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ENVIRONMENTAL MANAGEMENT SUSTAINABILITY

BY

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ENVIRONMENTAL MANAGEMENT SUSTAINABILITY

These lecture materials are for the Environmental Management Sustainability for Southeast Asia (MARE) (Project No. 610327-EPP-1-2019-DE-EPPKA2-CBHE-JP)

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Environmental Management Sustainability

By: Dr. Mohd Badruddin Mohd Yusof

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SYNOPSIS

This course is designed to expose students to various aspects of environmental management and the concept of sustainability. The topic discussed include the principles of sustainable development, understanding the environmentally sensitive area particularly the natural water bodies, catchment management, development of coastal and inland areas.

Current issues related to environmental problems especially climate change and water supply are the main aspects to be addressed. some of the methods and concepts of sustainable approaches are introduced in order to promote and achieve sustainable development goals.

At the end of the course, the students should be able to understand the concept of environmental sustainability and present it through effective communication. The course enables the students to understand, plan and incorporate the concept of sustainability in environmental management.

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LESSON PLAN

MARE

01 **WEEK**

Environmental Sustainability

02 **WEEK**

Environmental issues and problems

03 **WEEK**

Classification of the natural environmental system;Soil

04 **WEEK**

Classification of the natural environmental system; River

05 **WEEK**

Classification of the natural environmental system; Swamp forest

06 **WEEK**

Environmental sustainable approaches

07 **WEEK**

Integrated river management system

08 **WEEK**

Mid-semester break

09 **WEEK**

Water security

10 **WEEK**

Water security

11 **WEEK**

Water footprint

12 **WEEK**

Life cycle analysis

13 **WEEK**

Carbon footprint; carbon credit

14 **WEEK**

Green building

15 **WEEK**

Assignment and presentation

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SUSTAINABILITY & DEVELOPMENT

01

SUSTAINABILITY

Can be defines as managing Earth and resources so that future generations may have hospitable conditions and a satisfactory standard of living for an indefinite period of time

02

SUSTAINABILITY DEVELOPMENT

The pattern of resources use, that aim to meet human needs while preserving the environment for present and future generation
Developments that meet the needs of the present without compromising the ability of future generations to meet their own needs.

03

CONCEPT

Encompasses ideas, aspirations and values that continue to inspire public and private organizations to become better stewards of the environment and promote positive economic growth and social objectives

04

ENVIRONMENTAL SUSTAINABILITY

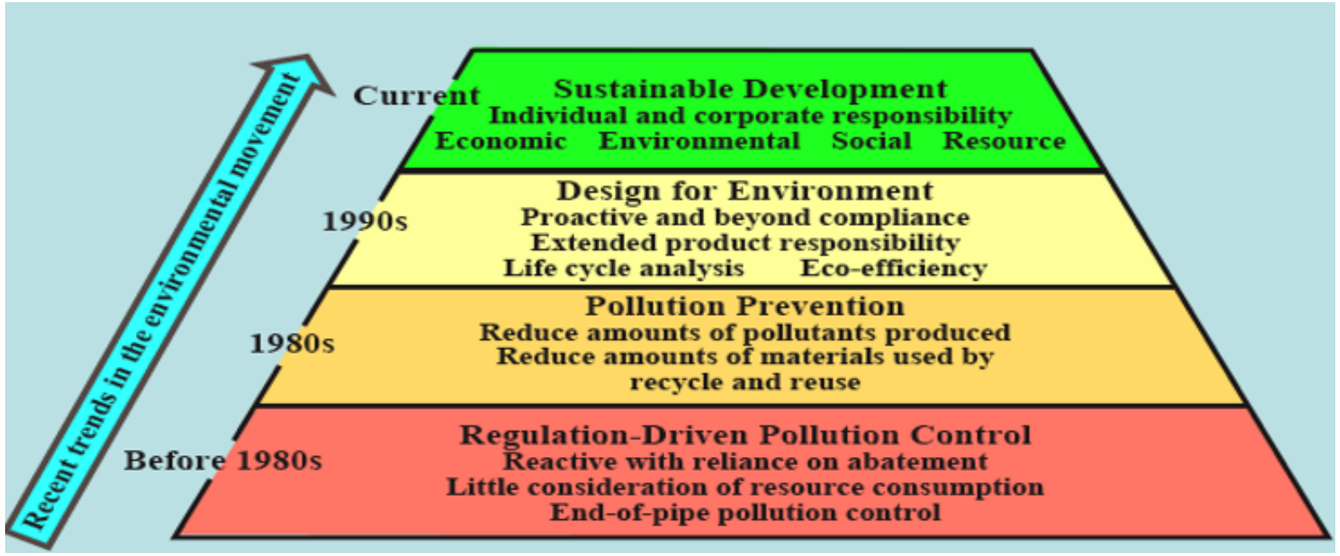
The process of making sure current processes of interaction with the environment - the idea of keeping the environment as pristine as naturally possible

05

PRINCIPLES

Can stimulate technological innovation, advance competitiveness and improve quality of life. Able to achieve continuing economic prosperity while protecting the natural system of the planet and providing high quality of life for its people

ENVIRONMENTAL SUSTAINABILITY



The figure shows Evaluation of the environmental movement from pollution detection and treatment to sustainability

01 Involves reducing pollution, waste, and the consumption of natural resources by implementing an environment action plan.

02 Toward sustainability

03 Evolution of the environmental movement from pollution detection and treatment to sustainability

ENVIRONMENTAL ISSUES

01 **GLOBAL WARMING**

burning of fossil fuels that pump C02 & other gasses into atmosphere

02 **CONSERVATION**

Species extiction, coral bleaching, invasive species

03 **CLIMATE CHANGES**

sea level rise, global dimming

04 **DAMS**

Environmental impacts of dams

05 **ENERGY**

Energy conservation, renewable energy

06 **INTENSIVE FARMING**

overgrazing, irrigation

07 **LAND DEGRADATION**

land pollution, soil erosion, soil contamination

08 **NUCLEAR ISSUES**

nurclear fallout, radioactive waste

09 **OVERPOPULATION**

burial

10 **OZONE DEPLETION**

cfc

11 **POLLUTION**

Llight, noise, and visual pollution

12 **WASTE**

landfill, recycling, incineration

ADVERSE EFFECT OF GLOBAL WARMING

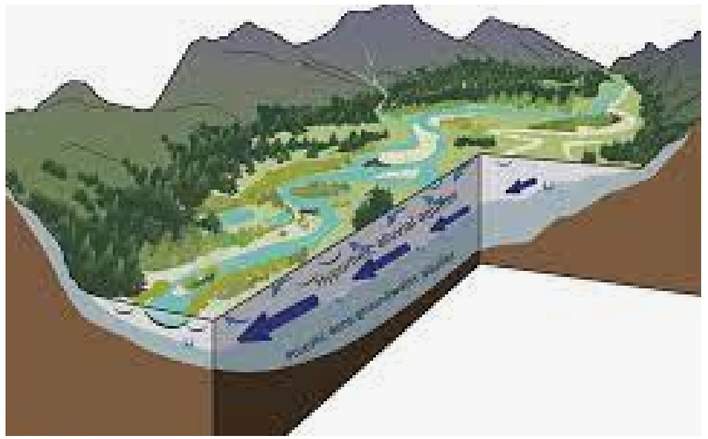
- Spread the disease
- Warmer water and more hurricane
- Increase the intensity of droughts and heat waves
- Economic consequences
- Polar ice cap melting
- More floods
- Destructive storms
- Desertification

- Tsunami and cold waves
- More outbreaks of deadly disease
- More dangerous thunderstom
- Loss of biodiversity and animal extinction
- Polar ice cap melting
- Death of ocean life
- Animal attacks
- Diminished food and water supplies

CLASSIFICATION OF NATURAL ENVIRONMENTAL SYSTEM

SOIL, STEEP SLOPES

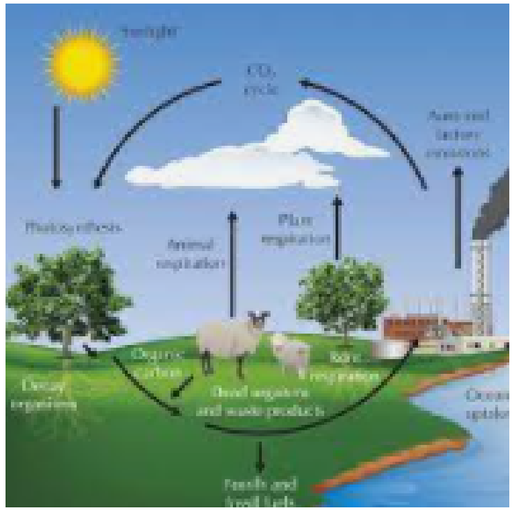
LAKE AND LAKEFRONT



RIVERS

FLOODPLAINS

RIVERINE



WATER CYCLE

NUTRIENT CYCLES

AQUATIC FOOD WEB

SOIL AND STEEP SLOPES

SOIL

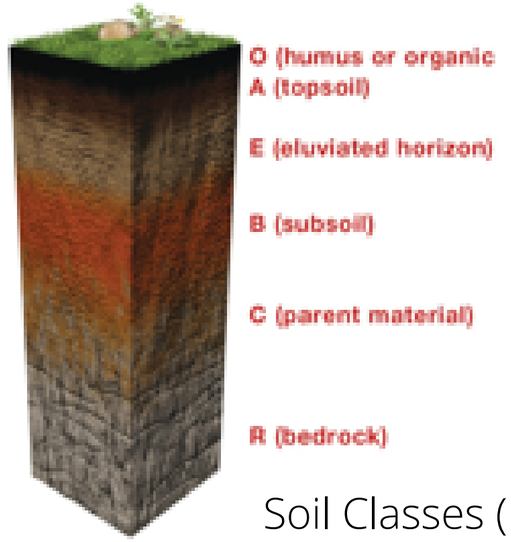
develops over time by weathering of bedrock and the combined action of local climate and living organisms on bedrock and accumulated material

ALLUVIUM (COMMON SOIL)

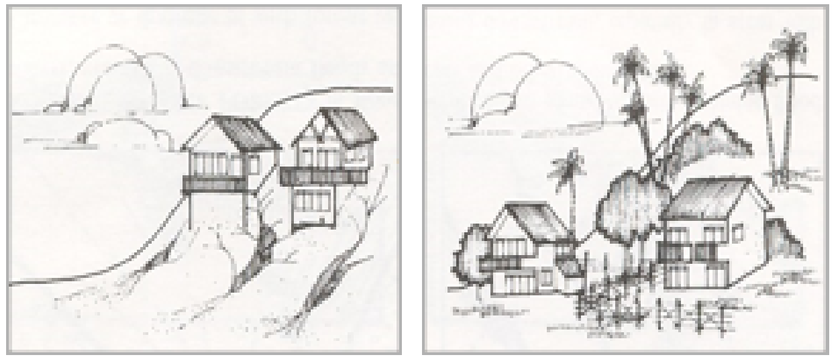
consists of clay-loams, clay and silt, or coarse gravel and sands

SOURCES FOR WATER SUPPLY

large sands and gravel deposits that are saturated with groundwater



Soil Classes (UK-ADAS)



Steep Slopes

Erosion from the surface runoff is likely considerably more severe than on moderate slopes, and the weight of structures on steep hillsides may cause unstable soils to slump and weaken or crack foundations.

LAKE AND LAKEFRONT

LAKES

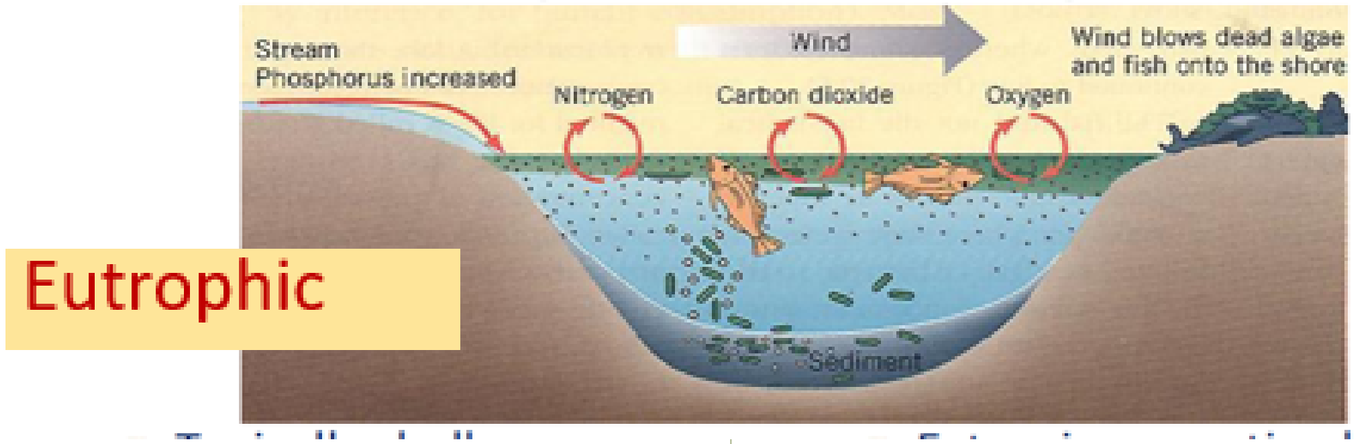
open bodies of slow moving water, not contact with the ocean

LAKE GEOLOGY

Basin area, shape, death
Watershed size and mineral soils,
Basic water quality and sediment characterisitcs

EUTROPHICATION

the natural process in lakes
the process of organic enrichment results from excess nutrients from runoff



the process of organic enrichment results from excess nutrients from runoff often causes the depletion of oxygen dissolved in the water, killing fish and most other animals.

can cause algal growth, a shift in food chains, oxygen depletion, and other undesirable effects on marine ecosystems.
Increase in the occurrence of blooms, which cause mass mortalities in a variety of marine organisms

RIVERS AND FLOODPLAINS

RIVERS

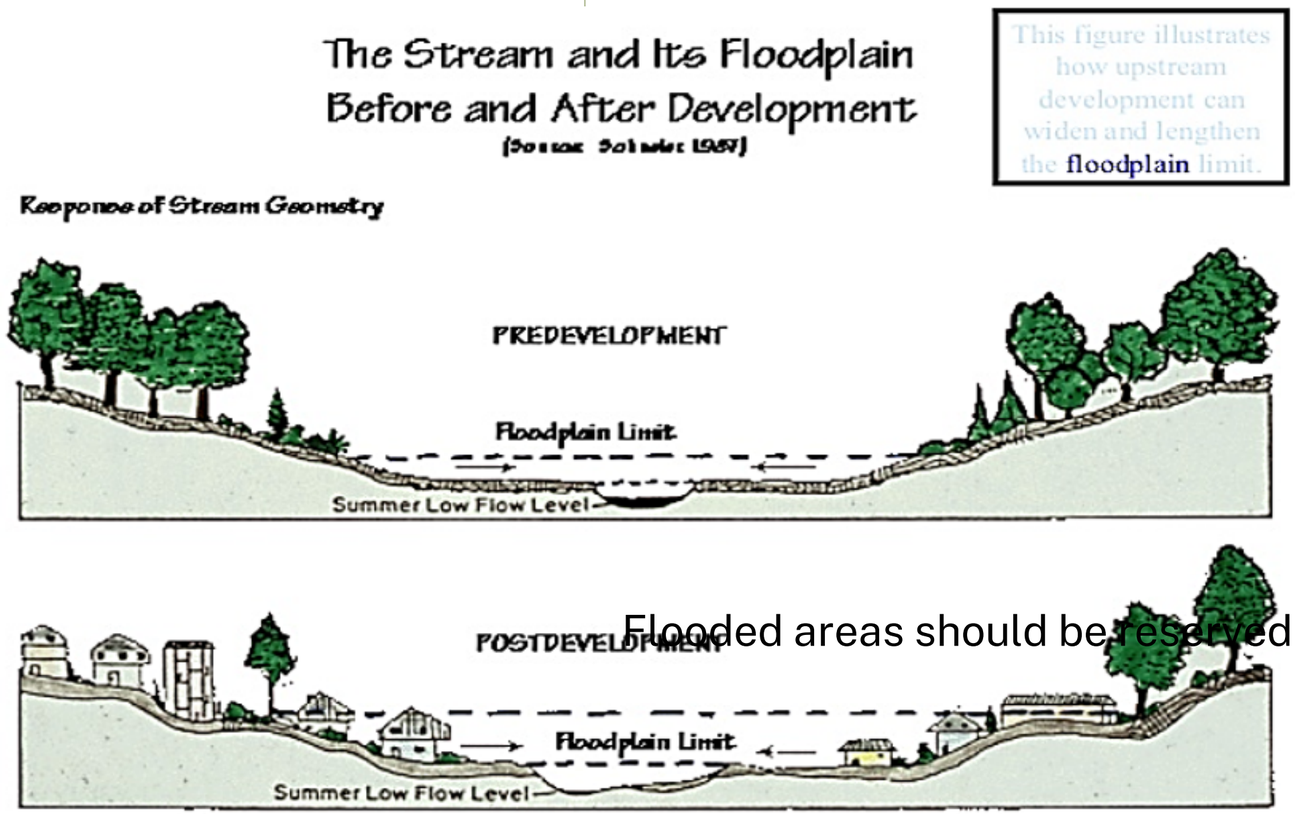
Flow over the relatively flat land border on broad flood plains

FLOODPLAINS

flat, land adjacent to a stram or river that experiences occasional flooding

FLOODPLAINS ARE FROMED IN 2 WAYS

1. By Erosion,
2. Aggradations



This figure illustrates how upstream development can widen and lengthen the floodplain limit.

Development of floodplains may result:

1. Loss of life
2. Damage to property from floodwaters

Flooded areas should be reserved

The flooded area should be reserved for open space, recreation, wildlife, or agriculture

RIVERINE AND SWAMP FORESTS

SWAMP

a wetland that features permanent inundation of large areas of land by shallow bodies of water

SWAMP FOREST

Including a large amount of woody vegetation

CHARACTERISTICS

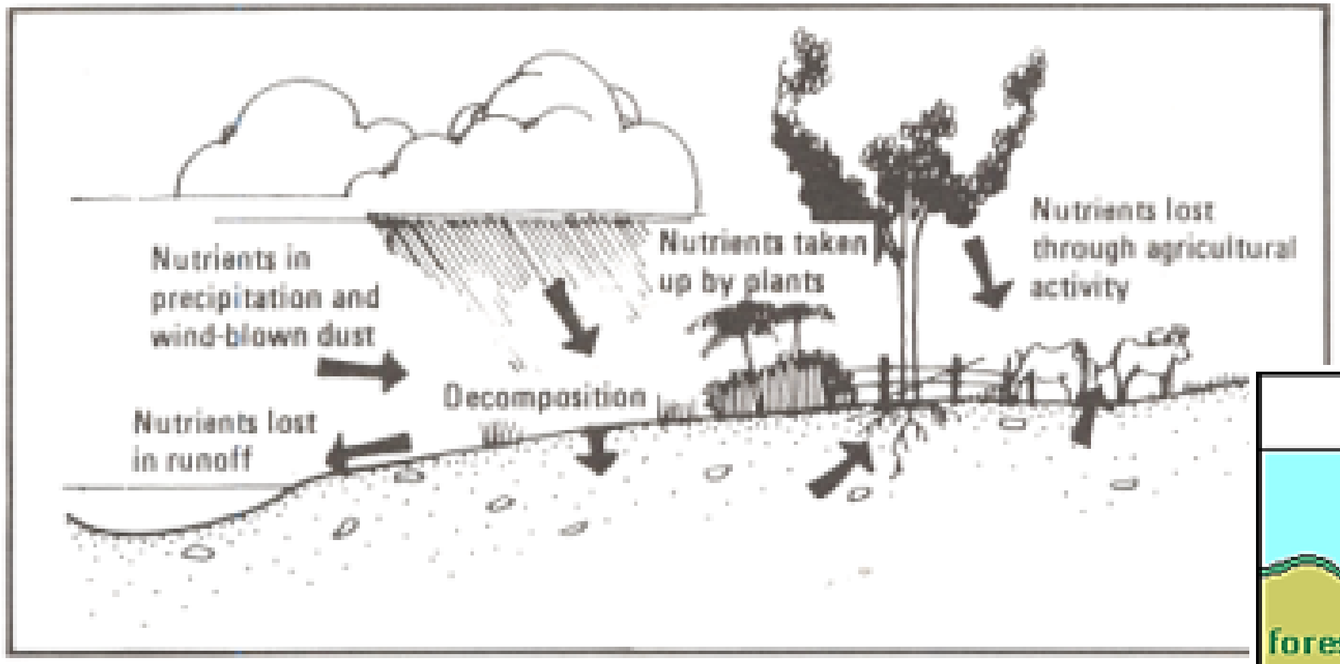
very slow-moving water often rich in tannins from decaying vegetation associated with adjacent rivers or lakes

USE ROLES

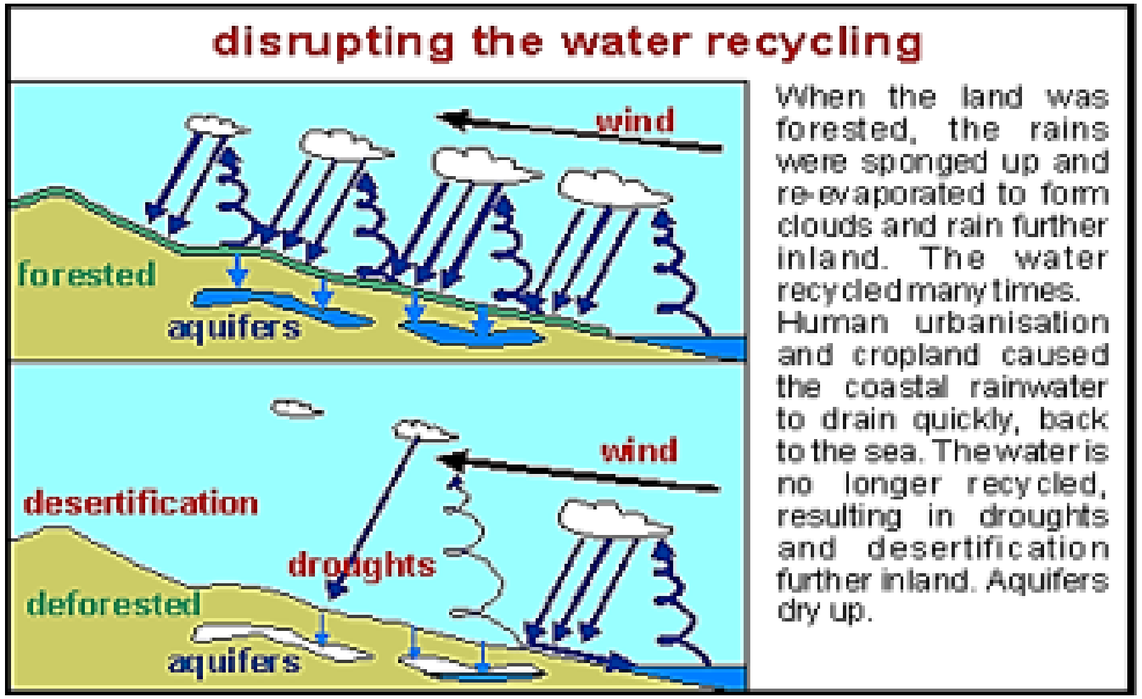
absorbing and retaining flood waters
preventing downstream floods
trapping sediments and other poluution

The soil is infertile and primarily organic matter

WATER CYCLE

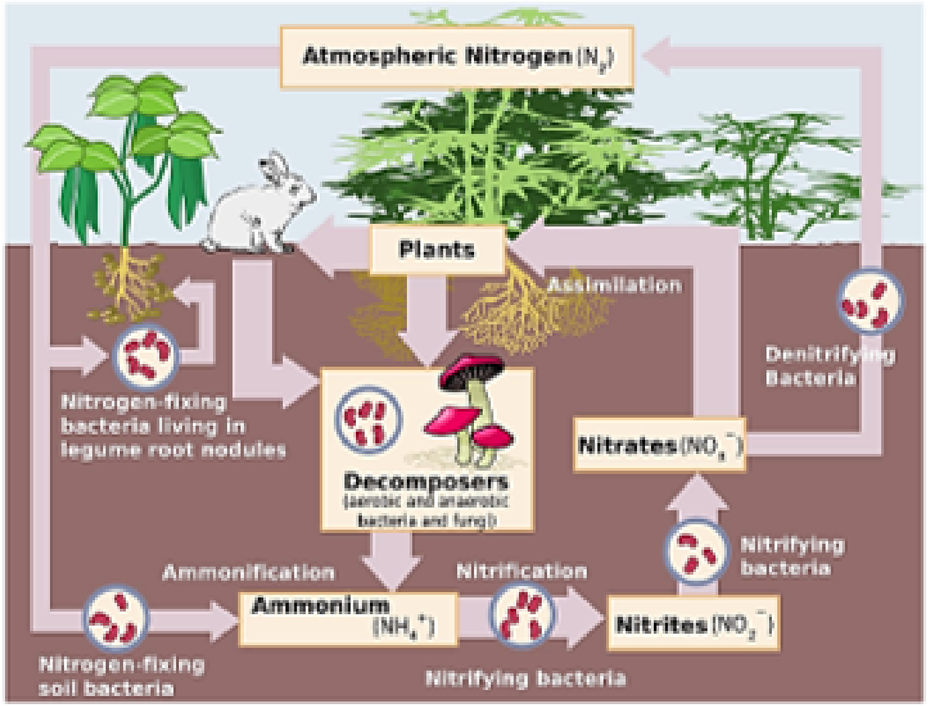


Water evaporating from lakes, rivers and the ocean from clods; precipitation from the clouds completes the cycle



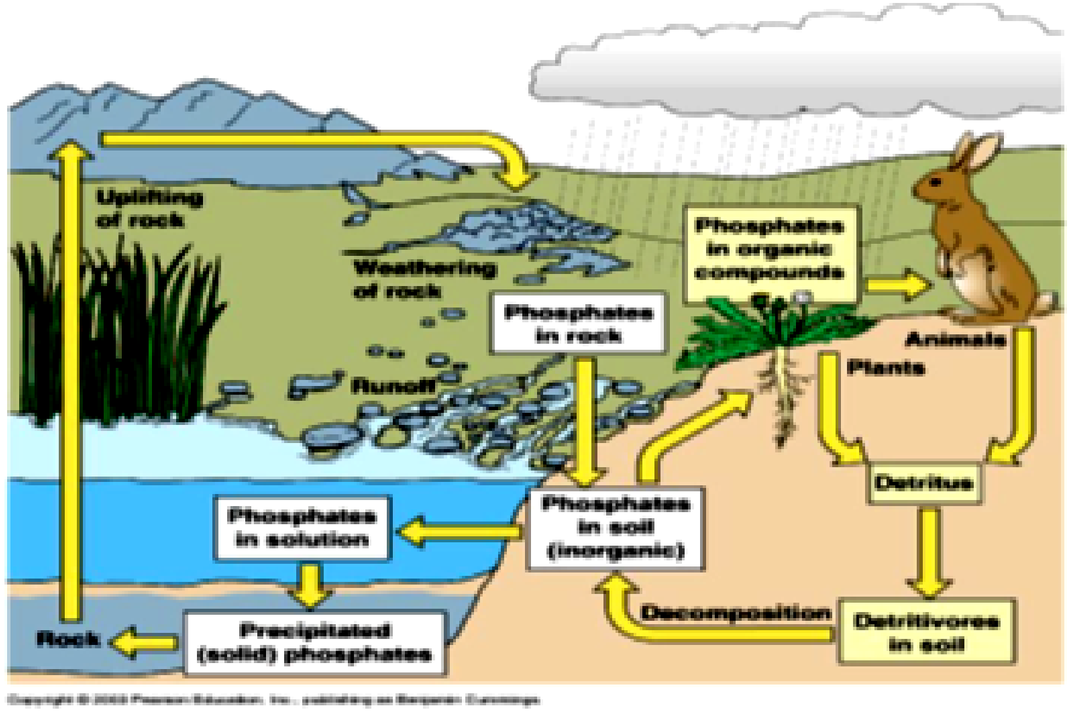
the water cycle provides a basic link between natural systems such as forests.
it is important to man in maintaining water supplies and removing degrading pollutants

NUTRIENTS CYCLE



Including organic compounds and minerals is essential in maintaining natural systems.

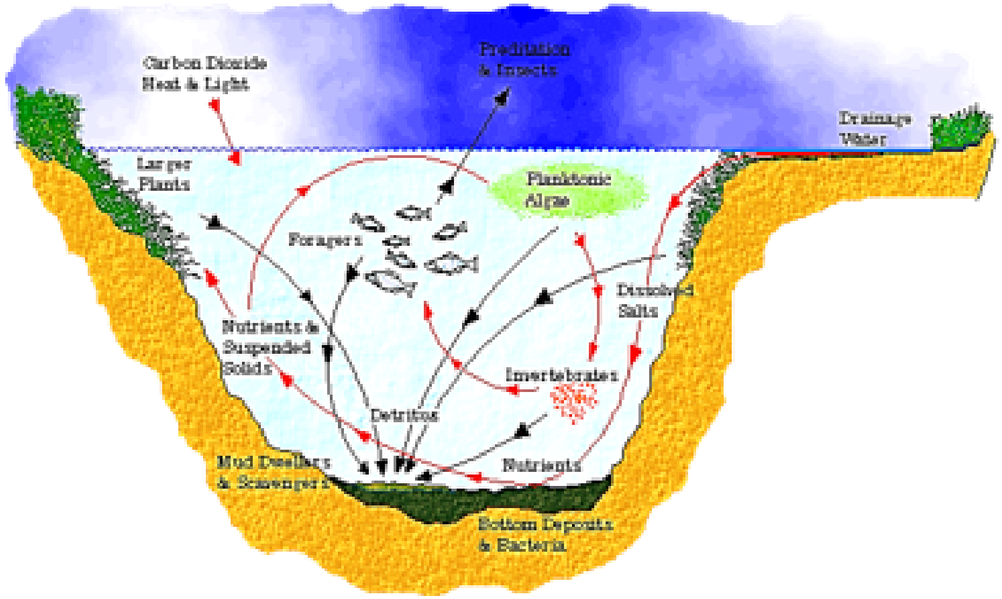
The nutrient cycle occurs through precipitation and wind-blown dust, and nutrients are lost through erosion and runoff, hunting and harvesting of trees and crops



The environmental disturbance may cause more nutrients to be lost than added, upsetting the nutrient cycle of an area decreasing its productivity

AQUATIC FOOD WEB

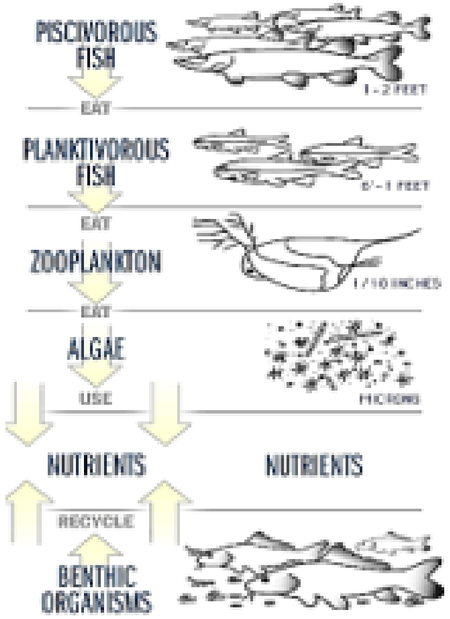
Aquatic Food Web

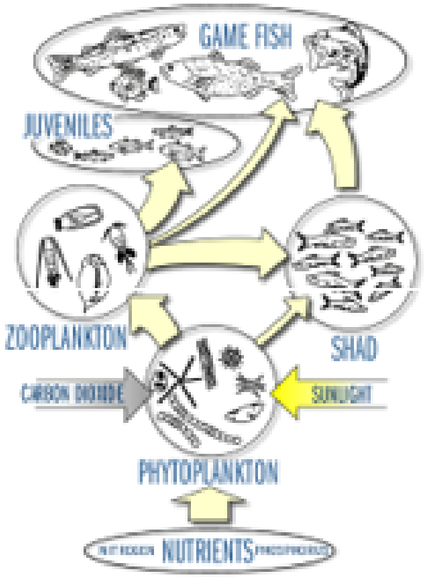


The food web of coastlines and rivers begins with dead plant and animal matter flowing into rivers and estuaries from upland areas.
converted into food by shoreline vegetation, bacteriaa and minute floating plants

All aspects of the systems are interrelated, disruption of one part of the food web can affect many other parts

Aquatic Food Web





CLASSIFICATION OF COASTAL AREA DEVELOPMENT

ESTUARIES AND TIDAL WETLANDS

BEACHES AND SHORELINES

LOW LYING AREAS BORDERING ESTUARIES AND COASTLINES

ESTUARIES

01

ESTUARIES

are river mouths and bays where fresh and saltwater meet.

generally found at the end of rivers

saltwater is slightly heavier than freshwater, it is usually moving up the estuary beneath our flowing freshwater

02

ESTUARINE PLANT

including seagrasses, mangroves, and salt marshes, support a diverse range of estuarine habitats,

known as 'the nurseries of the sea': contain a large amount of food and shelter for fish and other animals

03

ROLES/FUNCTION

area for habitat, breeding and nursery areas for plants and animals

provide habitat for fish, birds, and other wildlife to live, feed and reproduce.

functions as biological productivity, (most biological productive area in the world)

WETLAND

01

CRITERIA

the area must be permanently or seasonally inundated

the area must support hydrophytic vegetation

the soil in the area must be waterlogged for a sufficient time to become anaerobic

02

TIDAL WETLAND SERVE AS

buffers against storms and typhoons

refuges for wildlife

nurseries for various forms of marine life

pollution filters, removing contaminants from water flowing through them

03

DEVELOPING WETLAND

poses drainage and sometimes subsidence problems.

dredging of rivers and wetland often has numerous adverse impacts

BEACHES

01

BEACHES

Deposition landforms, and the result of wave action by which waves or currents move sand or other loose sediments.

02

SHAPE OF BEACHES

Depends on whether the waves are constructive or destructive

Constructive waves: moves material up the beach

Destructive waves: move the material down the beach

03

EROSION

erosion and movement of sand above the shoreline is reduced by vegetation

manmade erosion results from sand extraction from river mouth and beaches, removal of mangrove, and infrastructure construction

SHORELINES

01

SHORES

are influenced by the topography of the surrounding landscape, as well as by water erosion such as waves

the sandy shoreline is an unstable environment that exposes plants and animals to harsh conditions.

02

COASTS

popular destinations because of recreational activities

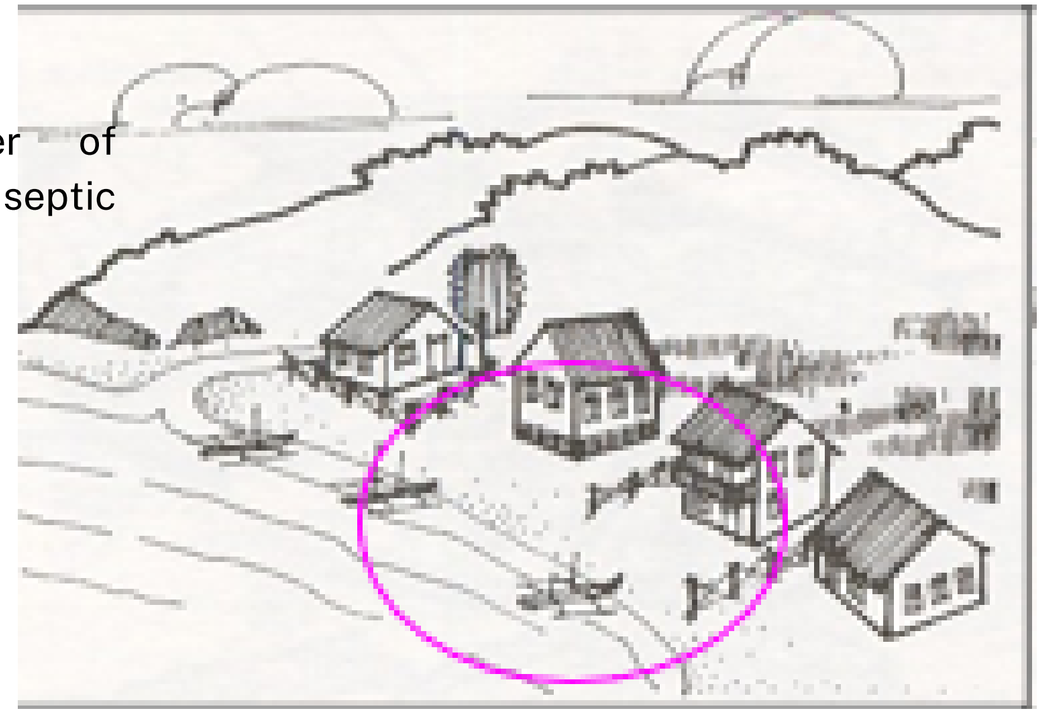
- swimming
- fishing
- surfing
- boating
- sunbathing

03

DEVELOPMENT

Causes loss to most vegetation

increase danger of pollution from septic systems



LOW LYING AREAS BORDERING ESTUARIES AND COASTLINES

01

LOW LYING AREAS

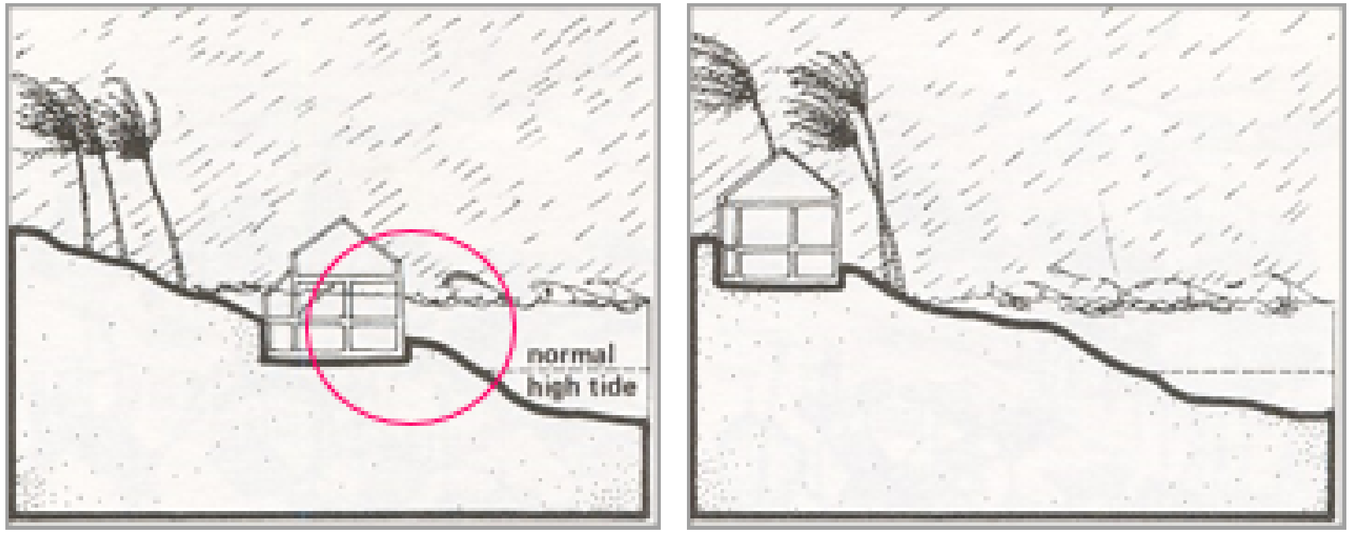
maybe prone to periodic flooding and storm damage.

development should be limited to water-related activities such as recreation

02

SUSTAINABLE BEACH

often goes to the cycle of submersion during rough weather then accretion during calmer periods.



INTEGRATED RIVER BASIN MANAGEMENT

01

RIVER

body of inland water flowing for the most part of the surface of the land but which may flow underground for part of its course

02

RIVER BASIN

area of land from which all surface runoff flows through a sequence of streams, rivers, and possibly lakes into the sea at a single river mouth, estuary or delta

03

INTEGRATED RIVER BASIN MANAGEMENT

the sustainable management of land and water based on natural geographical boundaries, rather than administrative units

04

OBJECTIVE IRBM

1. ensure clean water
2. ensure sufficient water
3. reduce flood risks
4. enhance environmental convnservation

WATER SECURITY

WATER SECURITY

ability to access sufficient quantities of clean water to maintain adequate standards of food and goods production, proper sanitation, and sustainable health cear

DEFINITION

The reliable availability of an acceptable quantity and quality of water for health, livelihoods, and production, coupled with an acceptable level of water-related risks

AREA THAT HAVE WATER INSECURITY

Places with low rainfall,

a place with rapid population growth in a freshwater scarce area

areas with international competition over a water sources

WAY TO PROVIDE WATER SECURITY

implementing water desalination

pipelines between sources and users

water licenses with different levels and war

COMMON THREAT TO WATER SECURITY

water scarcity

environmental threats

natural disaster

terrorism and radiation due to a nuclear accident

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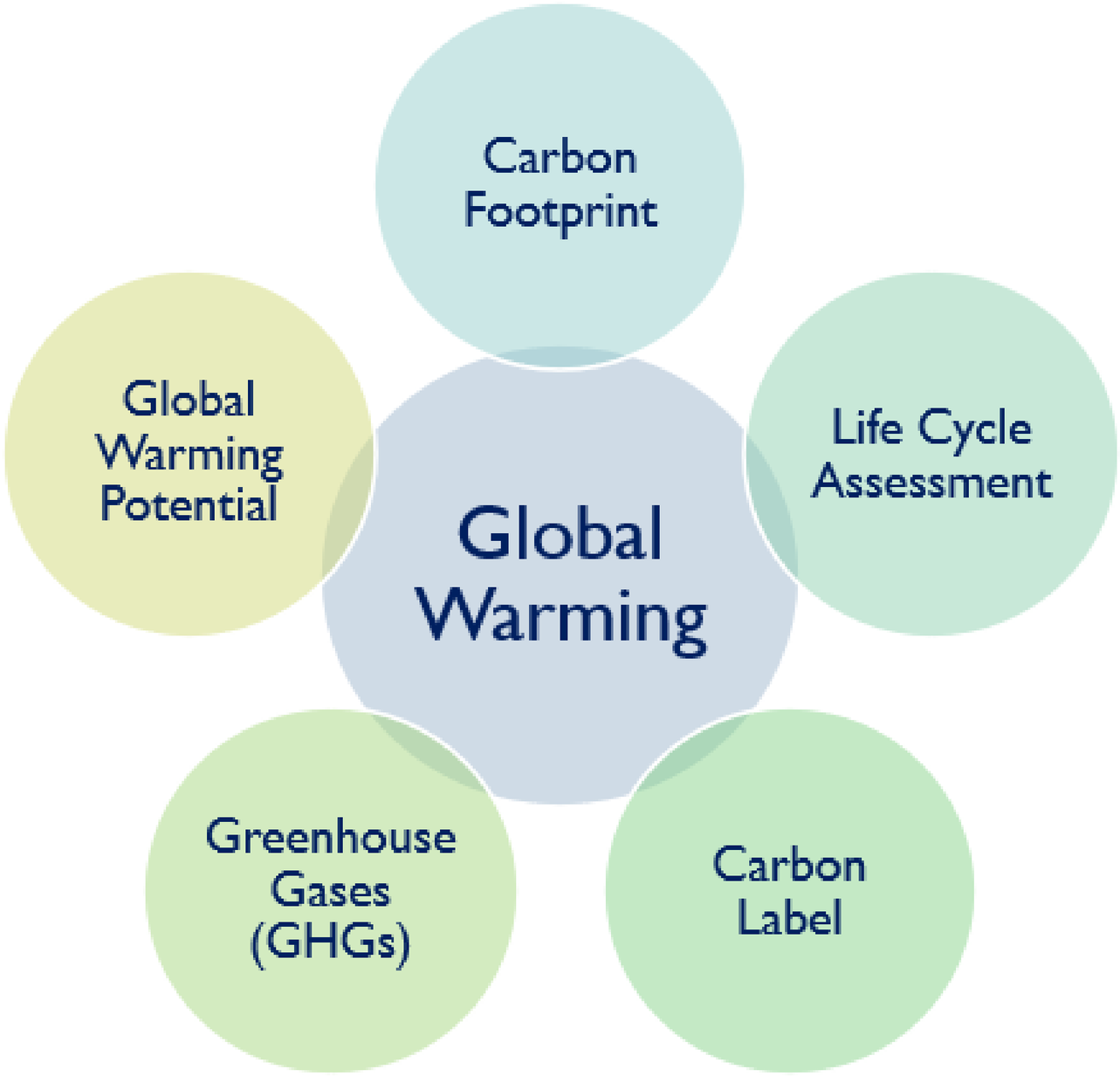
CARBON FOOTPRINT / GHGs

measurement of all greenhouse gases we individually produce and has units tonnes (or kg) of carbon dioxide equavalent



CARBON FOOTPRINT

SOURCES

made up of the sum of two parts;

the primary and secondary footprint

PRIMARY CARBON FOOTPRINT

measure how much carbon dioxide is given out directly by energy consumption, so you are in control

eg: home appliances permenantly switch on,

SECONDARY CARBON FOOTPRINT

the measure of carbon dioxide given out that is not under your control by-products you consume

eg: the amount of fuel used if the train not full

WHY NEED TO CALCULATE

to report the footprint accurately to a third party

3 TYPES OF GHGs EMISSION

direct emission that results from activities the organizations controls

emission from the usage of electricity

indirect emission from products and services

GREEN BUILDING

01

DEFINITION

both structure and use of a process that is environmentally responsible and resource-efficient throughout a building's life cycle:

from siting to design, construction, operation, maintenance, renovation, and demolition

02

TAKING ADVANTAGE OF RENEWABLE RESOURCES

Using sunlight through passive solar, active solar, and photovoltaic equipment

using plants and trees through green roots, rain gardens

using packed gravel or permeable concrete instead of conventional concrete

03

OBJECTIVES

Efficiently using energy, water, and other resources

protecting occupant health and improving employee productivity

reducing waste, pollution and environmental degradation

04

ENERGY EFFICIENCY

1. Reduce energy consumption
2. specify high-performance windows and extra insulation in walls, ceiling, and floors
3. effective window placement can provide more natural light and lessen the need for electric lighting

Taipei 101, the tallest and largest green building in the world since 2011

Green building in Bangladesh

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