EWCE 431
Environment and Social Impact Assessment

Environmental Crisis in Industrial Countries

By the ***early 1960s*** in the US and other industrial countries, it was clear that ***something was wrong***

Environmental crisis

- 1952 "killer fog" kills 4,000 in London
- 1963 Rachel Carson's *Silent Spring* documents the negative effects of DDT
- 1966 Cayahoga River in Ohio catches fire



"killer fog": London, 1952



River in Ohio catches fire: 1966

What was happening?

- the causes were:
  - Population Growth
  - Natural Resource Pressures
  - Urbanization
  - Industrialization
  - Unrestrained profit motive
- These forces were all combining to create unprecedented environmental damage

Environmental crisis in the developing world

- 1984 Methyl isocyanate cloud from Union Carbide plant accident in Bhopal, India kills 2,000+
- Cities with worst air quality: megacities in developing country
- Millions of deaths per year from environmental conditions—particularly poor sanitation



1984: Bhopal, India



Beijing, China

Example of Environmental Crisis



Land Degradation and Desertification: satellite photo shows topsoil blowing off SW African coast, from Angola to S. Africa --- NASA

Example of Environmental Crisis



Chemical Pollution: obsolete pesticides in Mozambique -- U.N. FAO

Example of Environmental Crisis



Deforestation: trees cleared for planting in Guinea – UN FAO

Environmental Issues

- Development has had many positive impacts globally.
- Environment has suffered due to the effects of increased urbanisation and industrialisation.
- Industrial revolution of the 19th century caused environmental damage, but mainly in Europe.
- The main contributors to environmental degradation are connected to global development.
- **Four** major environmental issues that have been the result of global development: deforestation, pollution, desertification and extinction of certain species.

Causes of Environmental Development Impact

Specific reasons why development has caused damage to the environment:

- Growing population
- Economic necessity
- Corruption and human greed
- Debt and poverty
- Increased consumption e.g. large-scale use of non-degradable plastic
- Industrial and agricultural development
- Higher levels of pollution
- Global warming and climate change

Environmental Issues

1. Deforestation as an impact of development on the environment

– refers to the removal of great patches of woodland.

The three most common reasons are:

– Using the wood for timber.

– Using the land for industrial production or grazing.

– Using the land for human habitation.

Environmental Issues

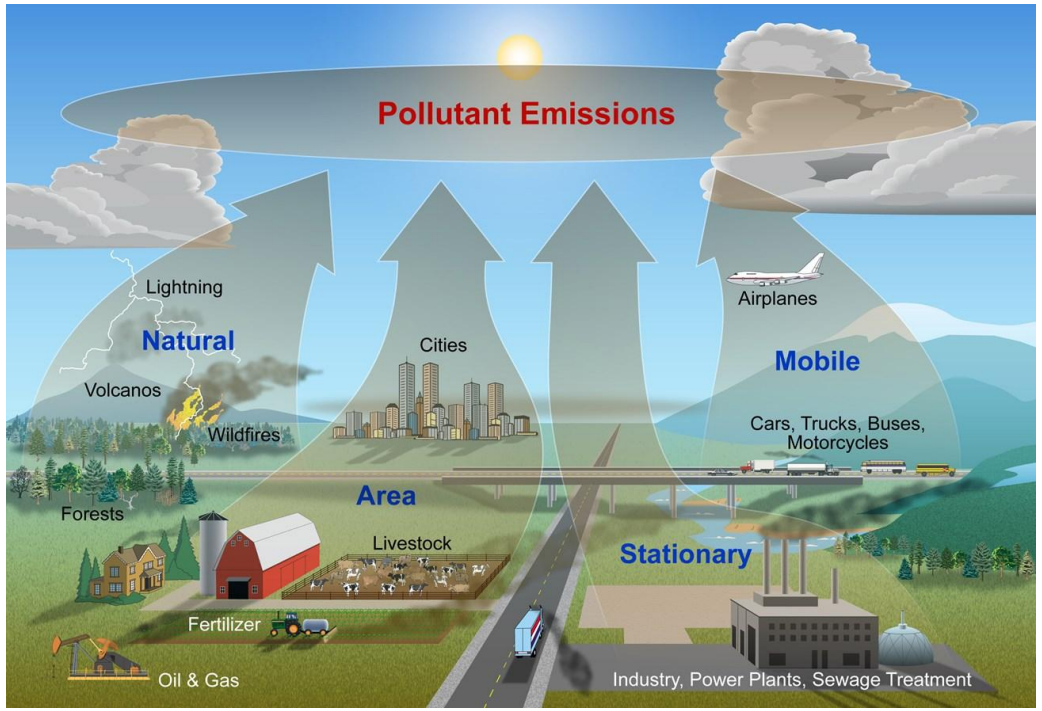
1. Deforestation as an impact of development on the environment

- reduces the levels and efficacy of CO_2 absorption and the production of O_2
- destruction of the **natural habitats** of many animal and plant species
- causes reduction of rainfall and increase in droughts
- soil ultimately washes down to rivers and causes floods
- major reason for global warming

Environmental Issues

2. Pollution as an impact of development on the environment

- most significant forms of pollution today are **air and water pollution**.
- Emission from industrial plants and manufacturing activities
- Combustion of fossil fuels
- Farming chemicals and household products
- Worldwide in 2012, 800 million people had limited or no access to clean water.


Pollutant Emissions
Lightning
Natural
Volcanos
Wildfires
Cities
Airplanes
Mobile
Cars, Trucks, Buses, Motorcycles
Area
Forests
Livestock
Fertilizer
Oil & Gas
Stationary
Industry, Power Plants, Sewage Treatment


Water Pollution

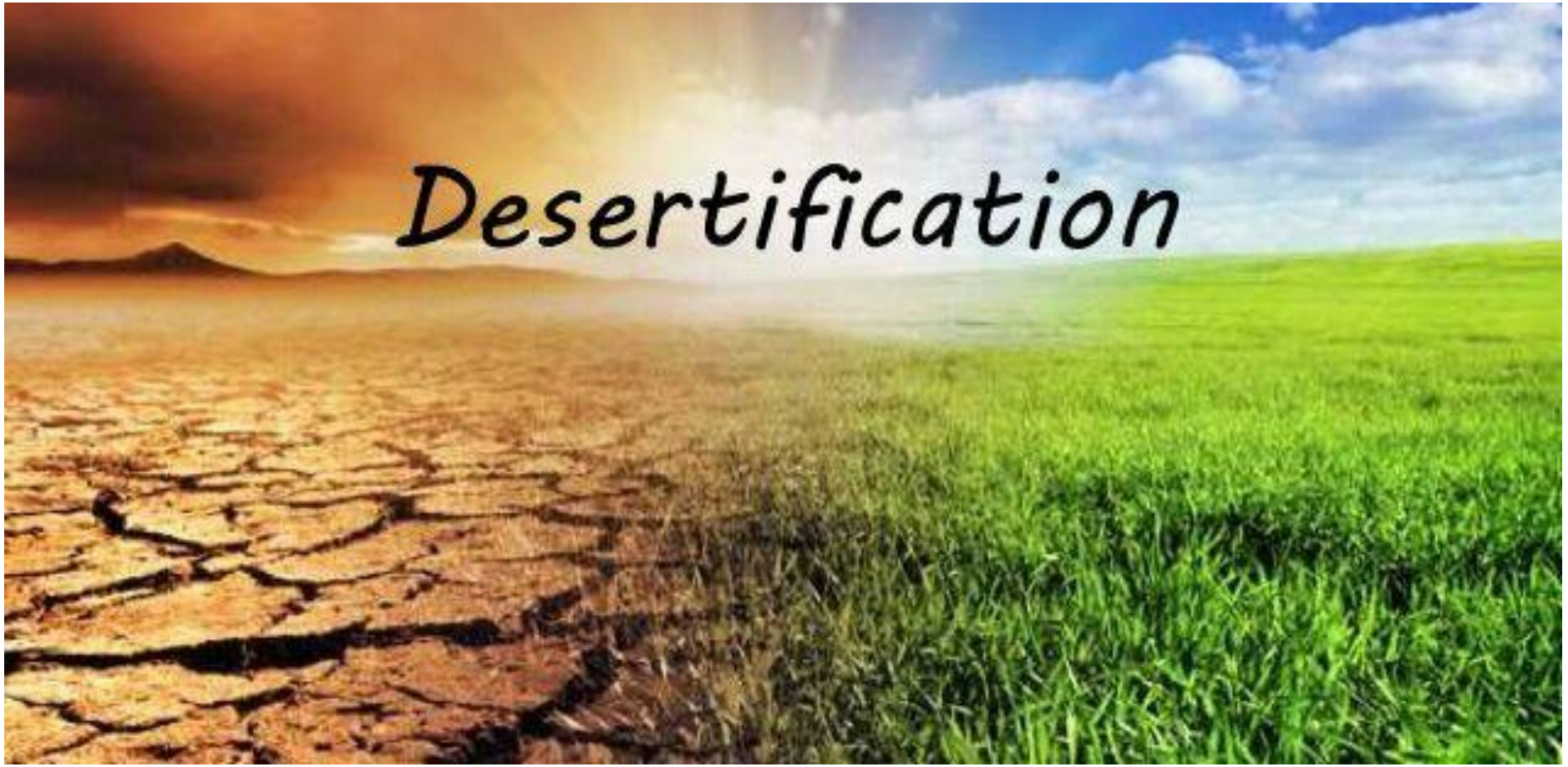

Soil/ Land Pollution


Noise Pollution
HONK

Environmental Issues

3. Desertification as an impact of development on the environment

- refers to the process of overusing land, which then becomes infertile and not suitable for agriculture anymore.
- farmers in developing countries are forced to over-farm certain crops, due to the imbalance in trade with the West.
- overexploitation of its natural resources (water)
- growing population's demands, along with other related demands for agriculture and industry

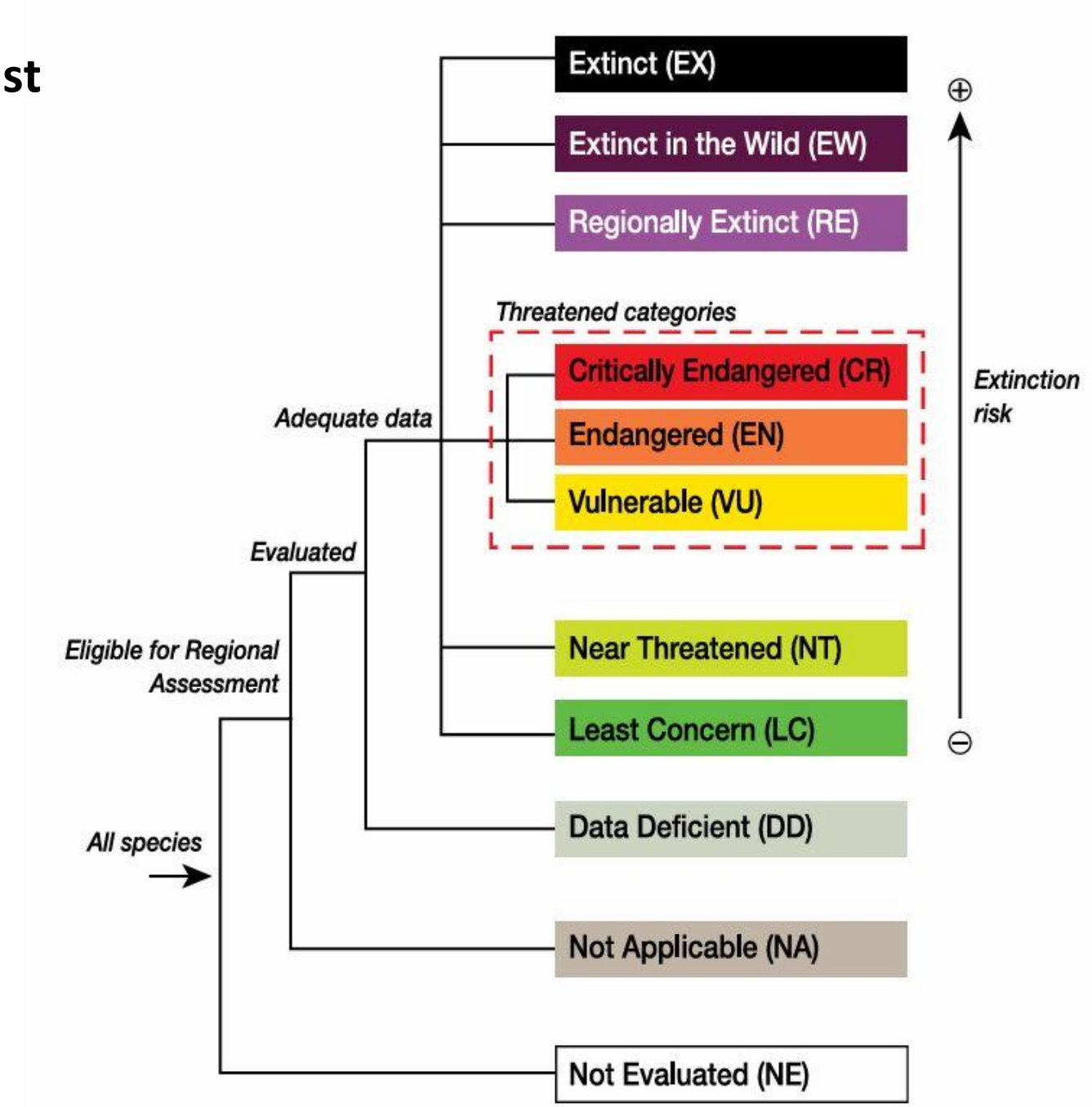

Desertification

Environmental Issues

4. Extinction of species as an impact of development on the environment

- combination of deforestation, pollution, and desertification has resulted in another major environmental concern: the **extinction** of some wildlife species.
- When species lose their natural habitat or have no access to clean water and food supplies, they eventually go extinct.
- According to ecologists, 816 species have gone extinct in the past 500 years.

IUCN Red LIst



Govt prepares list of 1,000 endangered plant species

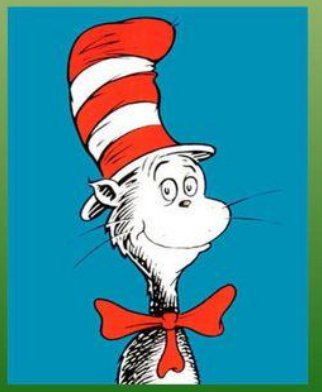
According to the results of the red list assessment:

- 8 are primarily extinct
- 5 are critically endangered
- 127 are endangered
- 262 are vulnerable
- 69 are nearly threatened
- 271 are of least concern



"I speak for the trees, for the trees have no tongues"

-*The Lorax*, Dr. Seuss





Striped Hyena (SID–MA0145) © M M Feeroz



Grey Wolf (SID–MA0144) © M M Feeroz



Nilgai (SID–MA0142) © M. Monirul H. Khan



Banteng (SID–MA0140) © Fletcher & Baylis www.arkive.org



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Javan Rhinoceros (SID–MA0138) © www.pinterest.com



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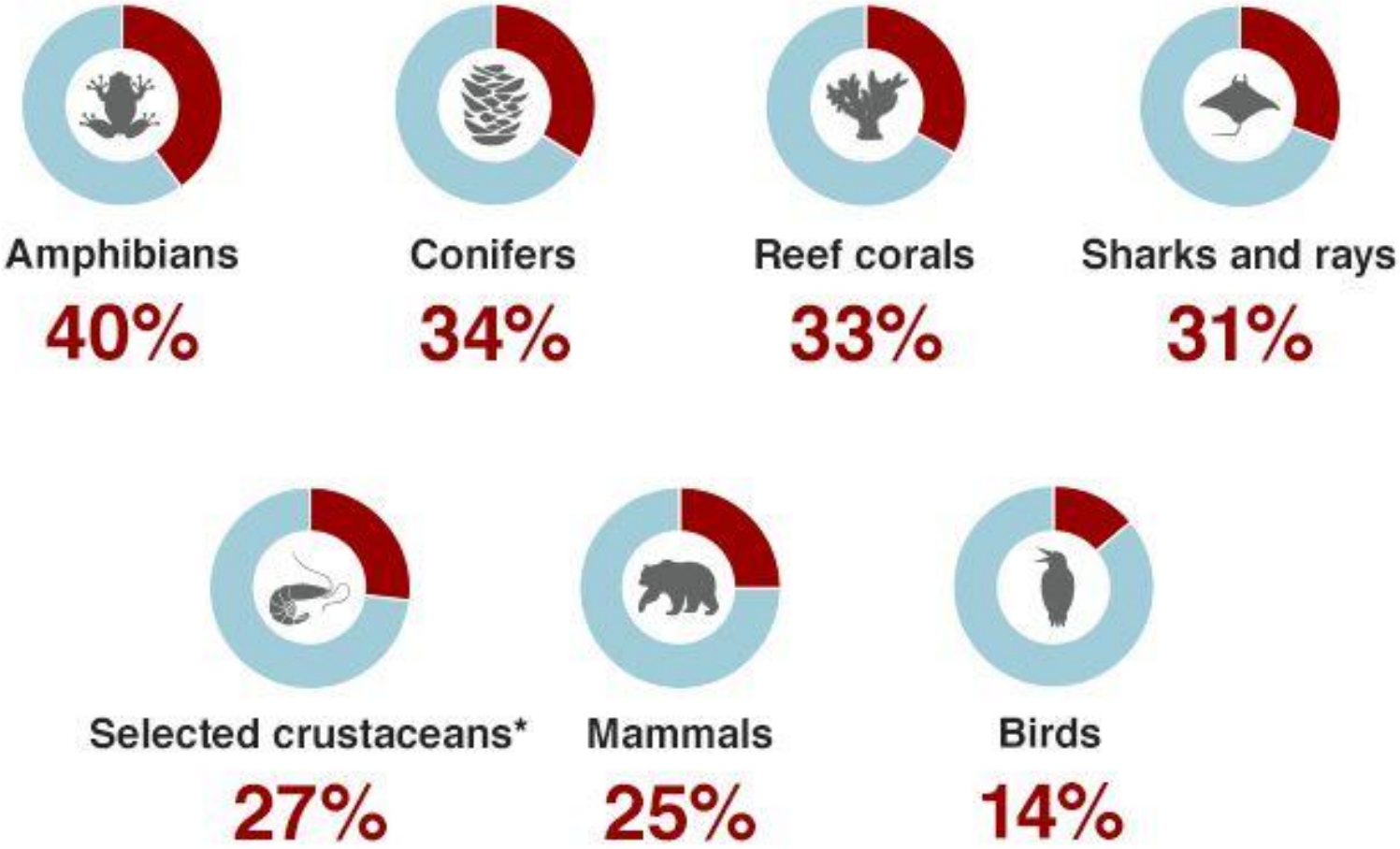
Swamp Deer (SID–MA0143) © www.nickgarbutt.photoshelter.com





One in four species are at risk of extinction

Species assessed by the IUCN Red List



*Assessed species include lobsters, freshwater crabs, freshwater crayfishes and freshwater shrimps

Source: IUCN Red List of Threatened Species

BBC

Sustainable Development

- Sustainable development is the development that meets the needs of the present without compromising the ability of future generations to meet their own needs
  - it ties together concern for the carrying capacity of natural systems with the social, political, and economic challenges faced by humanity
- It is a process that ***envisions a desirable future state for human societies*** in which living conditions and resource-use continue to meet human needs without undermining the "integrity, stability and beauty" of natural biotic systems

Environmental Impact Assessment

What is EIA?

- A formal process for identifying the likely effects of particular activities or projects on the environment, and on human health and welfare
- An important procedure for ensuring that the likely effects of new development on the environment are fully understood and taken into account before the development is allowed to go ahead
- A systematic identification and evaluation of potential impacts of proposed projects, plans, programs, or legislative actions related to physical-chemical, biological, cultural and socio-economic components of the Environment

In essence ***EIA is a framework of sustainable development***

Where and Why did EIA start?

Environmental Impact Assessment emerged in the United States as a response to the rise of environmental movements of the 1960s that raised awareness of the serious environmental effects of human activities which were inadequately controlled by existing planning regulation and pollution control measures.

Impact Analysis

- Type: biophysical, social, health or economic
- Nature: direct, indirect or cumulative
- Extent: local, regional, Trans-boundary or global
- Magnitude or severity: extreme, moderate or low
- Timing: immediate or long-term
- Duration: temporary or permanent
- Uncertainty: low likelihood or high probability
- Reversibility: reversible or irreversible
- Significance: important or unimportant

What is Environment?

In simplest words

- environment is everything that surrounds us

or

- the sum of all external conditions affecting the life, development, and survival of an organism

What is Environment?

Comprehensive definition:

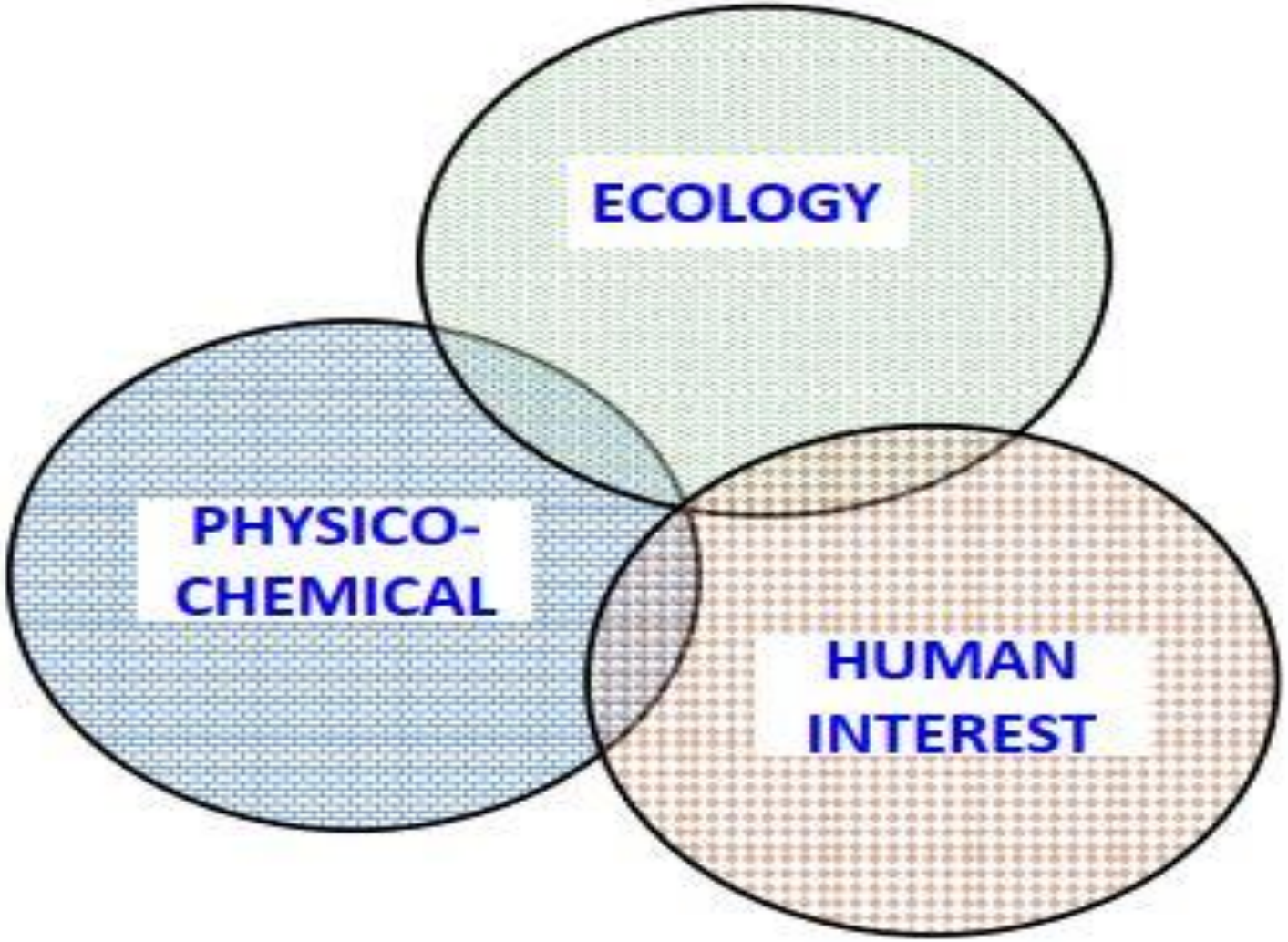
— the ***complex of physical, chemical, and biotic factors*** (such as climate, soil, and living things) that act upon individual organisms and communities, including humans, and ultimately determine their form and survival

— it is also the ***aggregate of social and cultural conditions*** that influence the life of an individual or community

— it includes ***natural resources and ecosystem services*** that comprise essential life supporting functions for humans, including clean water, food, materials for shelter, and livelihood generation

Environmental Parameters

components of environment can be grouped into three major categories:



Ecology

- **Aquatic**
  - Fisheries
  - Eutrophication
  - Aquatic Weeds
  - Species diversity
  - Endangered species



- **Terrestrial**
  - ☐ Forest
  - ☐ Wildlife
  - ☐ Species diversity
  - ☐ Endangered species



Physico-chemical

- **Land**
  - Erosion and Siltation
  - Bank stability
  - Drainage
  - Soil characteristics
- **Groundwater**
  - Regional Hydrology
  - Recharge
  - Water table
  - Water Pollution
- **Surface water**
  - Regional Hydrology
  - Silt Load
  - Water Pollution
- **Atmosphere**
  - Air pollution
  - Dust Pollution
  - Noise Pollution

Human Interest

- **Health**
  - Nutrition
  - Sanitation
  - Diseases
- **Aesthetic**
  - Landscape
  - Recreation

- **Socio-Economic**
  - ☐ Land Loss
  - ☐ Crop Production
  - ☐ Aquaculture
  - ☐ Irrigation
  - ☐ Navigation
  - ☐ Flood Control
  - ☐ Transport
  - ☐ Re-settlement
  - ☐ Employment
  - ☐ Agro-industrial

Environmental Impacts

— Any impact caused by a proposed ***development activity*** on the environment, including effects on human health and safety, flora, fauna, soil, air, water, climate, landscape and historical monuments, or other physical structures

— It also includes effects on cultural heritage or socioeconomic conditions resulting from alterations to the environmental factors

Example of Environmental Impact due to Infrastructure Development (e.g. Thana Road) Project

Ecological Impact

(a) Fisheries:

- (-) Roads prevent longitudinal and lateral migration of fishes in the flood plain
- (-) Obstruct movement of fishes onto natural feeding and breeding grounds in the flood plain.

(b) Forest:

- (-) Roads running through forest area and plantations may be the cause of destruction of trees in the forest and alteration of ecology of the forest.

Example of Environmental Impact due to Infrastructure Development (e.g. Thana Road) Project

Ecological Impact

(c) Plantation:

- (+) The roadsides may be used for plantation of trees

(d) Wetland and Wetland Habitant:

- (-) The road may encroach wetlands which may alter the ecology of wetlands and may cause destruction of wetland habitat

Example of Environmental Impact due to Infrastructure Development (e.g. Thana Road) Project

Physico-chemical Impact

(a) Erosion and Siltation

- (-) causes erosion during flood and siltation in the downstream.

(b) Drainage Congestion /Water logging

- (-) roads interfere with cross drainage and can cause flooding or drainage congestion in adjacent areas during periods of high precipitation.
- (-) May cause crop damage, water pollution and breeding of mosquitoes.

Example of Environmental Impact due to Infrastructure Development (e.g. Thana Road) Project

Physico-chemical Impact

(c) Regional Hydrology/Flooding

- (-) Roads constructed across flood plains perpendicular to the direction of water flow cause back water effect and increase duration, frequency and extent of flooding in the up stream.

(d) Obstruction to Wastewater flow

- (-) Roads may obstruct the drainage of sewage and industrial wastewater leading to serious pollution problem.

(e) Dust /Noise Pollution

- (-) Dust raised from unpaved rural roads and blown by the vehicles can pose a health hazard and damage vegetation along the sides of the road.

Example of Environmental Impact due to Infrastructure Development (e.g. Thana Road) Project

Impact on Human Interest

(a) Loss of Agricultural Lands

- (-) Construction of any road is associated with the loss of agricultural lands.

(b) Generation of Employment Opportunities

- (+) Construction of road generates temporary employment during project implementation and permanent employment during maintenance phase.

(c) Navigation and Boat Communication

- (-) Roads interference with navigation and boat communication at least for certain period of the year.

Example of Environmental Impact due to Infrastructure Development (e.g. Thana Road) Project

Impact on Human Interest

(d) Commercial and Service Facilities

- (+) The thana roads provide benefit of fast communication, transport facilities etc.

(e) Industrial Activities

- (+) Road communication promotes industrial activities.

(f) Irrigation Facilities

- (+) Borrow-pits by the side of the roads provide facility for small scale irrigation.

(g) Landscape

- (-) Scattered borrow pits, unauthorized growth around road, erosion result in marred landscape.