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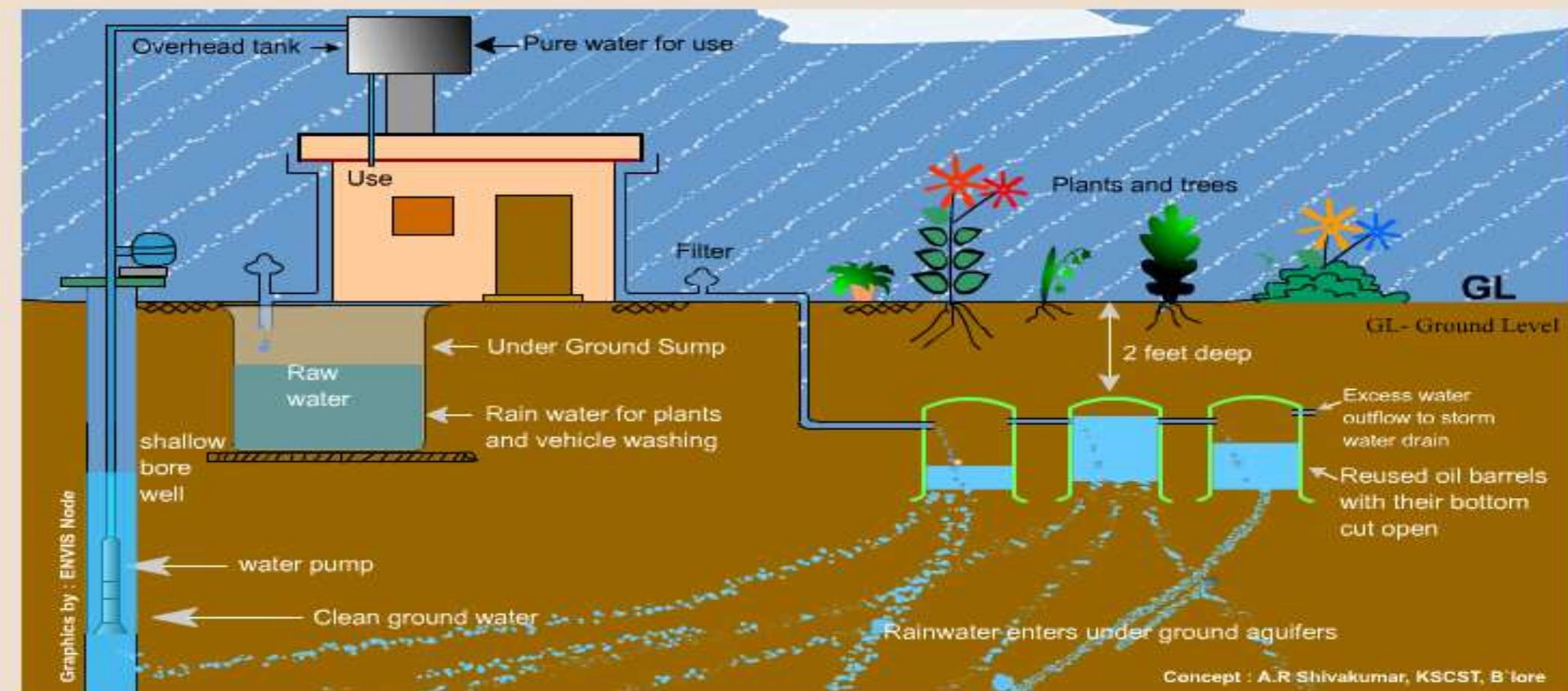
# Rainwater Harvesting





# Rainwater Harvesting

Rainwater harvesting is a technique of increasing the recharge of groundwater by capturing and storing rainwater. This is done by constructing special water-harvesting structures like





# Objectives of rainwater harvesting

- To reduce run-off
- To avoid flooding of roads
- To meet the increasing demands of water
- To raise the water table by recharging ground water
- To reduce the ground water contamination
- To supplement ground water supplies during lean season.



# Traditional rainwater harvesting

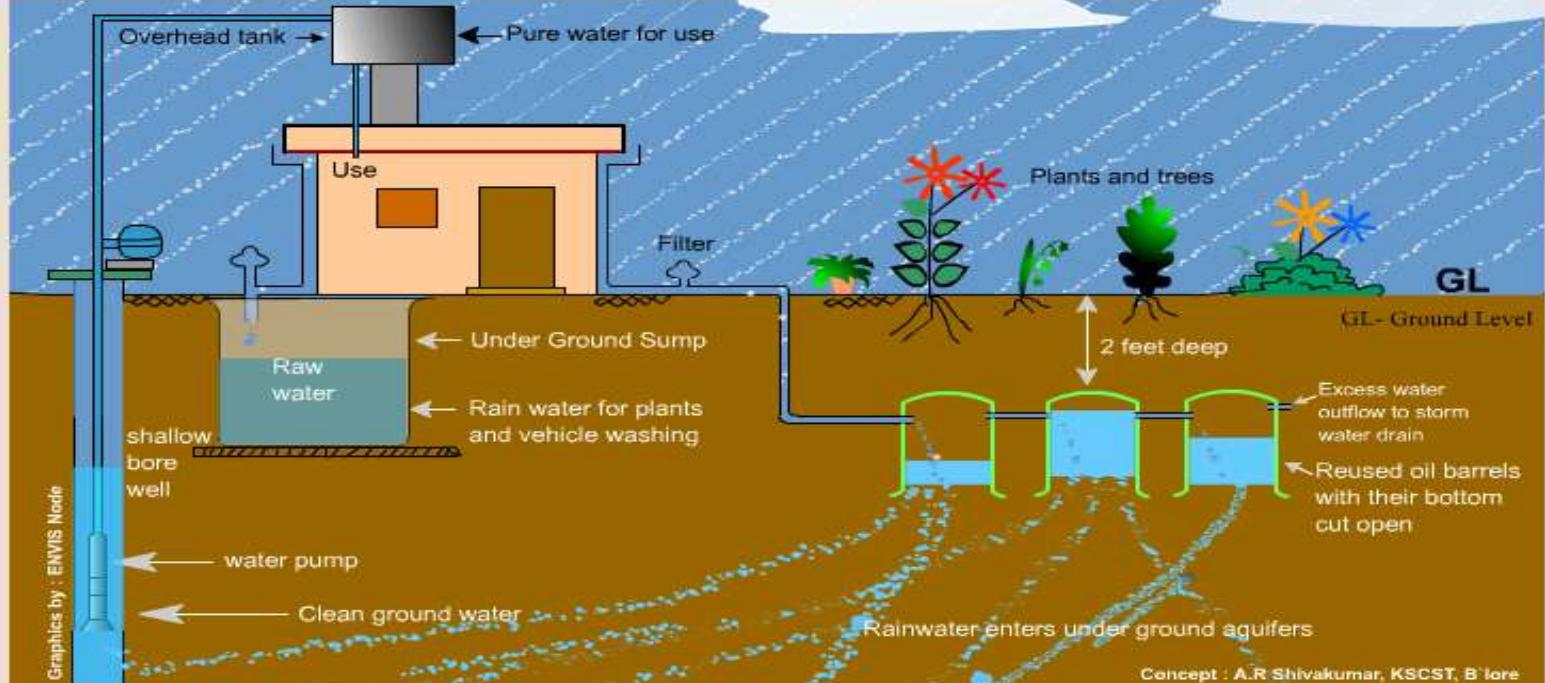
It is an old practice in high rainfall areas to collect rain water from roof-tops into storage tanks. In Himalayan foot hills people use the hollow bamboos as pipelines to transport the water of natural springs.





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# Water Harvesting



# Modern techniques of rainwater harvestings

In arid and semi arid regions artificial ground water recharging is done by constructing shallow percolation tanks. Check dams made of any suitable native materials (brush, poles, rocks, plants, wire nets, stone etc) are constructed for harvesting run-off from large catchments areas.

Ground water flow can be intercepted by building ground water dams for storing water underground.



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# A Watershed





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# Watershed management practices

It is defined as the land area from which water drains under gravity to a common drainage channel.





# Watershed Degradation

The watersheds are very often found to be degraded due to uncontrolled, unplanned and unscientific land use activities

Overgrazing, deforestation, mining, construction activities, industrialization, shifting cultivation, natural and artificial fires, soil erosion and ignorance of local people have been responsible for degradation of various watersheds.



# Objectives

- (i) To rehabilitate the watershed through proper land use adopting conservation strategies for minimizing soil erosion and moisture retention so as to ensure good productivity of the land for the farmers.
- (ii) To manage the watershed for beneficial developmental activities like domestic water supply, irrigation, hydropower generation etc.
- (iii) To minimize the risks of floods, droughts and landslides.
- (iv) To develop rural areas in the region with clear plans for improving the economy of the region.



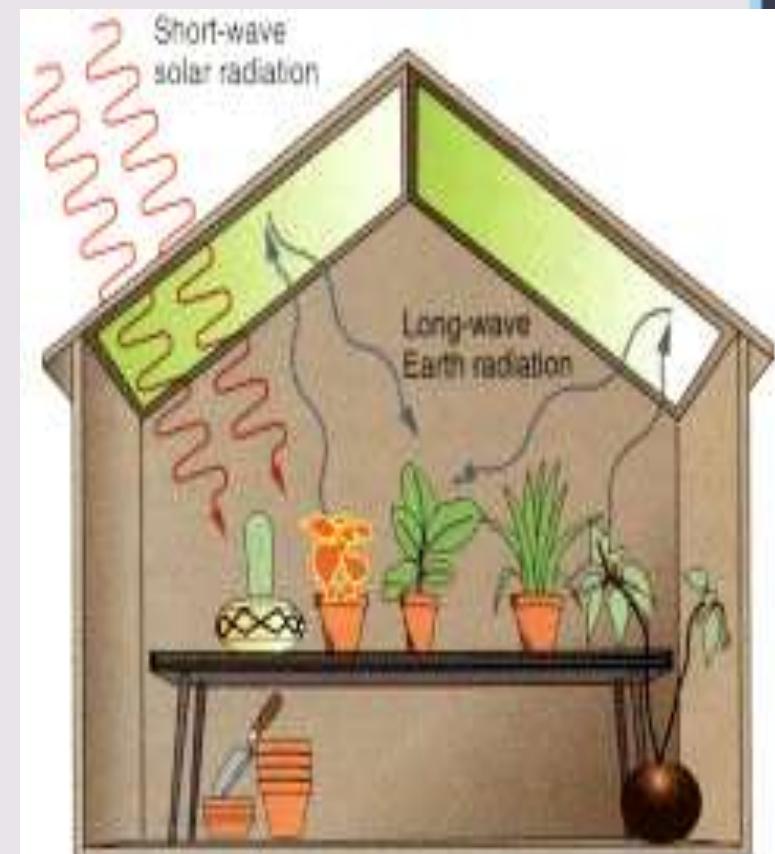
# Watershed management practices

- Water harvesting
- Afforestation and agro-forestry
- Mechanical measures for reducing soil erosion and run off losses
- Scientific mining and quarrying
- Public participation



# Global warming

Troposphere, the lowermost layer of the atmosphere, traps heat by natural process due to the presence of certain gases. This effect is called Green house effect.





# Green house gases

**Carbon di-oxide:** it contributes about 55% global warming caused by green house gasses. Industrial countries account for about 76% of annual emission. The main sources are fossils fuel burning (67%) and deforestation, other forms are of land clearing and burning(33%).

**Chlorofluorocarbons(CFCs):** These are believed to be responsible for 24% of the human contribution to green house gases. They also depleted the ozone layer in the stratosphere. The main sources of CFCs include leaking air conditioners and refrigerators.



**Methane (CH<sub>4</sub>):** It accounts for 18% of the increased green house gases. Methane is produced when bacteria break down dead organic matter in moist places that lack oxygen such as natural wetlands, paddy fields and digestive tracts of cattle, sheep and termites.

**Nitrous oxide (N<sub>2</sub>O):** It is responsible for 6% of the human input of green house gases. It is released from nylon products, from burning of biomass and nitrogen rich fuels and from the break down of biomass and nitrogen fertilizers in soil.





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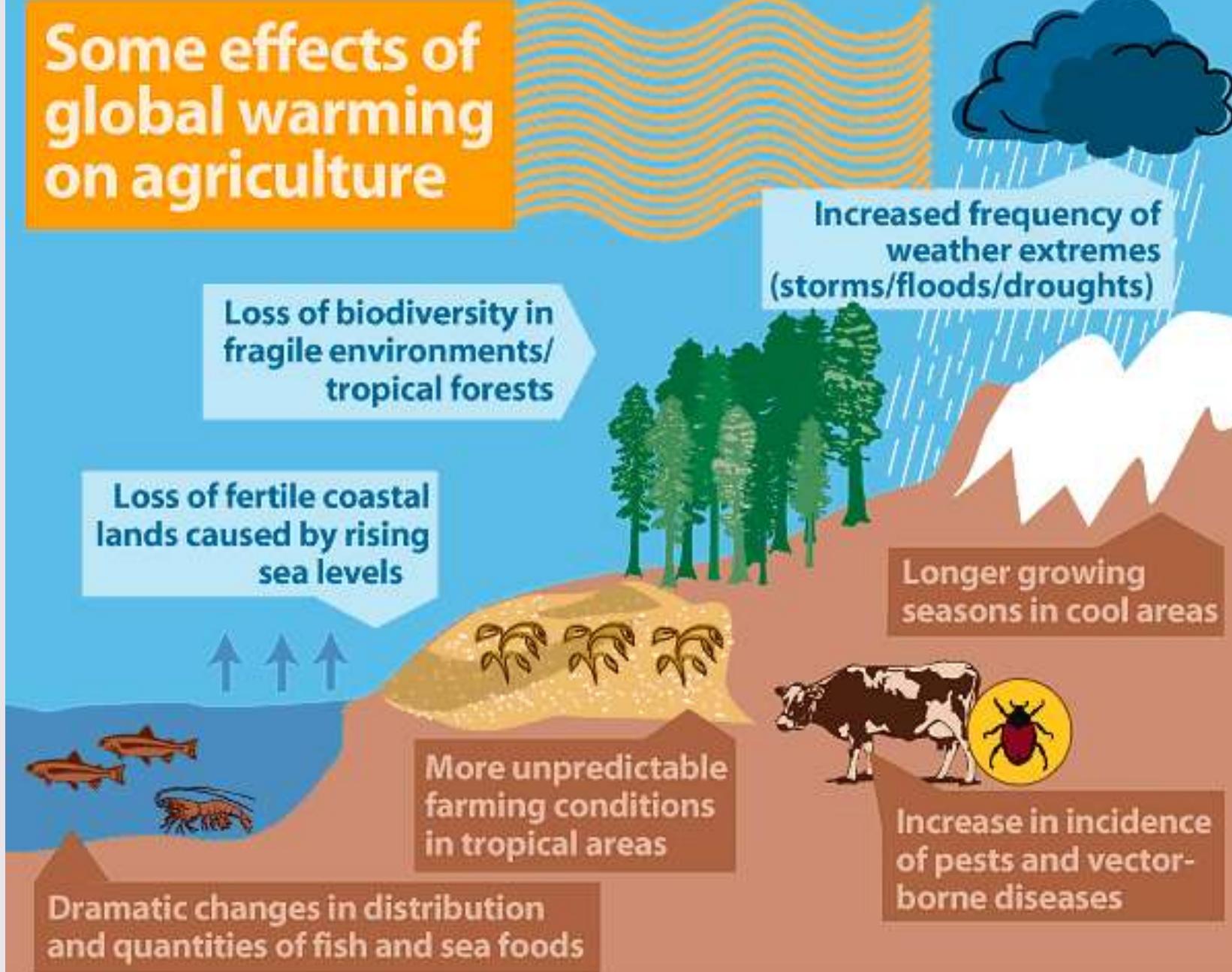
# Impacts of enhanced green house effect

- Global temperature increases
- Rise in sea level
- Effects on human health
- Effects on Agriculture





# Some effects of global warming on agriculture



*Long-term fluctuations in weather patterns could have extreme impacts on agricultural production, slashing crop yields and forcing farmers to adopt new agricultural practices in response to altered conditions.*



# Measures to check Global warming

- Cut down the current rate of use of CFCs and fossil fuels
- Use energy more efficiently
- Shift to new and renewable resources
- Increase nuclear power plants for electricity production
- Shift from coal to natural gas
- Trap and use methane as a fuel
- Adopt sustainable agriculture
- Stabilize population growth
- Plant more trees

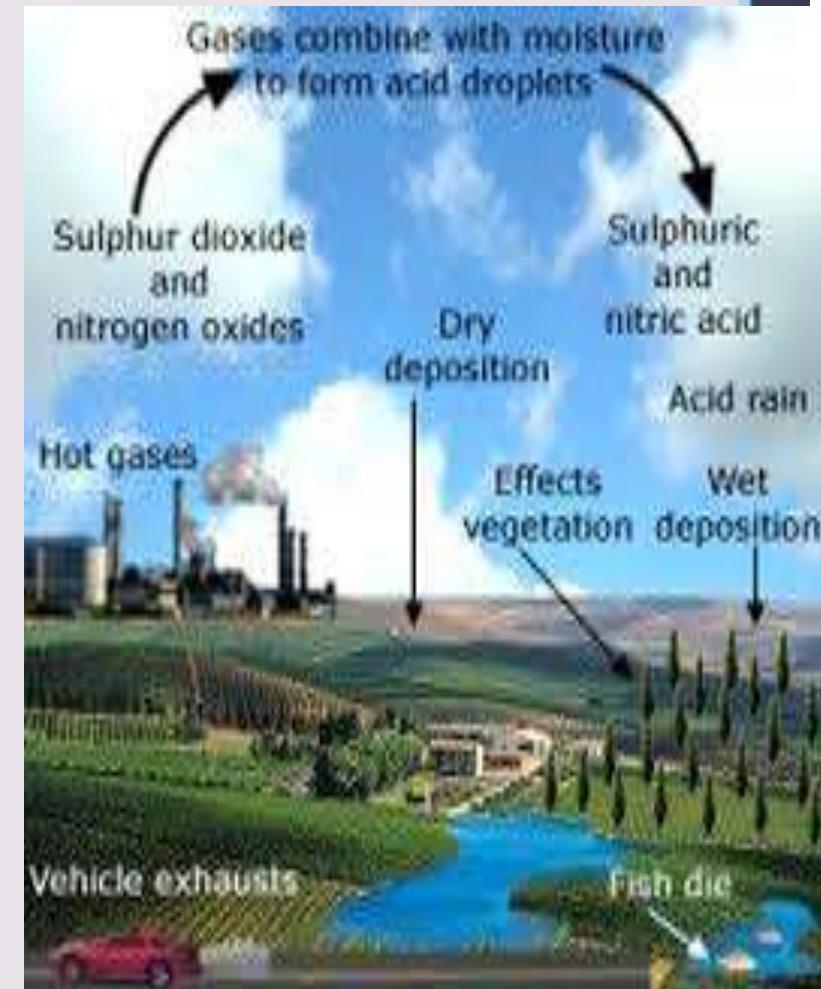




# Acid Rain

Rainfall made so acidic by atmospheric pollution that it causes environmental harm, chiefly to forests and lakes.

The main cause is the industrial burning of coal and other fossil fuels, the waste gases from which contain sulphur and nitrogen oxides which combine with atmospheric water to form acids.





# Effects of Acid Rain

- It causes deterioration of buildings especially made of marble ,e.g. monuments like Taj Mahal. Crystals of calcium and magnesium sulphate are formed, as a result of corrosion caused by acid rain.
- It damages stone statues
- It damages metals and car finishes.
- Aquatic life are badly affected by lake acidification.
- Aquatic animals suffer from toxicity of metals such as aluminium, mercury, manganese, zinc and lead which leak from surrounding rocks due to acid rain
- It results in reproductive failure and killing of fishes.
- It damages foliage and weakens trees.



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# Environmental Acts



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# WILDLIFE (PROTECTION) ACT, 1972





# **WILDLIFE (PROTECTION) ACT, 1972**

- The act, a landmark in the history of wildlife legislation in our country, came into existence in 1972. Wildlife was transferred from State list to concurrent list in 1976, thus giving power to the Central Govt. to enact the legislation.
- The Indian Board of Wildlife (IBWL) was created in 1952 in our country.



# Major activities of the act

- ❖ It defines the wild-life related terminology.
- ❖ It provides for the appointment of wildlife advisory Board, Wildlife warden, their powers, duties etc.
- ❖ The Act provides for setting up of National Parks, Wildlife Sanctuaries etc.
- ❖ The Act provides for the constitution of Central Zoo Authority.
- ❖ The Act imposes a ban on the trade or commerce in scheduled animals.
- ❖ It provides for legal powers to officers and punishment to offenders.
- ❖ It provides for captive breeding programme for endangered species.
- ❖ There is provision for trade and commerce in some wildlife species with license for sale, possession, transfer etc.



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# The Forest (Conservation) Act of 1980





# **FOREST (CONSERVATION) ACT, 1980**

This act deals with the conservation of forests and related aspects. Except J & K, the act is adopted all over India. The Act covers under it all types of forests including reserved forests, protected forests or any forested land irrespective of its ownership.



The salient features of the Act are as follows:

- (i) The State Govt. has been empowered under this Act to use the forests only for forestry purposes. it can pass orders for declaring some part of reserve forest for non-forest purposes (e.g. mining) or for clearing some naturally growing trees and replacing them by economically important trees (reforestation).

It makes provision for conservation of all types of forests and for this purpose there is an Advisory committee which recommends funding for it to the Central Government.

- (iii) Any illegal non-forest activity within a forest area can be immediately stopped under this Act.



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# Water (Prevention & Control of Pollution) Act, 1974





# **WATER (PREVENTION AND CONTROL OF POLLUTION) ACT, 1974**

- It provides for maintaining and restoring the wholesomeness of water by preventing and controlling its pollution.
- Pollution is defined as such contamination of water, or such alteration of the physical, chemical or biological properties of water, or such discharge as is likely to cause a nuisance or render the water harmful or injurious to public health and safety or harmful for any other use or to aquatic plants and other organisms or animal life.



The salient features and provisions of the Act are summed up as follows:

- (i) It provides for maintenance and restoration of quality of all types of surface and ground water.
- (ii) It provides for the establishment of Central and State Boards for pollution control.
- (iii) It confers them with powers and functions to control pollution.
- iv) The Act has provisions for funds, budgets, accounts and audit of the Central and State Pollution Control Boards.
- (v) The Act makes provisions for various penalties for the defaulters and procedure for the same.



# Central Pollution Control Board (CPCB)

- It advises the central govt. in matters related to prevention and control of water pollution.
- Coordinates the activities of State Pollution Control Board and provides them technical assistance and guidance.
- Organizes training programs for prevention and control of pollution.
- Organizes comprehensive programs on pollution related issues through mass media.
- Collects, compiles and publishes technical and statistical data related to pollution.
- Prepares manuals for treatment and disposal of sewage and trade effluents.
- Lays down standards for water quality parameters.
- Plans nation-wide programs for prevention, control or abatement of pollution.
- Establishes and recognizes laboratories for analysis of water, sewage or trade effluent sample.



# Air Control



# THE AIR (PREVENTION AND CONTROL OF POLLUTION) ACT, 1981

- (i) The Act provides for prevention, control and abatement of air pollution.
- (ii) In the Act, air pollution has been defined as the presence of any solid, liquid or gaseous substance (including noise) in the atmosphere in such concentration as may be or tend to be harmful to human beings or any other living creatures or plants or property or environment.

Just like the Water Act, the Air Act has provisions for defining the constitution, powers and function of Pollution Control Boards, funds, accounts, audit, penalties and procedures.

- iv) As per Section 19, in consultation with the State Pollution Control Board, the state government may declare an area within the state as .air pollution control area.



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# **THE ENVIRONMENT PROTECTION ACT ( 1986 )**





# THE ENVIRONMENT (PROTECTION) ACT, 1986

The Act came into force on Nov. 19, 1986, the birth anniversary of our Late Prime Minister Indira Gandhi, who was a pioneer of environmental protection issues in our country. The Act extends to whole of India. Some terms related to environment have been described as follows in the Act:





- (i) Environment includes water, air and land and the inter-relationships that exists among and between them and human beings, all other living organisms and property.
- (ii) Environmental pollution means the presence of any solid, liquid or gaseous substance present in such concentration, as may be, or tend to be, injurious to environment.
- (iii) Hazardous Substance means any substance or preparation which by its physico-chemical properties or handling is liable to cause harm to human beings, other living organisms, property or environment.



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# Functions

- (a) The standards of quality of air, water or soil for various areas and purposes.
- (b) The maximum permissible limits of concentration of various environmental pollutants (including noise) for different areas.
- (c) The procedures and safeguards for the handling of hazardous substances.
- (d) The prohibition and restrictions on the handling of hazardous substances in different areas.
- (e) The prohibition and restriction on the location of industries and to carry on process and operations in different areas.





Under the Environmental (Protection) Rules, 1986 the State Pollution Control Boards have to follow the guidelines provided under Schedule VI, some of which are as follows:

- a) They have to advise the Industries for treating the waste water and gases with the best available technology to achieve the prescribed standards.
- (b) The industries have to be encouraged for recycling and reusing the wastes.
- (c) They have to encourage the industries for recovery of biogas, energy and reusable materials.