



# Environmental Management 5014

Revision notes

These notes are taken from the YouTube channel "Football Fanatic"  
[https://www.youtube.com/channel/UCceCuUNkdnLH4\\_W5vLrAhA](https://www.youtube.com/channel/UCceCuUNkdnLH4_W5vLrAhA)

Mustafa Asif

6/6/2018

Summarized notes of the book of John Pallister

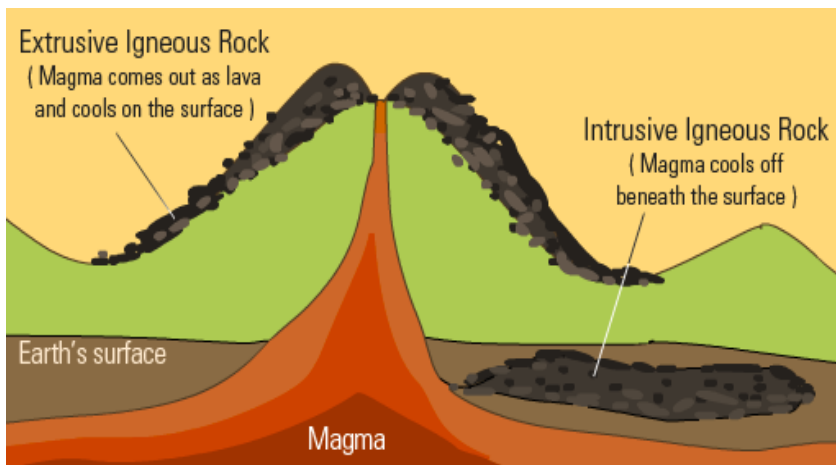


## LITHOSPHERE

### The earth and its rocks

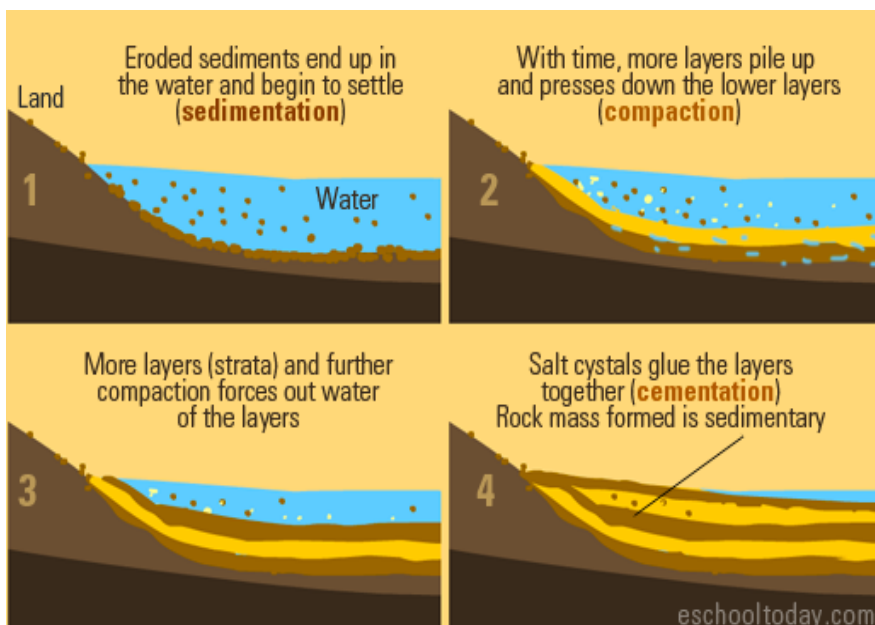
#### (a) Igneous rocks:

- They are formed by lava through volcanic activity.
- Magma is released from the mantle
- Magma rises towards the surface
- The magma cools down to form sedimentary rocks  
E.g. Granite, diorite



#### (b) Sedimentary rocks

- **These are made up of sediments**
- **Sediments are small particles which are broken from different rocks.**
- **After breaking, they reach the seabed**  
**E.g. Sandstone, flint**



## (c) Metamorphic rocks

- These rocks are formed in the Earth's crust which also change their shapes
- The change in shape is due to heat and pressure
- Heat is provided by the magma flow and pressure is provided at the plate boundaries  
E.g. Anthracite, quartzite



## Metamorphic Rocks

- Metamorphic rocks are formed by the effect of heat and pressure on existing rocks.
- This can greatly affect the hardness, texture or layer patterns of the rocks.

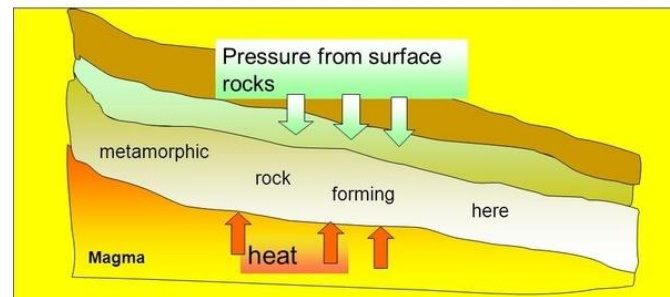
## Methods of mining

### i) Open-cast mining

- The vegetation is removed and the top soil is cleared
- The rocks are broke and cut using explosives
- The diggers are used to remove the loose rock
- The rocks are carried in trucks/railway wagons

### ii) Underground mining/deep mining/shaft mining

- Sinking the vertical shaft down to the rocks containing minerals
- Horizontal tunnels are dug down to the mineral layers
- The loose rock is brought from the mines and piled up on the surface
- The minerals are then transported away.



## Some uses of different rocks

- Chalk: used in manufacturing of cement
- Gravel: Used for making concrete
- Clay: used in making sand
- Granite: for construction
- Sand: making glass



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## Impacts of mining:

- **Surface piles of waste destroy scenic beauty.**
- **Deforestation destroys wildlife**
- **Dust and noise pollution for the workers and the local residents**
- **Workers may die due to suffocation, explosions or earthquakes**
- **Underground mining lowers the water table**
- **Erosion is caused**

## Conservation of environment damaged by mining

- **LANDSCAPING/RESTORATION**

**Bulldozers can be used to level and smooth out the surface. Land is made to look like a natural landscape so that it looks like it hasn't been disturbed by mining. Trees, grasses can be planted.**

- **RECLAMATION**

**The land can be reclaimed from MINING to be used for FARMING. Farmers may be able to start using the land again**

- **LANDFILLING**

**It's a cheap and easy way to dispose of waste. The waste is tipped into the hole left by mining; from time to time it is LEVELLED OFF and COMPACTED. When full, the land can be reclaimed for other uses.**



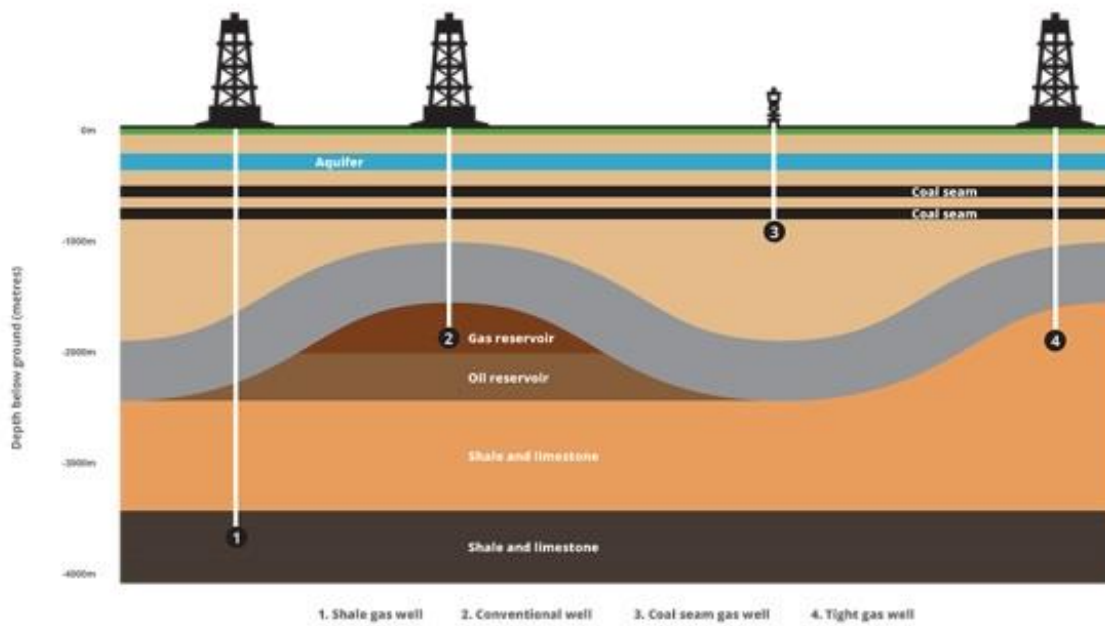
## Fossil fuels as a source of energy:

### Coal, oil and natural gas:

- Formed from decomposition of plants and animals over a period of millions of years
- Coal is extracted via mining
- Natural gas and oil are trapped under the impervious rock layer and at the top of the sandstone rock layer

A drilling rig is used to extract oil and gas

## Types of gas wells

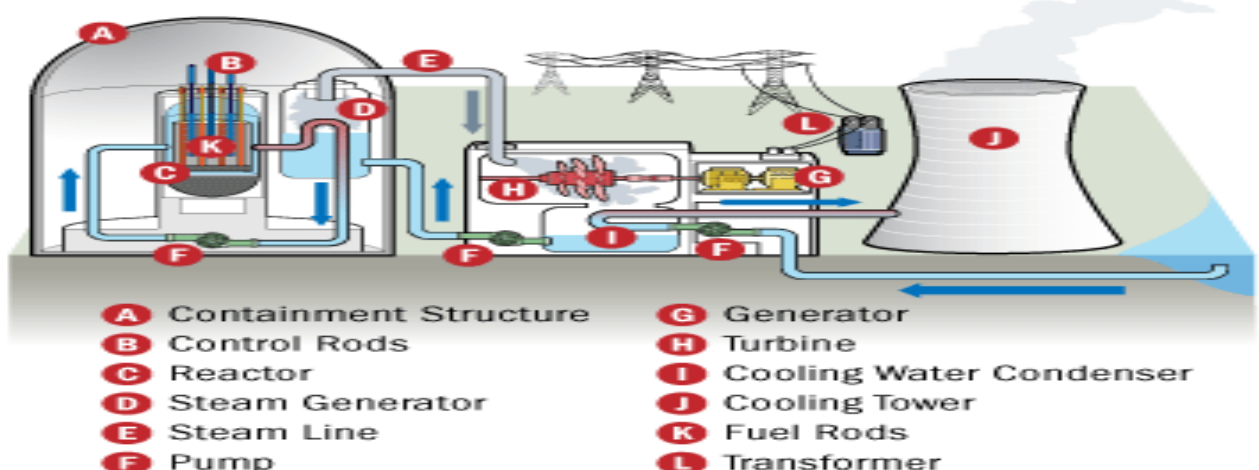


## Nuclear energy

- It is produced by fission in which atoms split and release a large amount of energy
- A gas takes the produced heat to the reactor to the boiler, where water turns into steam, which drives the turbines which in turn drive the generators to produce electricity

## Inside a Nuclear Power Plant

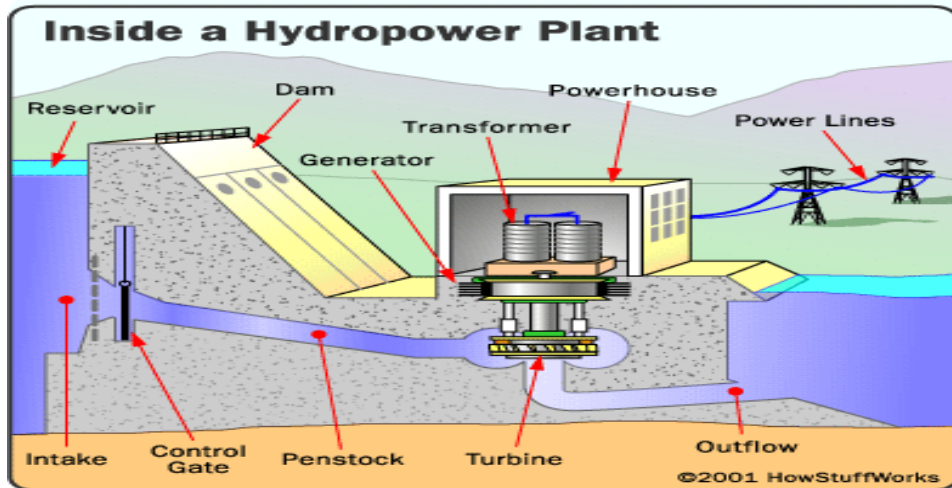
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## Alternative/renewable sources:

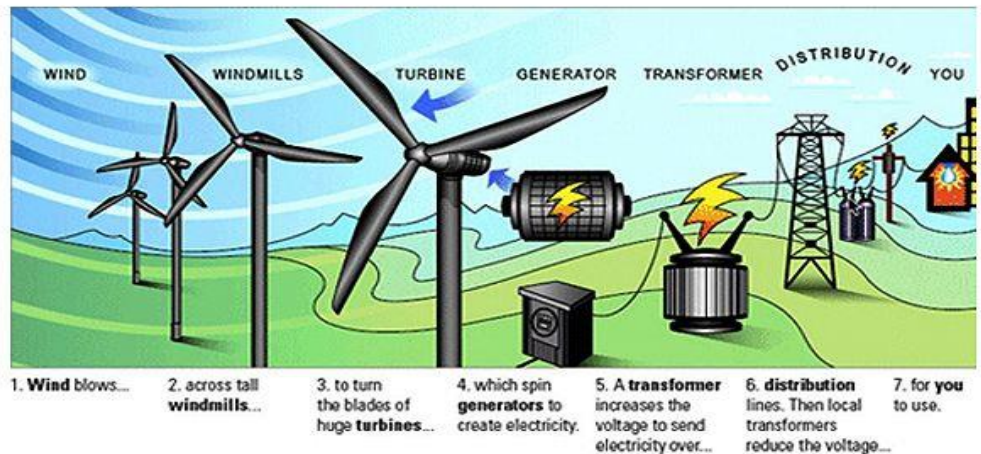
### Hydroelectric power:

- **Fast running water (from a waterfall) is used to drive turbines which produce electricity.**
- **Suitable conditions should be present : A deep narrow valley where a dam can be built**



### Wind power:

- **Turbines are used which are blown by wind to generate electricity**
- **Turbines are usually constructed in those areas with strong wind e.g. hill tops, coastlines**



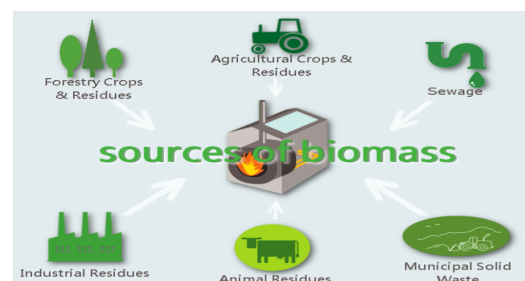
### Solar Panels:

- **Absorbs heat energy from the sun to produce electricity**



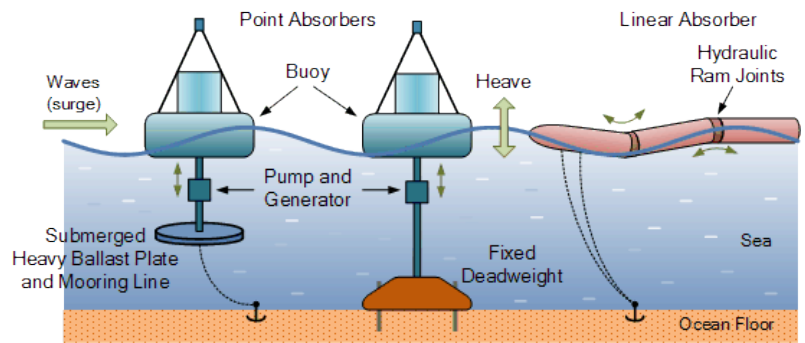
### Biomass:

- **Energy can be made from fuelwoods, animal dung and fuel**



## Wave energy:

- **Sea waves can create energy**
- **A generator converts this mechanical energy into useful electricity.**



## Geothermal energy:

- **Geothermal energy involves heat from the ground in areas of volcanic activity used to produce electricity**

## Advantages of renewable energy:

- **Limitless**
- **No air or water pollution**
- **Do not contribute to global warming**
- **Can boost economic growth by proving jobs**



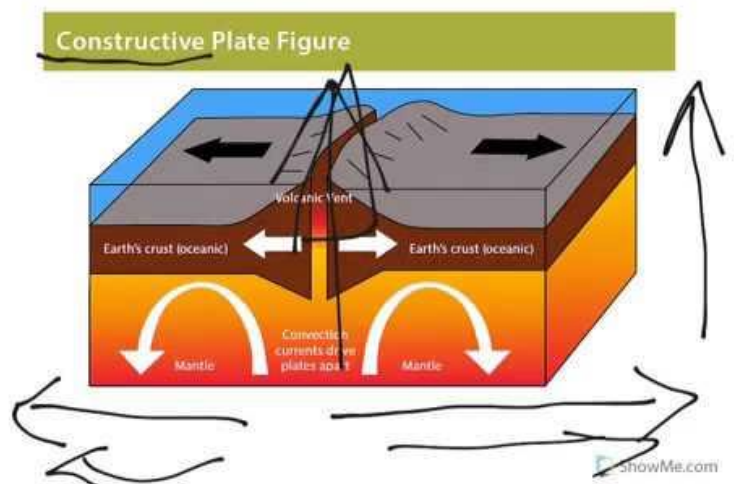
## Disadvantages

- **Most are expensive to install and maintain**
- **Construction of dams can destroy habitats and cause silting. Also a village's inhabitants may need to be moved.**
- **Wind turbines are noisy and can kill birds**
- **Solar panels depend upon weather**
- **Difficult to generate electricity in much quantity as that of fossil fuels**

## Plate tectonics

### Constructive/Divergent Plate boundary:

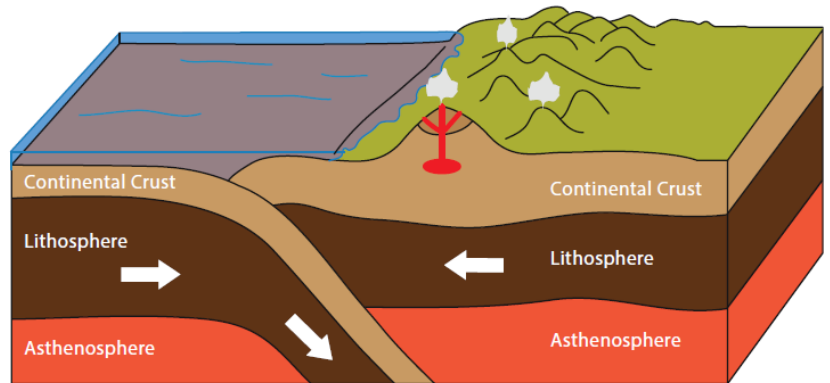
- **Two plates move apart from each other.**
- **Magma from the mantle rises to the surface to fill the gap between moving plates**
- **Lava pours out and cools to form rocks and volcanoes**
- **Rift valleys are also formed**



Destructive Plate Figure

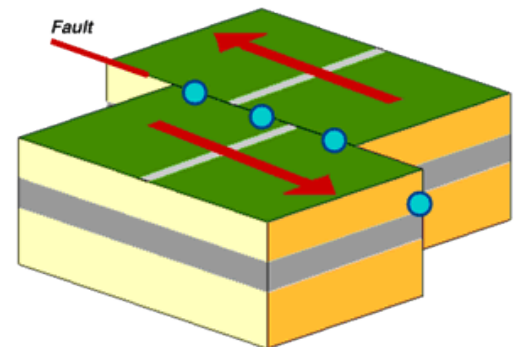
Destructive (convergent) plate boundary:

- Two plates move towards each other
- One plate sinks down below the other and is destroyed when collided with the other.
- The sediments formed are compressed and folded to form mountain ranges.
- Friction during the collision of the plates makes the rock melt which produces magma which in turn produces volcanoes
- Earthquakes also occur



Conservative plate boundary:

- Two plates move against each other
- They can be in the same direction but different speeds
- The frictional movement against each creates pressure and upon their pressure, it releases earthquakes



Conservative plate margin earthquake foci

→ relative movement of adjacent continental plates  
← actual movement in opposite directions  
← actual movement in the same direction - but at different speeds

Earthquakes and volcanoes

- Earthquakes occur mostly at destructive plate boundary
- Volcanoes occur at both constructive and destructive plate boundary when magma rises to the surface



Impact of Earthquakes:

- Rocks and lava can kill people and animals
- Poisonous gases are released
- Shockwaves of earthquakes destroy buildings which causes damage to the economy
- Heat can melt snow, causing floods
- Electivity and gas supplies damaged
- Economic loss



## Management of earthquakes and volcanoes

- **Signs of volcanoes should be seen. (Increase in temperature, steam and gases coming out of the crater)**
- **People should move away from the predicted area**
- **Better quality buildings to prevent collapse**
- **Awareness should be spread as what to do in these circumstances**
- **Factories should be located far from houses**

## EARTHQUAKE SAFETY



## Soil composition and its uses:

- **Consists of organic matter, minerals, water and air**
- **Uses include growing plants and farming for which the soil should have pore spaces**
- **Aeration (perforating the soil with small holes to allow air, water and nutrients to penetrate the grass roots. This helps the roots grow deeply and produce a stronger, more vigorous lawn.)**



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## Causes and consequences of land pollution:

### Pollution due to farming:

- **Eutrophication due to surplus fertilizers (drain into water and algae grow in water. This reduces the amount of O<sub>2</sub> in water for marine organisms**
- **Pesticides kill other organisms in the soil**
- **Salinization due the input of large quantity of water on soil surface**

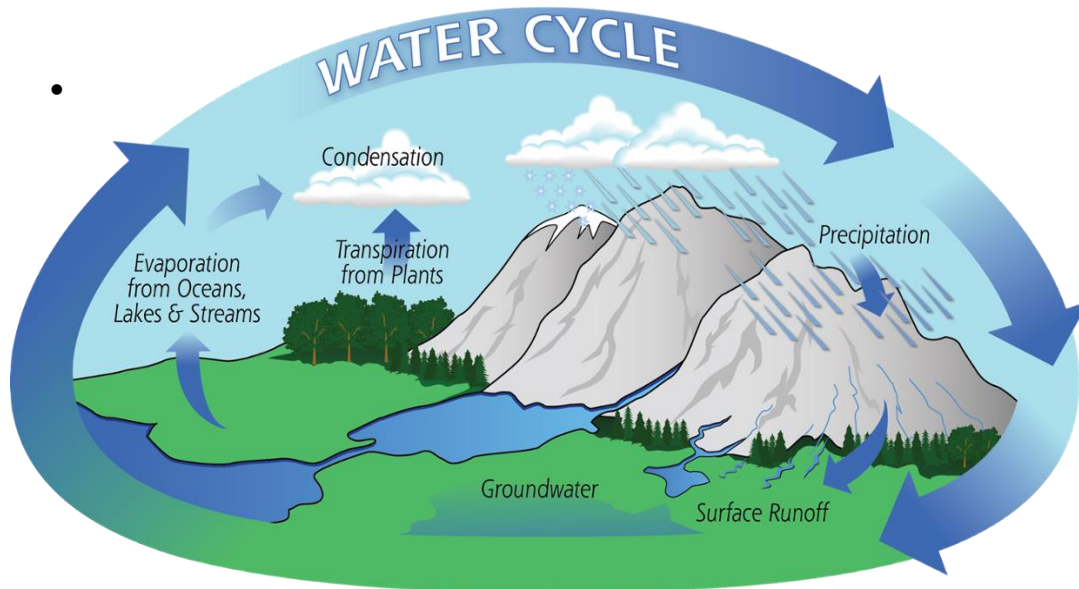


### Pollution due to industrial and urban waste

- **Domestic waste-Garbage**
- **Toxic waste from industries**
- **Nuclear waste containing radioactive substances**
- **When domestic waste is burned, it causes air pollution.**
- **Toxic waste is dumped in rivers/freshwater sources so it pollutes them**
- **Nuclear waste can cause cancers**

## HYDROSPHERE

Water cycle:



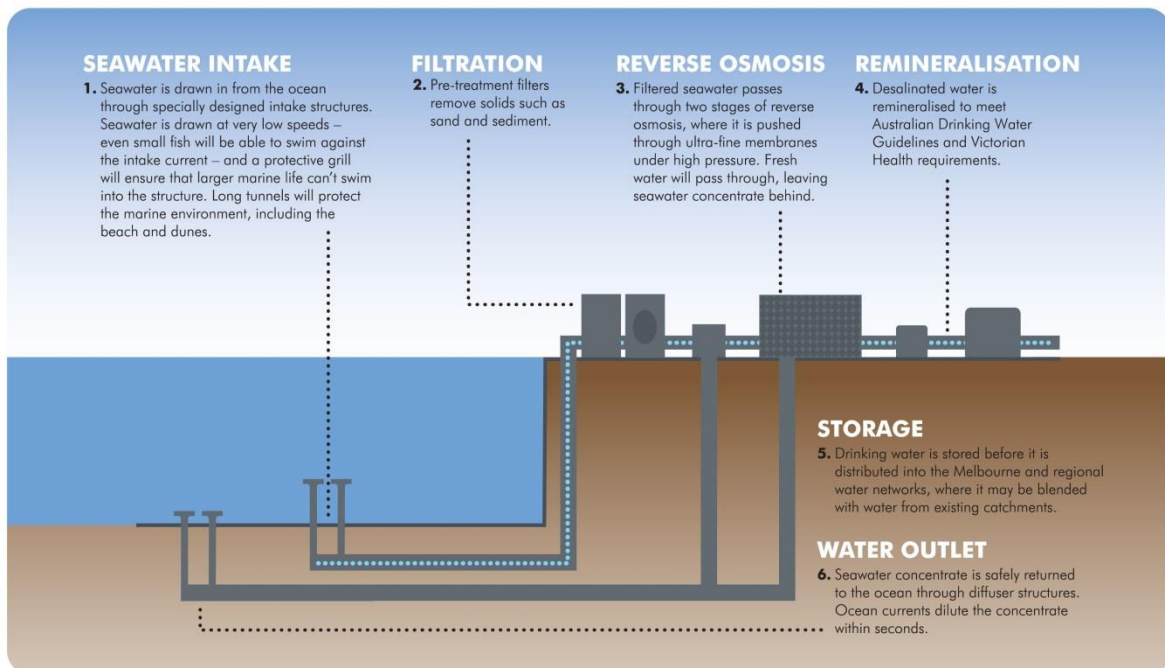
- **Evaporation is changing of water (from sea and land) into water vapors due to heat**
- **When water is lost in the same way from plants and animals, it is called transpiration**
- **Evapotranspiration is the loss from both plant and oceans**
- **When water vapors are carried by air currents upwards to a great height above the ground, and the vapors change into liquid in the process known as condensation**
- **Precipitation is the rain and snow that reaches the ground**
- **Some of it flows over the ground surface and flows its way to reach the rivers, this is known as "runoff"**
- **Infiltration is the process by which water enters the ground**
- **Ground flow is the water that enters the soil and seeps into the underground streams and flows there**

### **Effects of vegetation cover on water cycle**

- **Interception increases as there are leaves to block rain**
- **Evapotranspiration increases as leaves are the main source of water loss**
- **Run-off decrease as less water reaches the ground due to presence of leaves**
- **Infiltration increases as water slowly enters the soil after travelling the leaves**

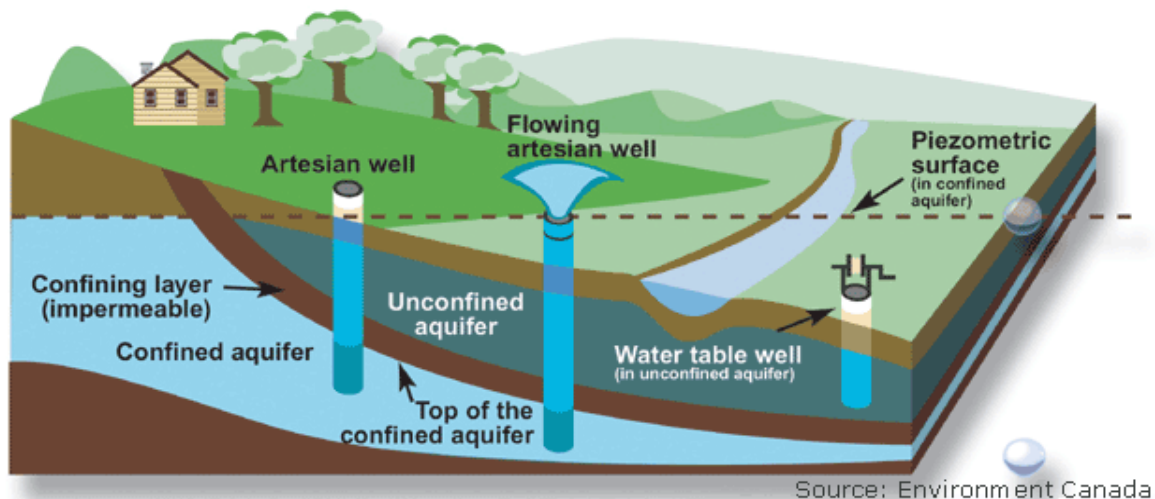
## How to obtain water artificially:

- **Desalination plants: Salt is separated from water**



## Underground aquifers: Water can be pumped from underground stores via wells

### Aquifers and wells

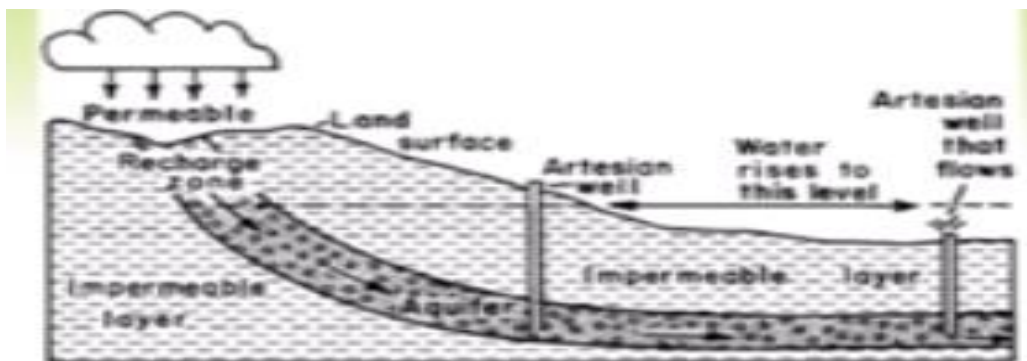


### Uses of water

- **Domestic uses:** in homes for cleaning , bathing, washing, cooking and drinking
- **Industrial uses:** used in factories to power machines and to make paints and dyes
- **Also used in pharmaceutical industries**
- **Used in irrigation (Agriculture)**

## Water supply from natural stores

- These stores are available in mountainous regions as precipitation is higher, ice melts in summer to release fresh water and many lakes are found at the bottom of mountains
- Since fresh water is concentrated in the permeable rocks deep in the stores, they have to be dug and pumped through pipes
- The process is less expensive and easier in areas with favorable geological conditions such as alternating rocks of permeable and impermeable rocks to trap the water in permeable rocks
- Folded layer of rocks so that water can accumulate most in the down fold, permeable rocks outcropping the surface to receive new supplies of rainwater and water is stored in limestone and sandstone rocks below the water table
- The water is then transferred to holding reservoirs before being pumped home



## Dams:

A *dam* is a barrier that stops or restricts the flow of water or underground streams. Reservoirs created by *dams* not only suppress floods but also provide water for activities such as irrigation, human consumption, industrial use, aquaculture, and navigability.

## Advantages of large dams

- Provide and irrigate a large area
- Huge electricity production
- Stops flooding
- Creates recreational facilities and tourist spots

## Disadvantages

- Large-scale evacuation of nearby villages
- Destroys natural habitat
- Very expensive to construct and maintain
- Siltation can decrease capacity
- Can effect fisheries and increase unemployment



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## Floods

A *flood* is an overflow of water that submerges land that is usually dry.

### Causes

- **Persistent raining**
- **Plants can no longer hold moisture of more rain**
- **Infiltration decreases as spaces between soils are full and run-off increases**
- **Deforestation**

### Effects:

- **Loss of human and animal life**
- **Crops ruined**
- **Houses and infrastructure destroyed**
- **Problems of moving between places**
- **Food shortages**
- **Diseases can spread**



## Drought:

### Causes:

- **A long period of dry weather caused by change in wind patterns**
- **Air pressure remains high so air sinks instead of rising. Hence precipitation is low as no water vapors reach high altitude**

### Consequences:

- **Crops die**
- **Risk of soil erosion**
- **Starvation and malnutrition**
- **Dry wells**
- **Livestock lose conditions due to shortage of grazing**



## Water pollution: Contamination of water bodies

### Causes:

- **Agricultural reasons such as surplus fertilizers and pesticides**
- **Domestic waste from homes-garbage**
- **Industrial waste from factories**
- **Nuclear waste**



### Consequences:

- **Fertilizers wash away into the rivers and give rise to eutrophication and pesticides contain toxic materials that are harmful to human health**
- **Domestic waste pollutes water with different biological and chemical wastes leading to diseases such as diarrhea**
- **Radioactive isotopes cause mutation in human cells**

## Bilharzia:

- It is a water- based disease
- Parasite grows inside a snail and after becoming a worm it tends to enter into the body of a human who steps in the water where the snail lives
- They mostly enter through feet and grows inside the body
- Their eggs are released through urine and feces

## Cholera

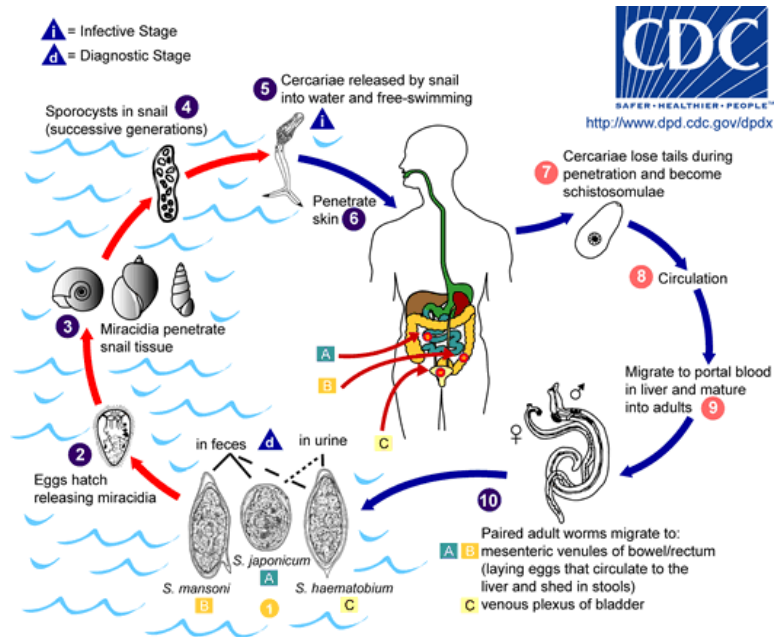
- A water-borne disease
- Caused by consumption of contaminated water
- Causes dehydration and diarrhea

## Malaria:

- A water-bred disease
- Mosquitoes breed in stagnant water and female mosquitoes carry parasites
- It bites a human to suck blood for the development of its eggs and releases the parasites in the human body

## Strategies to spread their control

- Water should be treated in treatment plants before drinking
- Sanitation should be improved
- Destroy breeding grounds for mosquitoes
- Take personal precautions e.g. sleeping under a mosquito net
- Use vaccines



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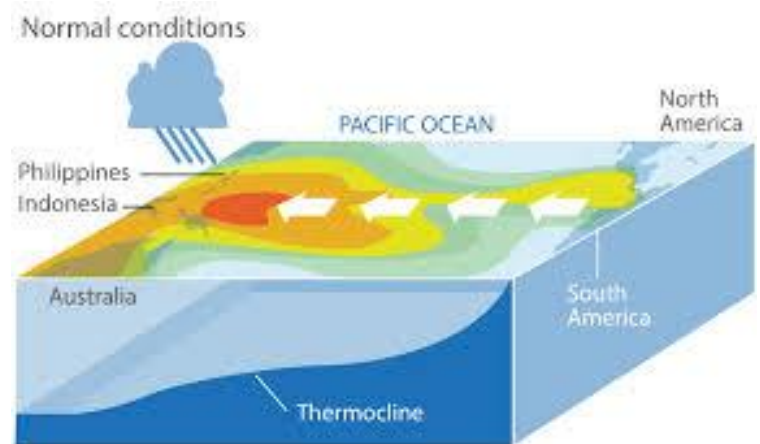
## Ocean currents and their effects

- These are surface movements of water due to friction between water which can be warm or cold
- Warm ocean currents keep the nearby coastal areas warm in winter
- Cold ocean currents reduce the amount of rain which limits farming but increase fishing
- They are economically beneficial as they provide nutrients to oceanic plants which are eaten by fishes, hence increasing fish production



## El Nino and its effects:

- It takes place in Peru
- South-east winds are weaker in some years due to which water from Indonesia drifts eastwards
- Due to this, the pattern of surface current changes
- Water gets very warm which kills plants and fishes because its currents are low in oxygen and nutrients
- Sometimes rivers are dried up
- Fishes tend to move away from the offshore, away from fishermen



## Fishing

### Over-fishing

Overfishing is the removal of a species of fish from a body of water at a rate that the species cannot replenish in time

### Causes

- Modern fishing techniques
- Fish is in demand as a healthy food followed by an increase in population
- Many communities depend upon fishing as a source of income



### Consequences:

- Loss of jobs of fishermen
- Loss of food for locals
- Large number of fishes is lost. This prevents commercial fish farming

### Sustainable fishing

- Fishing should be banned during breeding season
- Restricted areas where no fishing can take place to allow breeding
- Limit on net sizes that catch the baby fish



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## **Marine pollution:**

### **Causes:**

- **Flow of nutrients from farming**
- **Sediments from soil erosion and mining**
- **Pathogenic organisms in sewage and livestock waste**
- **Litter from ships and industries**
- **Oil from land ,transport systems, industries, ships and oil tankers**
- **Radioactive waste from Nuclear power station**
- **Toxic wastes from farming**



### **Consequences:**

- **Due to nutrients, algae lower O2 level in water**
- **Sediments block water flow**
- **Pathogenic organisms contaminate sea food and spread diseases**
- **Litter makes beaches unsightly and gets stuck in fishing nets**
- **Oil kills organisms**
- **Radioactive waste causes cancers**
- **Toxic waste pollutes marine life**

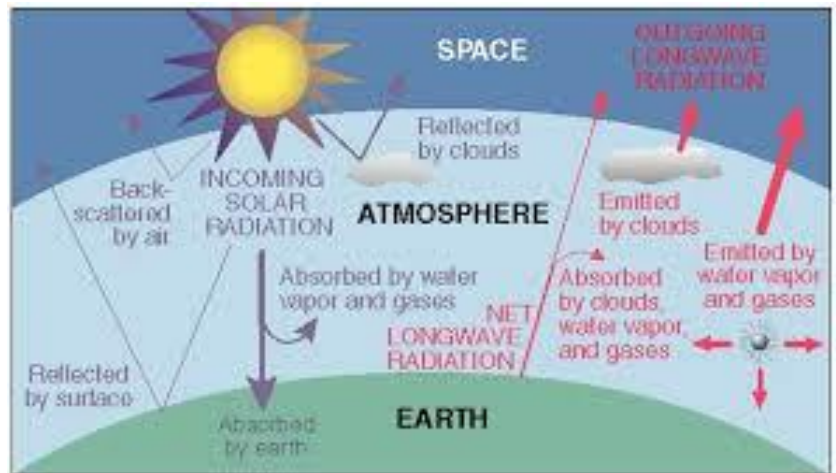
## ATMOSPHERE

### Composition and energy source:

- **Nitrogen-78%**
- **Oxygen-21%**
- **Carbon Dioxide-0.04%**
- **Argon-0.96%**

### Energy Source:

- **Sun is the source of all energy on the planet**
- **Sunlight is a radiation that enters the atmosphere of the earth**
- **Some of it is absorbed by gases and surface and some of it is reflected**
- **The amount of solar energy reaching the surface of the earth that is available as heat is known as insolation**
- **Rates of insolation vary, it is highest at the equator and lowest at the poles**



### Causes, effects and strategies relating atmospheric pollution

#### Causes

- **Burning fossil fuels in power stations and exhaust fumes from transport system**
- **Waste burnt from industries**
- **Bare soil in agricultural areas picked up and carried by wind**
- **Use of CFCs and Halons**
- **Deforestation**

#### Effects

- **Effects include reduced visibility and poor air quality**
- **Formation of acid rain which increases acidity in crops and lakes**
- **Health problems such as asthma**
- **Depletion of ozone layer so increased radiation reaches surface and more chance of skin cancer**
- **Trapping more heat, leading to global warming, rising sea levels and temperature**



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- **Less precipitation will cause less food production**

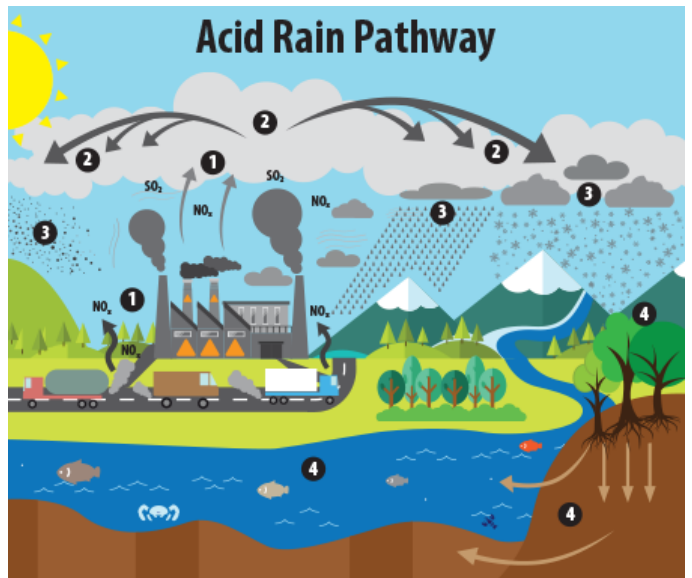
**Acid Rain: rainfall made so acidic by atmospheric pollution that it causes environmental harm, chiefly to forests and lakes**

## Causes:

- **Increased acidity in atmosphere that comes from Sulphur dioxide and oxides of Nitrogen**
- **Vehicles, power stations and industries are sources**
- **Can be transported from one place to another via winds**

## Effects

- **Crop destruction**
- **Destruction of forests and habitat**
- **Soil erosion**
- **Trees lose leaves and become less resistant to droughts**
- **Increased acidity of lakes which damages marine life**



This image illustrates the pathway for acid rain in our environment: (1) Emissions of SO<sub>2</sub> and NO<sub>x</sub> are released into the air, where (2) the pollutants are transformed into acid particles that may be transported long distances. (3) These acid particles then fall to the earth as wet and dry deposition (dust, rain, snow, etc.) and (4) may cause harmful effects on soil, forests, streams and lakes.

**Ozone layer: The ozone layer or ozone shield is a region of Earth's stratosphere that absorbs most of the Sun's ultraviolet radiation**

## Damage to ozone layer

### Causes:

- **Caused by release of CFCs and Halons in atmosphere**
- **Source is use of chemicals containing them e.g. Hair sprays**
- **Chlorine destroys the layer by converting ozone into O<sub>2</sub>**

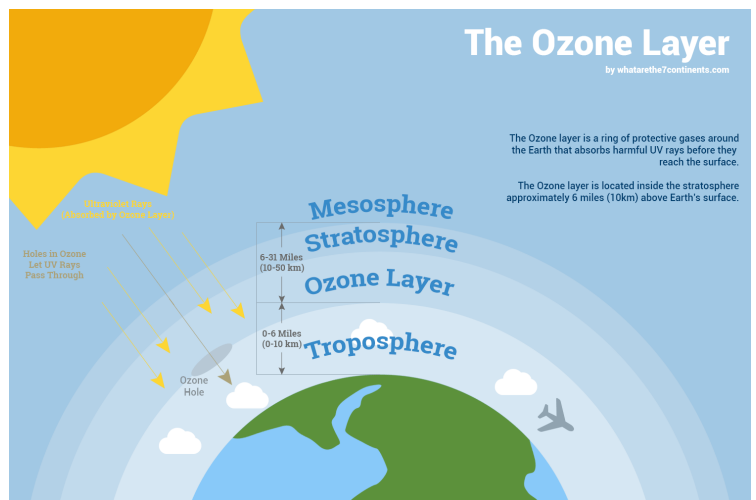
### Effects:

- **Increased UV rays entering surface which causes skin cancer and other diseases**
- **Increased greenhouse gases gives birth to more pollution**

## Global Warming

### Causes:

- **Increased in concentration of Greenhouse gases**
- **These gases include CO<sub>2</sub> by burning of fossils fuels, wood and deforestation**
- **Methane due to deforestation and decomposition of chemicals**
- **CFCs from different chemicals**
- **Oxides of Nitrogen from transport systems, burning of fuels and use of fertilizers**



- **These gases trap UV radiation and heat**



## Effects:

- **Increase in temperatures of earth leading to ice caps melting-Antarctica**
- **Rising sea levels which causes floods and tsunamis**
- **This will lead to famines and droughts and start "Water Wars"**
- **Crop failures will cause food shortages**
- **Changes in habitat and many species will go extinct e.g. Water wars**
- **Extreme weather events**
- **Populated areas will no longer be able to be livable**

## Strategies to deal with Atmospheric pollution

- **Catalytic converters fitted in cars to reduce air pollution**
- **Petrol and diesel should be replaced by natural gases**
- **Add limestone in polluted lakes to increase pH value**
- **Limestone should be used to convert Sulphur Dioxide into Calcium Sulphate before it leaves from chimney and oxides of nitrogen should be reduced by using ammonia**
- **A reduction is the use of CFCs**
- **Increased planting of trees**
- **Reduced use of fossil fuels**
- **Use alternative sources of energy like HEP**

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## Measuring the weather:

- **Barometer is used such as a mercury or aneroid barometer**
- **In a mercury barometer, mercury levels fall and rise with an increase or decrease in pressure**
- **In an aneroid barometer, an upper surface which is sensitive to changes and is used to measure air pressure**
- **Air pressure can be measured in millibar**

## Temperature:

- **Thermometers are used to measure temperature e.g. mercury thermometer, electronic thermometer**
- **Maximum and minimum thermometers**
- **Maximum thermometers consist of mercury and a metal index, mercury rises and falls with changes in temperature pushing and leaving behind the metal index in this process**
- **Minimum thermometer consists of alcohol and a metal index, alcohol expands and contracts with changes in temperature moving the metal index up and down**

## Precipitation:

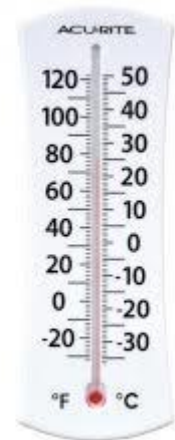
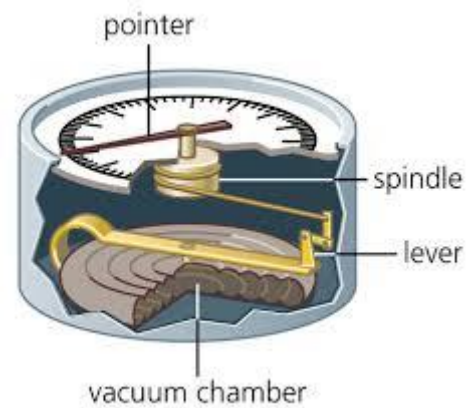
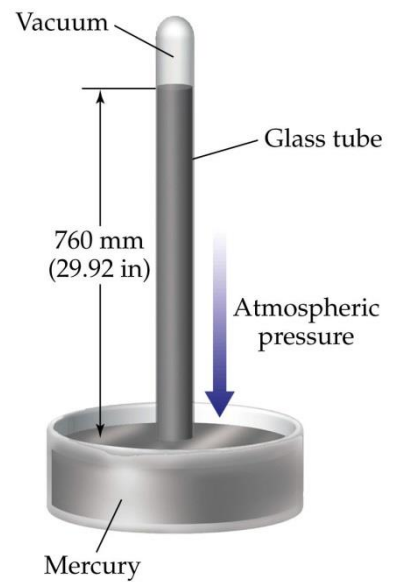
- **Measured by a rain gauge**
- **Rain enters into a funnel that is held inside a metal container, water moves through the funnel into an emptied jar**

## Wind:

- **Wind direction is measured by a weathervane which consists of a rotating arm on a pole**
- **It is also measured by an anemometer consisting of 4 cups that rotate on a long pole to measure the speed of wind**

## Sunshine:

- **Sunshine is measured by a sunshine recorder that consists of a glass sphere concentrating the rays of sun on a point.**



## Farming systems, Agricultural techniques and management

### Types of farming:

- **Arable farming is for growing crops**
- **Commercial farming is for growing crops and keeping animals for sale**
- **Extensive farming is producing a low quality output per hectare from large areas of land**
- **Pastoral farming is keeping and grazing animals**
- **Subsistence farming is growing crops and keeping animals for home use**



### Shifting cultivation in Tropical rainforests:

- **A small plot of land is cleared by slash and then burned**
- **Crops such as maize, rice and bananas are planted**
- **Nothing special for their growth is added to the soil, they are harvested when ready**
- **After a period of 2 to 3 years, soil loses its fertility and the plot is abandoned**
- **So another plot needs to be cleared to carry out this practice**
- **Plants and small trees grow rapidly and take over this abandoned plot**



### Wet rice cultivation in Asia:

- **Monsoon brings heavy rains between June-September**
- **Flat flood plains and deltas make flooding the fields easier**
- **Silt soils are fertile, deep and easy to work**
- **Large number of people in rural areas work in the field**
- **Hand labor is needed for planting seeds in nurseries, transplanting rice into the fields, harvesting and threshing**
- **Rice cultivation also requires a lot of labor**



### Techniques to increase yield:

- **Irrigation from rivers and lakes through canals**
- **Chemicals such as inorganic fertilizers and pesticides to increase yields and kill pests**
- **Mechanization**
- **Capital to improve different methods of agriculture**
- **HYVs**

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## Negative effects of modern methods:

- **Overuse of fertilizers and pesticides leads to eutrophication and nitrates accumulating in ground water that we drink**
- **Use of irrigation water leads to salinization and the land becomes too salty for crop growth and all negative consequences from large dams occur**
- **Over cultivation and overgrazing leads to soil erosion and desertification**

## Use of appropriate technology:

- **Instead of irrigation surface channels, sprinklers and trickle drip techniques should be used**
- **Organic fertilizers such as animal dung should be used**
- **Mixed cropping should be practiced since they are healthier and more economical and prevents soil exhaustion**
- **Natural pesticides such as birds should be used**
- **New seeds should be used with more plant varieties**

## Power from living resources:

- **Use of biofuel that are obtained from vegetable oils and distilled products of crops**
- **They are used in diesel and petrol engines and are carbon neutral thus environment friendly**
- **Use of biogas which is clean methane gas produced from animal dung which is fermented in pits in villages**
- **The dung after converting into gas leaves plenty of material for fertilizers**

## Causes and occurrence of climatic hazards

- **These are storms formed when the sea water is at its hottest**
- **Air above the sea surface heats up and warm moist air starts to rise**
- **A huge swirl of clouds forms around which speeds increases**
- **Rainfall from clouds begin to occur after that**



## Impacts of tropical cyclones:

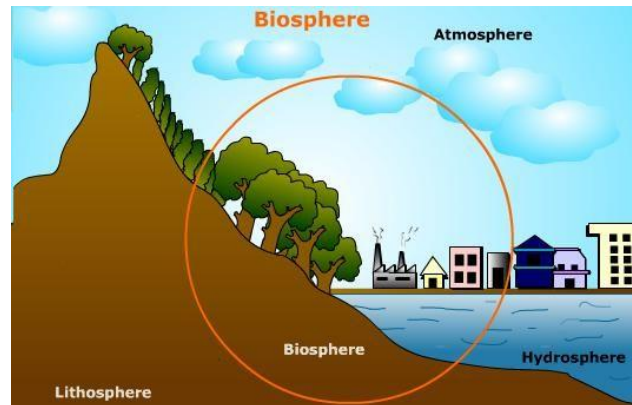
- **Loss of life**
- **Destroys infrastructure**
- **Economic losses**
- **Electricity lines, gas lines and telephone lines are damaged**
- **Disruption of water supply leads to diseases**
- **Farming economy is ruined**



## BIOSPHERE

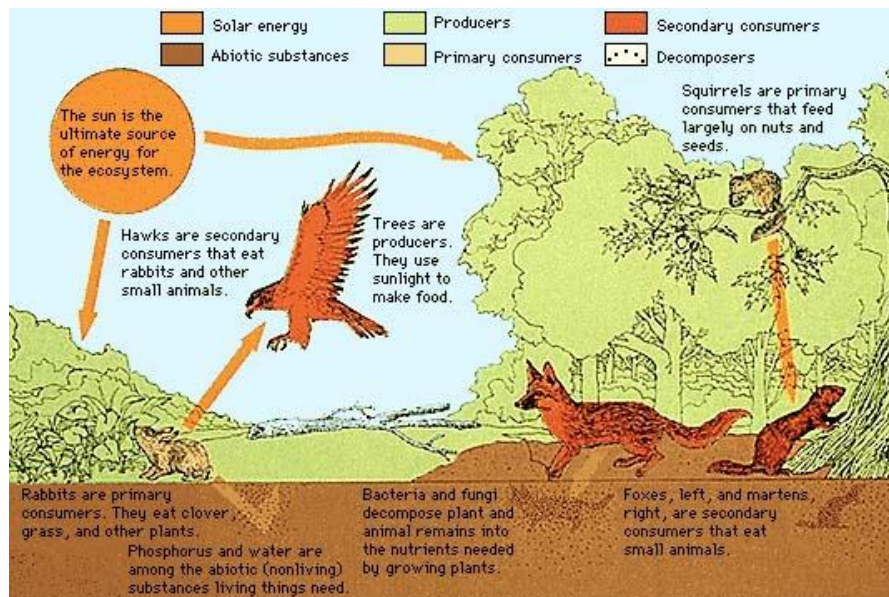
### Function, operation and resource potential of ecosystems

- The total of all individuals of the species is known as a population
- The population of all species is known as a community
- Habitat is the place where organism live
- All these organisms are biotic-living elements
- Abiotic(non-living) elements include climate, soil and atmospheric components
- All the communities and non-living factors combined are known as ecosystem
- Niche is the role of the organism in the ecosystem



### Relationship of living organism:

- They depend on each other in several ways such as pollination, birds and insects such as bees transfer pollen between plants
- For dispersal of fruits and seeds, birds and animals carry these away from parent plant and this reduces competition for light and water between members of the same species
- In vegetation succession, plant species improve the environment for living, especially for the soil to enable other species to invade and survive
- For food supply, small birds are eaten by large birds; zebras eat grasses which are eaten by lions etc.



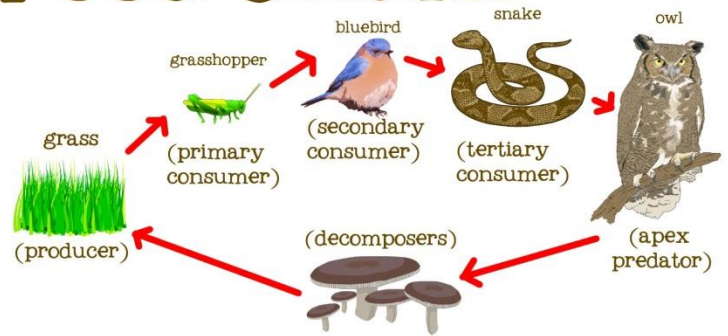
From The World Book (TM) Multimedia Encyclopedia (c) 1999 World Book, Inc., 525 W. Monroe, Chicago, IL 60661. All rights reserved. World Book diagram by George Suyeoka



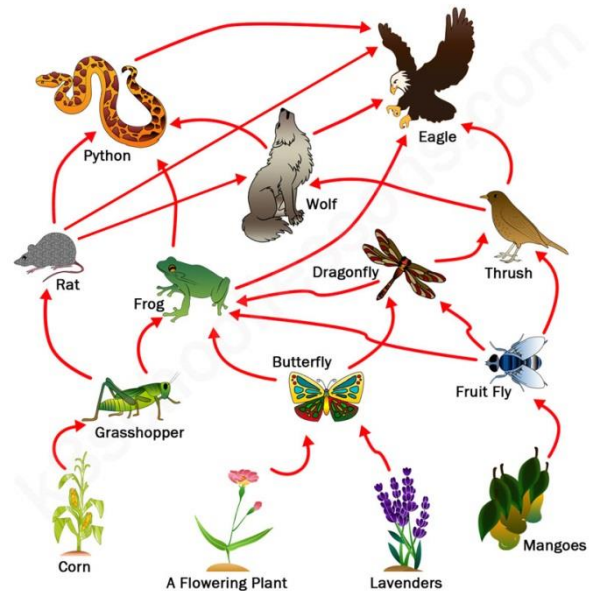
**Food chains:**

- **Producers** are organism that make food on their own such as green plants
- **Consumers** are organism that eat the green plants and are also known as herbivores and primary consumers
- These consumers may be eaten by other organisms known as secondary consumers and carnivores
- There may be larger animals present that eat these carnivores known as tertiary consumers
- A carnivore which kills and eats other animals is known as a predator
- Energy in the form of nutrients is passed on between organisms
- A food chain consists of straight chains
- While a food web consists of different food chains interlinked
- Each stage in the chain where energy is exchanged is called a trophic level e.g. Green plants are in the first trophic level
- Usually more food chains do not have more than trophic levels because energy losses occur at each level due to respiration, excretion and egestion
- Energy by green plants is made available by the process of photosynthesis producing O<sub>2</sub> and glucose as products
- Respiration is the process by which energy is produced in a living organism and producing by-products, CO<sub>2</sub> and water

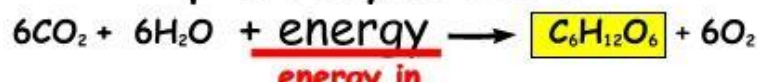
# Food Chains



## A Food Web

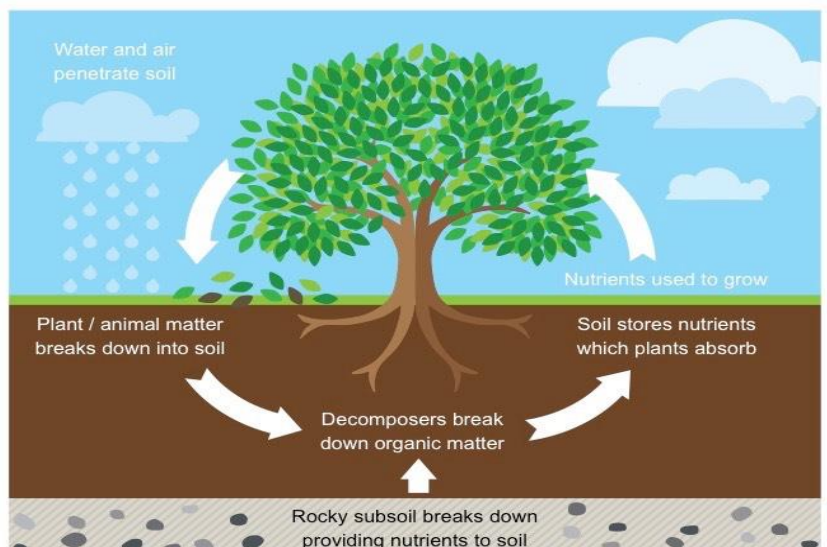


## photosynthesis



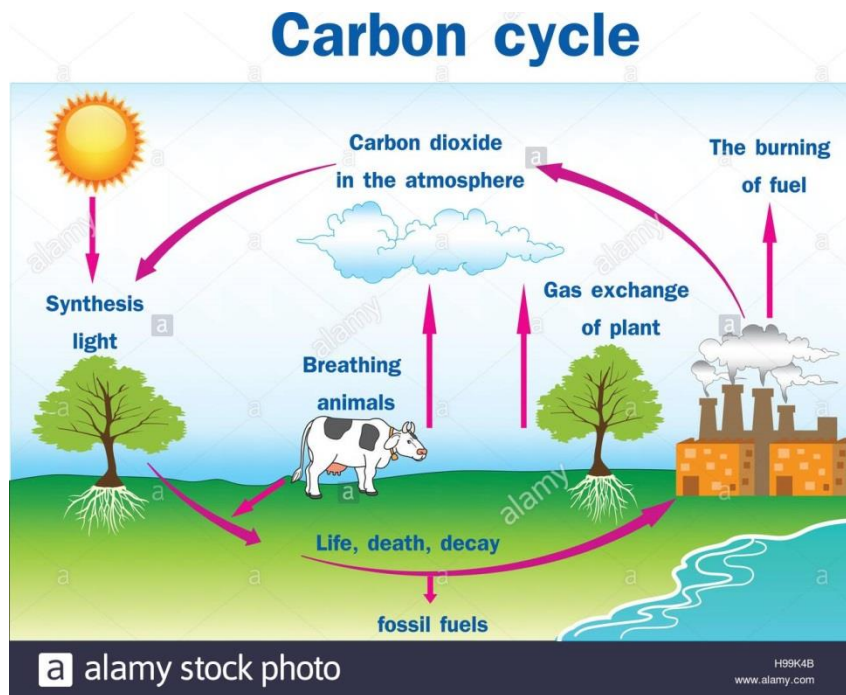
**Nutrient cycle:**

- **Green plants produce food**
- **Consumers eat them**
- **Consumers and producers die and are decomposed by bacteria and fungi**
- **Decomposed material decays and their nutrients enter the soil**
- **These nutrients and water are taken by plants again**



## Carbon cycle:

- Carbon is added into the atmosphere by respiration, CO<sub>2</sub> is a waste product
- Through decaying of organic matter from dead plants and animals, microorganisms can turn carbon compounds back to CO<sub>2</sub> in the atmosphere
- Through combustion of fuels containing carbon
- It is removed from the atmosphere through photosynthesis



## Human activities and their impact on the environment:

### Genetic engineering and GM crops:

- Genetic engineering is the process of altering the genetic composition of an organism by modifying its own genes or introducing genes from different species by transferring its genes
- Biotechnology is the use of living organisms or biological processes for industrial, agricultural or medical purposes such as for producing GM crops
- GM crops include Pest-resistant crops that have a pest-killing crop
- Herbicide tolerant that is not effected by the adverse effects of herbicides
- Disease resistant that are not affected by viral diseases



## Habitat destruction and its effects:

- **This is done by deforestation which is done for livestock and grazing purposes**
- **It occurs due to loss of wetlands as well as swamps, marshes and lakes etc. Where mangroves and other habitats are located**
- **Also due to flooding which occurs due to dam construction which also brings long term problems for habitats such as loss of humus from soil where no more plants and trees can grow**



## Tourism

**Tourism means people traveling for fun. It includes activities such as sightseeing and camping. People who travel for fun are called "tourists".**

### Advantages:

- **Increase in foreign exchange**
- **Increases employment**
- **Infrastructure is improved for tourists which is beneficial for locals**
- **Migration is reduced**
- **Greater awareness of wildlife and landmarks**
- **Improves economy**
- **Establishes ties between countries**



### Disadvantages

- **Income varies and number of tourists fluctuates**
- **Many jobs are poorly paid**
- **Tourist development replaces farming and fishing and takes over their place**
- **Local/cultural traditions are destroyed**
- **Destruction of habitats**
- **Pollution**

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## Strategies for conservation:

- **Set up gene banks to preserve a wide range of plants**
- **Create biosphere reserves for conservation of ecosystems, development of areas for ecologically sustainable use and to provide support for research and education for environmental issues**
- **Government should pass out laws to protect areas with natural reserves such as a national park where hunting and gathering are not allowed**
- **Eco-tourism should be promoted (People should be allowed to visit but pollute or damage the habitats). This would earn revenue which will be used for management of ecosystems**
- **Habitat conservation projects should be started such as UNEP that provides the world community with environmental data and focuses on freshwater, energy and biodiversity etc. WWF focuses on warning the people about extinction of wildlife and man's activities on the environment**
- **Ban on hunting, collecting and trading, such that done by cities that ensure that the world wide trading system of different animals does not affect their survival**

**Biomes and their distribution: A biome is a community of plants and animals that have common characteristics for the environment they exist in.**

## Tundra Biome:

- **Has a very cold climate so no vegetation can grow**
- **Trees will not grow as well because summer is short, winters are very cold, strong winds blow all year and soils are waterlogged**
- **Low net primary productivity so less number of species**
- **Some trees grow sideways instead of upwards due to vicious winds and seeds are there are very hard**
- **Species include mosses and lichens**



## Taiga (coniferous forests)

- **Conical in shape and have sloping branches**
- **Have needled leaves and thick bark which protects them from cold**
- **Snow slides over them since they have slopes**
- **They are flexible and bend in strong winds**
- **They reduce water loss by transpiration and hence save water**



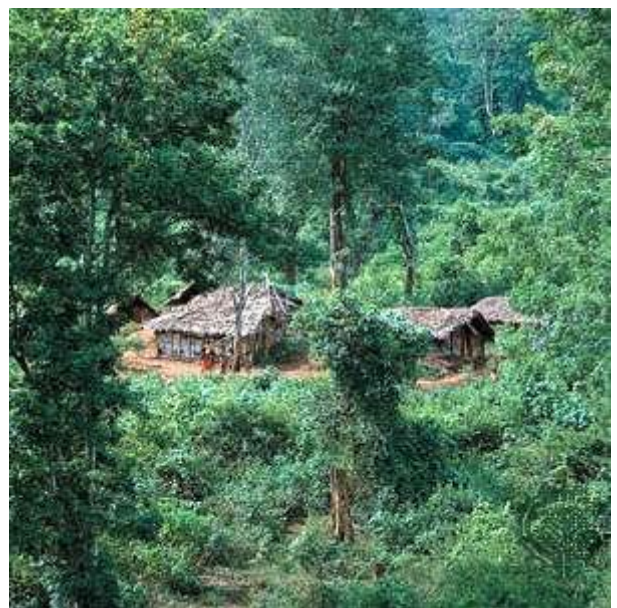
## Tropical rainforest:

- **Straight slender trunks with thin smooth bark**
- **Leaves and branches are found in the top, leaves are leathery**
- **Lianas, epiphytes and parasites are found**
- **Climate is hot which is ideal for growth**



## Monsoon rainforests:

- **Monsoon rainforests are like tropical rainforests with high rainfall**
- **Their leaves shed to prevent water loss through transpiration and open spaces between the trees allows light to enter the ground and so more shrubs grow between them**



## Savanna Grassland:

- **Savanna grassland has tall grass around which some trees can be found**
- **Surrounding trees shed leaves to reduce water loss by transpiration**



## Hot deserts:

- **The roots of these trees are long so that they can reach underground water stores. However their growth is slow**
- **Hot deserts undergo long periods of drought so plants cannot grow**
- **Branching root system helps some plants to survive such as cactus**
- **Plants have sunken stomata to reduce water loss through transpiration**



## Deforestation:

### Causes

- **Cultivation/farming**
- **Ranching and logging**
- **Fuel wood as an energy source**
- **Furniture**
- **Due to urbanization**
- **Firewood**
- **Paper making**



### Effects:

- **Global warming**
- **Decreased precipitation**
- **Increased flooding**
- **Increased soil erosion**
- **Extinction of species**
- **Lack of fuel wood**
- **Many people are displaced from their land and destruction of scenic beauty**

## Management:

- **Reforestation**
- **Awareness**
- **Selective cutting**
- **Afforestation**
- **Set aside areas of rainforest**
- **Ban cutting of endangered trees**

## Soil erosion:

- **It is the loss of top soil by wind and water**
- **Causes include deforestation, poor farming practices and clearance of natural vegetation**
- **These results in soil erosion because trees would no longer be there to break the force of falling rain**
- **Tree stems will no longer be there to obstruct the water flow down the slopes**



## Effects:

- **Reduction in crop yields**
- **Less productive land**
- **Farmers spend more on fertilizers to improve yields, increasing income**
- **Sediments of soil after being washed away settle on seabed**
- **They are costly to remove and increased amount of sediments in dams can cause flooding**

## Desertification:

### Causes:

- It is the process in which a land is turned in to a desert
- Decline in rainfall
- Overgrazing
- Over cultivation
- Irrigation and salinization
- Increased demand for food and fuel wood
- Soil erosion



### Effects:

- Reduction in crops hence less food
- Reduced total biomass hence less food
- Less wood
- Reduced water
- More sand dunes
- Increased disruption of life and increased migration

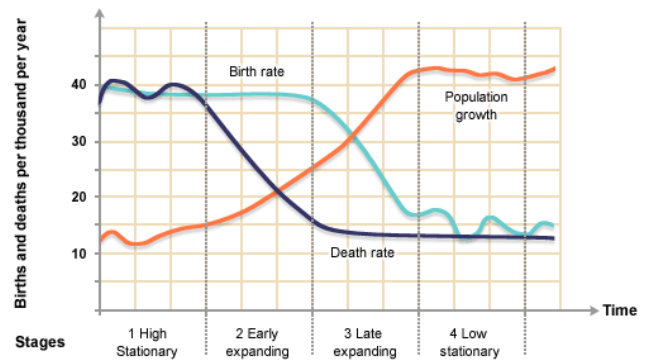
### Conservation of soil:

- Terrace farming
- Contour planting
- Plant trees in line to check wind speed and prevent erosion
- Mixed/intercropping to prevent erosion
- Grow more trees around crops to maintain surface cover and humus
- Plant trees on slopes



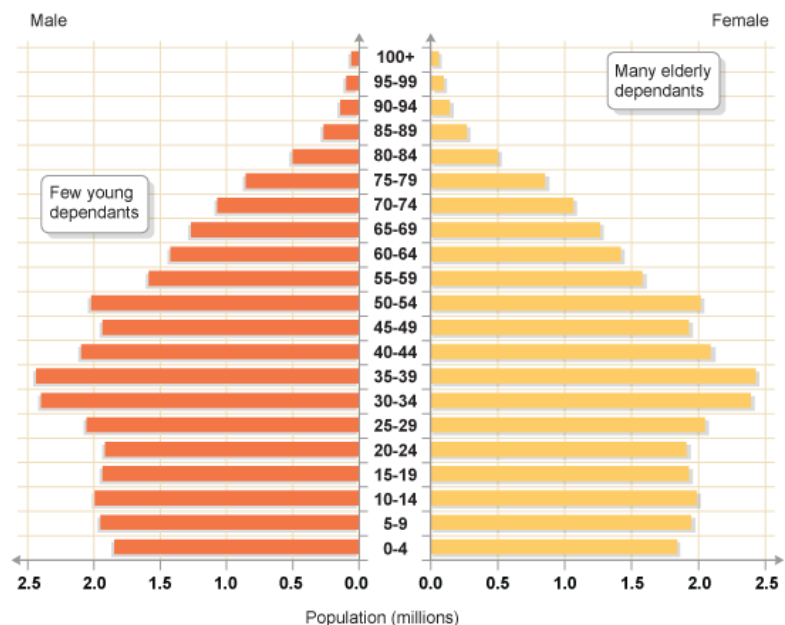
## World Population growth:

- **Birth rates are the number of births per 1000 people**
- **Death rates are the number of deaths per 1000 people**
- **Natural increase is the difference between number of births and number of deaths in a population in a time period of a year**
- **A demographic transition model is a line graph showing relationship between birth and death rates of a country over time**



## Population Structure:

- **Population structure is made up by age and gender of a country's population which is shown on a population pyramid**
- **Middle aged (15-64) are the working population**
- **The young (0-14) and the old (above 64) are dependent**
- **Higher fertility rates increase birth rates**
- **Increased medical facilities increase life expectancies and decreases infant death rates**



## Migration:

- **Movement of people from one place to another**
- **Push factors are the dislikes that people think about their place**
- **Pull factors are the attractions of the place they are moving into**
- **Voluntary migration is done for work, joining relative or for retirement such as moving to other countries**
- **Forced migration after a war or a natural disaster such as movement to camps**
- **Rural to urban migration and high rates of natural increase leads to urbanization**

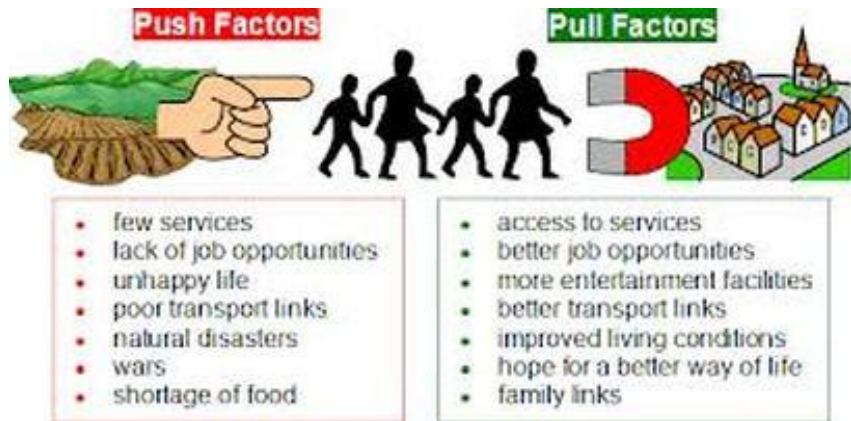




# Environmental Management 5014

## Push factors:

- **Poverty**
- **Pressure on land**
- **Drought and famine**
- **Lack of services**
- **Remoteness**
- **Little hope for change and improvement**
- **Corruption**



## Pull factors:

- **Better paid jobs**
- **Work in factories and shops**
- **Reliable food supplies**
- **Educational and medical facilities**
- **Paved roads**

## Problems of migration and population increase

- **Most people remain unemployed**
- **They have to pay for essential services**
- **Dirty water supplies**
- **Spread of diseases**
- **Rivers and seas are polluted**
- **Population growth leads to soil damage due to over cultivation and overgrazing**
- **Overused water resources**
- **Natural vegetation is cleared for farming so loss of habitats**

## Strategies for sustainable population growth:

- **Provision of family planning programs**
- **More educational facilities**
- **Increased literacy**
- **Late marriages**
- **Migration to cities**
- **Education for careers for women**
- **Equal distribution of income**

## World inequalities:

### Measures of development:

- **Housing** such a number of people, percentage of houses with access to electricity and water
- **Education** such as overall percentage of literary and primary school enrolment
- **Health** such as life expectancy, number of people per doctor, infant mortality rate, percentage of people with access to water health services and water
- **Nutrition** such as average calorie per person per day

