmental sciences, is often mistaken as a study of human induced effects on the environment. Environmental studies is a broader academic discipline that is the systematic study of interaction of humans with their environment. It is a broad field of study that includes the natural environment, built environments and social environments.

Environmentalism is a broad social and philosophical movement that, in a large part, seeks to minimise and compensate the negative effect of human activity on the biophysical environment. The issues of concern for environmentalists usually relate to the natural environment with the more important ones being climate change, species extinction, pollution, and old growth forest loss.

THE MINISTRY OF ENVIRONMENT AND FORESTS

The Ministry of Environment and Forest (MoEF) is thfe nodal agency in the administrative structure of the Central Government forjihe planning, promotion, co-ordinaiion and overseeing the implementation oflrtdia's environmental and forestry policies and programmes.

The primary concerns of the Ministry are implementation of policies and programmes relating to conservation of the country's natural resources, including its lakes and rivers, its biodivcrsitv. forests and wildlife ensuring the welfare of animals, and the prevention and abatement of pollution. While implementing these policies and programmes, the Ministry is guided by the principle of sustainable development and enhancement of human well-being.

The Ministry also serves as the nodal agency in the country for the United Nations Environment Programme (UNEP), South Asia Co-operative Environment Programme (SACEP) and International Centre for Integrated Mountain Development (ICIMOD) and for the follow-up of the United Nations Conferences on Environment and Development United Nations Conference on and Development (UNCED). The Ministry is also entrusted with issues relating to on multilateral bodies such as the Commission Global Environment Facility (GEF) and of regional bodies like Economic and Social Council for Asia and Pacific (ESCAP) and South Asian Association for Regional Co-operation (SAARC) on matters pertaining to the environment.

The broad objectives of the Ministry are:

- Conservation and survey of flora, fauna, forests and wildlife.
- Prevention and control of pollution.
- Afforestation and regeneration of degraded areas.
- Protection of the environment and
- Ensuring the welfare of animals

These objectives are well supported by a set of legislative and regulatory measures aimed at the preservation, conservation and protection of the environmental. Besides the legislative measures the National Conservation Strategy and Policy Statement on Environment and Development 1992. National Forest Policy 1988: Policy Statement on Abatement of Pollution. 1992; and the National environment Policy. 2006 also cuide the Ministry's work.

WHAT IS IMPACT ASSESSMENT?

Impact assessments are carried out to assess the consequences of individual projects – Environmental Impact Assessment – or of policies and programmes – Strategic Environmental Assessment.

Environmental Impact Assessment

Environmental Impact Assessment (EIA) is a process of evaluating the likely environmental impacts of a proposed project or development, taking into account inter-related socio-

economic, cultural and human-health impacts, both beneficial and adverse.

UNEP defines Environmental Impact Assessment (EIA) as a tool used to identify the environmental, social and economic impacts of a project prior to decision-making. It aims to predict environmental impacts at an early stage in project planning and design, find ways and means to reduce adverse impacts, shape projects to suit the local environment and present the predictions and options to decision-makers. By using EIA both environmental and economic benefits can be achieved, such as reduced cost and time of project implementation and design, avoided treatment/clean-up costs and impacts of laws and regulations.

Although legislation and practice vary around the world, the fundamental components of an EIA would necessarily involve the following stages:

Screening to determine which projects or developments require a full or partial impact assessment study; Scoping to identify which potential impacts are relevant to assess (based on legislative requirements, international conventions, expert knowledge and public involvement), to identify alternative solutions that avoid, mitigate or compensate adverse impacts on biodiversity (including the option of not proceeding with the development, finding alternative designs or sites which avoid the impacts, incorporating safeguards in the design of the project, or providing compensation for adverse impacts), and finally to derive terms of reference for the impact assessment;

Assessment and evaluation of impacts and development of alternatives, to predict and identify the likely environmental impacts of a proposed project or development, including the detailed elaboration of alternatives;

Reporting the Environmental Impact Statement (EIS) or EIA report, including an environmental management plan (EMP), and a non-technical summary for the general audience.

Review of the Environmental Impact Statement (EIS), based on the terms of reference (scoping) and public (including authority) participation.

Decision-making on whether to approve the project or not, and under what conditions; and Monitoring, compliance, enforcement and environmental auditing. Monitor whether the predicted impacts and proposed mitigation measures occur as defined in the EMP. Verify the compliance of proponent with the EMP, to ensure that unpredicted impacts or failed mitigation measures are identified and addressed in a timely fashion.