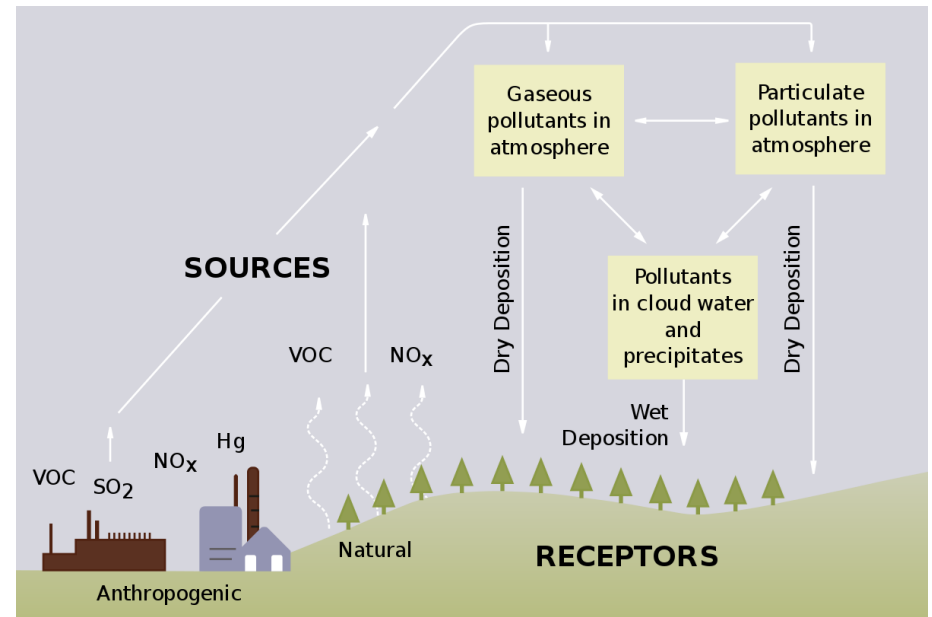


# Acid rain

# Introduction

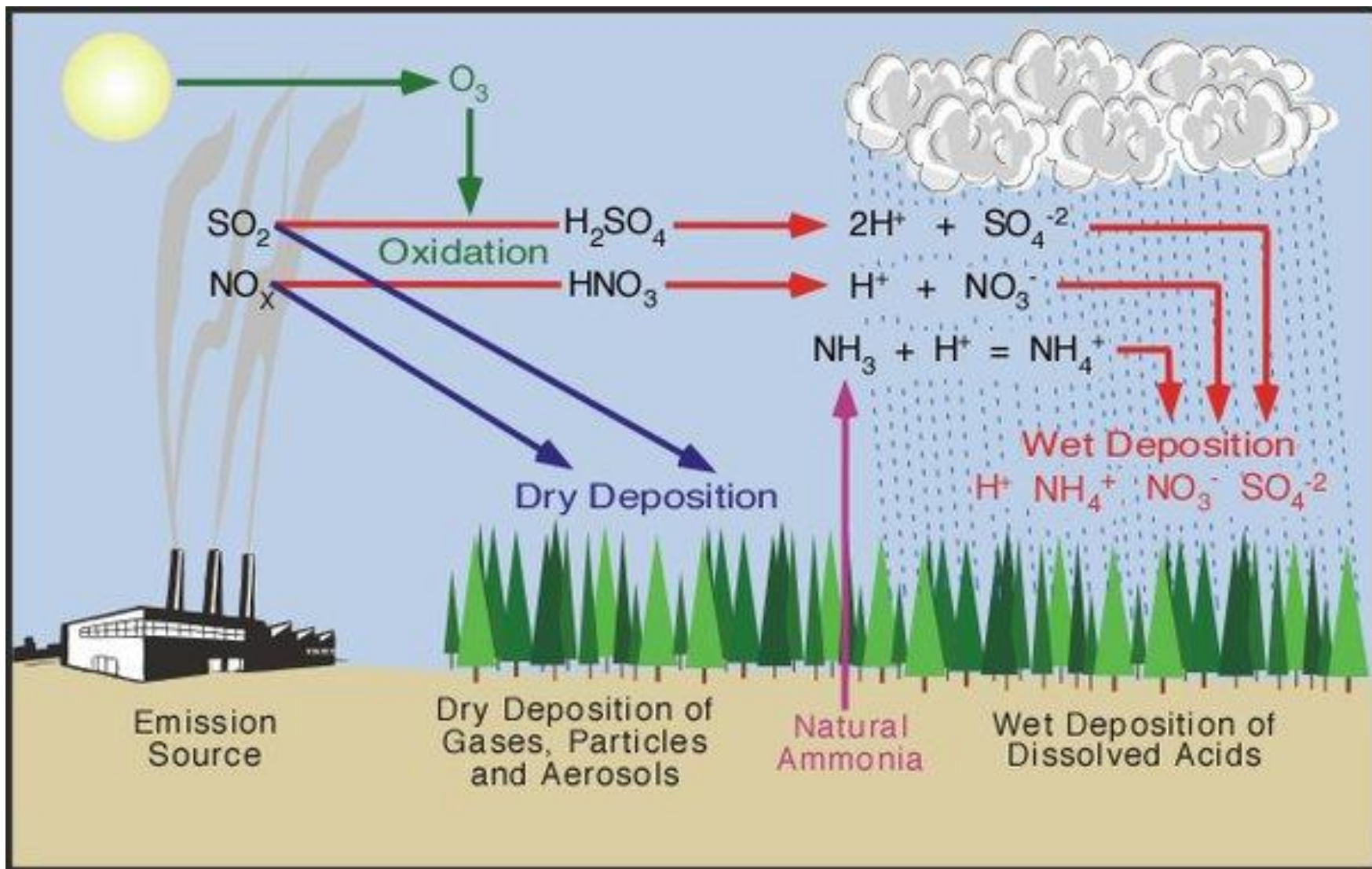
- Precipitation comprising of acidic components.
- Sulphuric acid and nitric acid
- SO<sub>x</sub> and NO<sub>x</sub>
- Forms- rain, snow, fog, hail,



# Causes

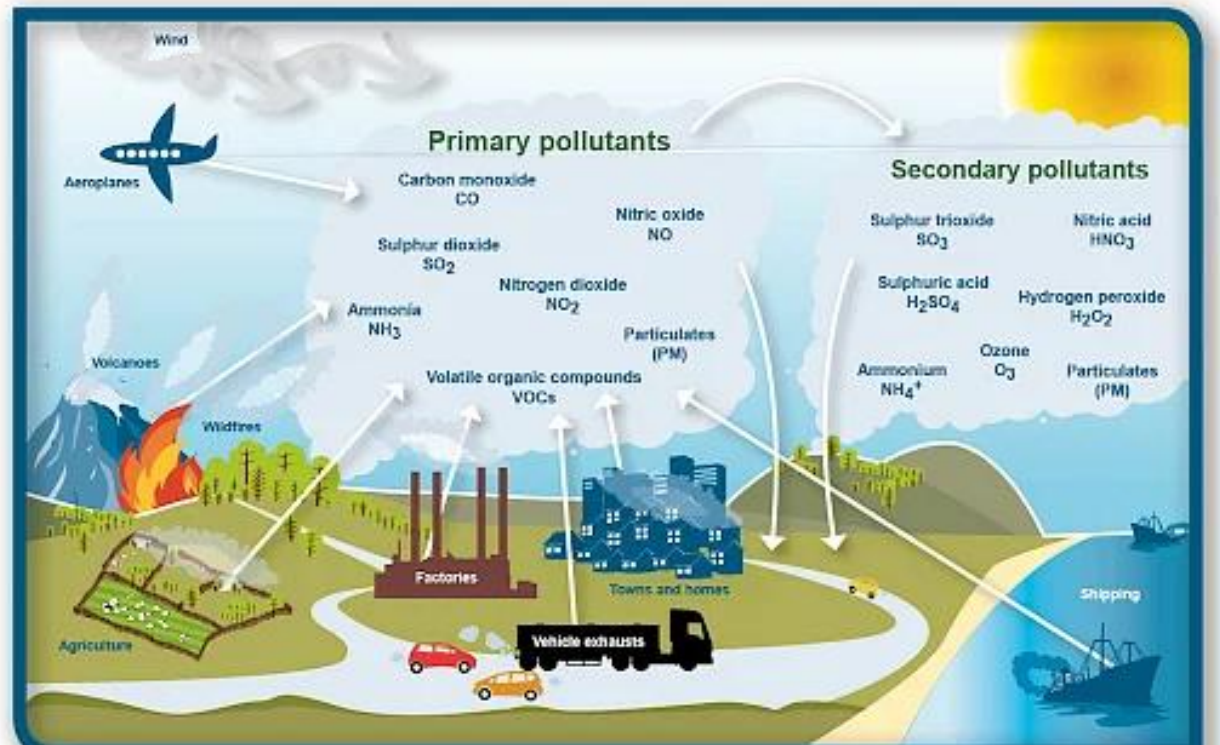
A) Natural causes:

1. Volcanic Eruptions
2. Lightening Trails
3. Emission from Vegetation



# Man made sources

1. Human activities emitting sulphur and nitrogen
2. These include factories, power generation facilities and automobiles



# Effects of acid rain

## **1. Effects on aquatic ecosystem:**

- a. Acid rain directly falls into these bodies or reach as run offs from forest, roads and field.
- b. Lower pH

## **2. Effects on forests :**

Wilting of leaves, trees vulnerable to disease, extreme weather conditions

### **3. Effects on agriculture:**

Soil pH is altered, destruction of biological activity, increased leaching of minerals

### **4. Effects on architecture and buildings:**

Corrosion of heritage buildings; particularly those made of limestone are affected.

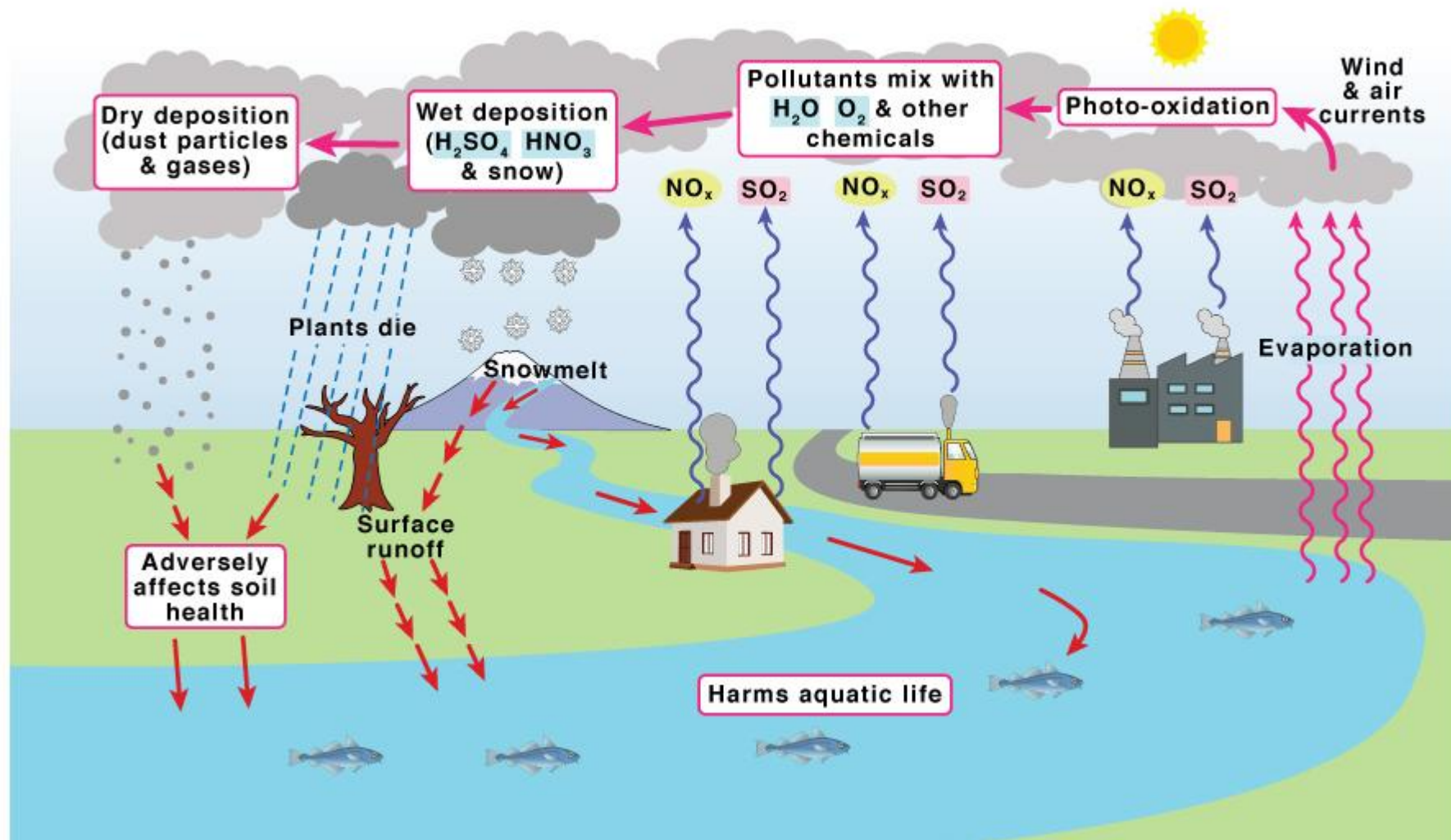
Example- Taj mahal

### **5. Effect on public health:**

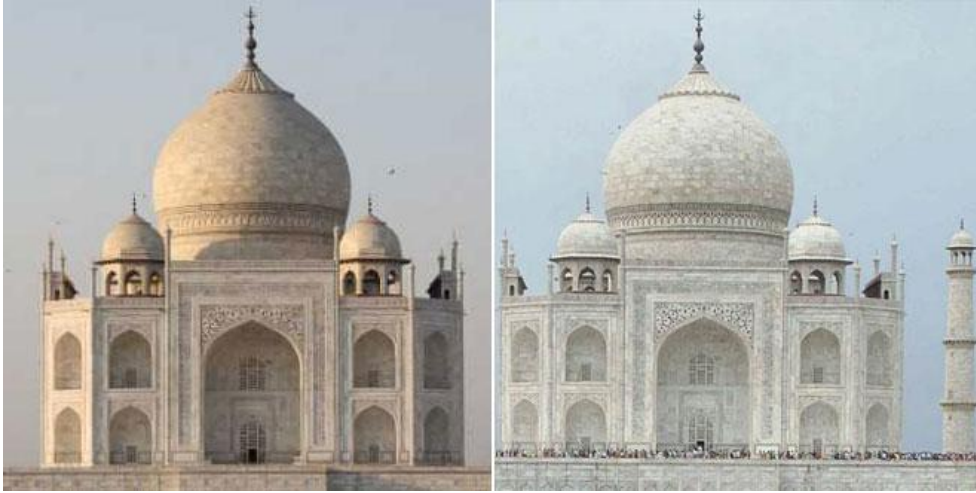
NO<sub>x</sub>, SO<sub>x</sub> and their particulate degrade visibility on roads, respiratory issues

**6.** Acid rain is also known to corrode metals like steel, bronze, copper and iron,









<https://swachhindia.ndtv.com/taj-mahal-pollution-impact-archaeological-survey-of-india-asi-to-protect-the-monument-scientificallly-minister-mahesh-sharma-29135/>



<https://cyark.org/news/top-5-endangered-heritage-sites-acid-rain>

# Control measures

- Use of alternative energy sources- renewable
- Individual actions
- Policy formulation at national and international level
- Addition of lime to water bodies

# Environmental laws

# LAWS IN INDIA RELATED TO ENVIRONMENT

1. Environment Protection Act, 1986
2. Air (Prevention and Control of Pollution) Act, 1981
3. Water (Prevention and Control of Pollution) Act, 1974
4. Wildlife Protection Act, 1972
5. Forest Conservation Act, 1980

# Introduction- Environment Protection Act, 1986

- UN conference on Human Environment at Stockholm in 1972
- 'Declaration on Human Environment'
- Indian Parliament inserted two articles- 48A and 51A in 1976
- Establishment Department of Environment in 1980.

# Environment Protection Act, 1986

- Established with the objective of protection and improvement of environment.
- Central government is authorized to protect and improve environmental quality, control and reduce pollution, prohibit/ restrict setting/operation of industrial facility.
- Under this act, central government can establish authorities to prevent environmental pollution in all its forms.

# Objectives

- Implement decisions taken for environment safety and protection at UN Stockholm conference on human environment.
- To provide for a comprehensive legislation for environment protection.
- To establish new authorities for the same.
- To provide for stringent punishment to those damage environment.
- To encourage sustainable development.



# Composition

The act comprises of 4 chapters and 26 sections.

Chapter 1 consists of preliminary information such as title, definitions.

Chapter 2 describes general powers of the government-

Some are-a) To plan and execute nationwide programs

b) To lay down quality standards

c) To co ordinate actions among state governments, officers and other authorities.

d) Operation of certain industries

e) To establish and recognize environmental laboratories and institutes, etc.

Chapter 3 gives central government the power to take actions.

Chapter 4 allows government to appoint officers to achieve the objectives of the act.

Other features of the act:

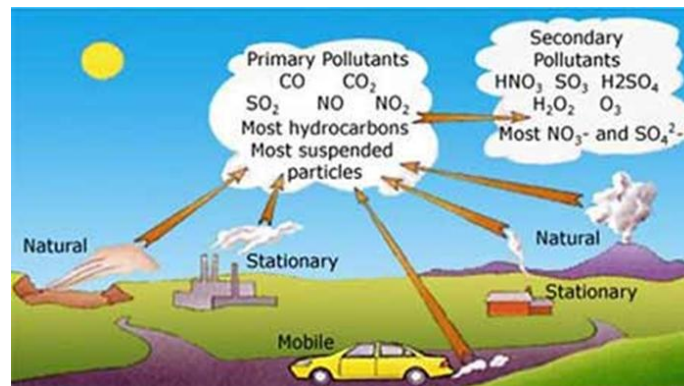
1. Central government can issue directions to any person, officer, authority to close, prohibit, or regulate any industry, operation, or process or to stop or regulate the supply of electricity, water, or any other service
2. To lay down rules regulating environmental pollution
3. To enter and inspect a place
4. Handling of hazardous substances

# Penalties

- Section 15 of the act prescribes penalty for general offences which is imprisonment for a term which may extend to five years or with a fine up to Rs. 1 Lakh, or with both. An additional fine which may extend to Rs. 5000 may be laid for every day the failure or contravention continues. And if this failure or contravention extends beyond one year after the date of conviction, then the imprisonment can extend upto seven years.
- Section 16 of the act describes the offences committed by companies and section 17 by the government departments.

# Air (Prevention and Control of Pollution) Act, 1981

- Enacted under article 253 in pursuance of declaration on human environment at Stockholm conference 1972.
- Objectives- prevention, control and abatement of air pollution by established boards
- Section 2(a) defines 'air pollutant' as any solid, liquid or gaseous substance that may be harming or injuring the environment, humans, other living creatures, plants or even property.

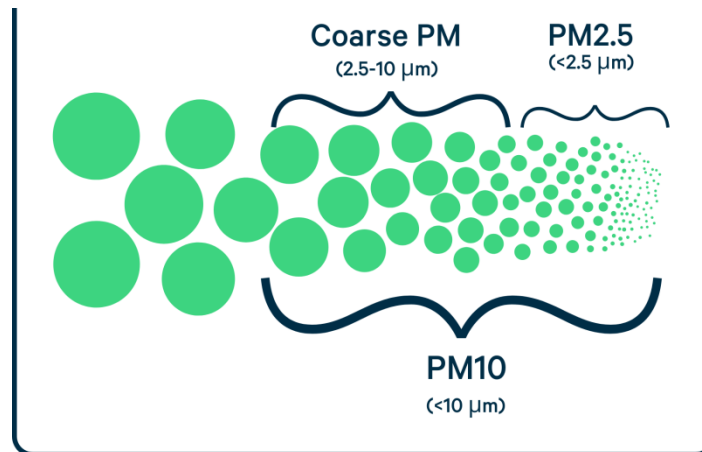


1987 Amendment, the noise was also included in the list of substances that are deemed to be harmful to the environment.

Section 2(b) defines 'air pollution' as the presence of any air pollutant in the atmosphere.

Two boards have been set up under this act- central pollution control board and state pollution control board.

Powers of central board extends to entire India and union territories while those of state are restricted to a particular state.



# Functions of central pollution control board

- To make efforts for the **prevention, abatement and control of air pollution in the country** and may advise the **Central Government** on the same.
- To **plan and implement a nationwide programme** for the prevention, control and abatement of air pollution.
- To **coordinate the activities of the States** and shall resolve the disputes that arise between them.
- To provide **technical assistance to the Boards**, carry out investigations and research relating to air pollution.
- To plan and implement training programmes for the persons to be involved in those programmes.

- It shall help combat air pollution **through a mass media programme.**
- It shall **collect, compile and publish statistical data relating to air pollution** and shall also prepare manuals, codes or guides relating to measures to combat air pollution.
- It shall lay down **standards for the quality of air** and shall perform other functions as prescribed.
- The Board shall also set up a **laboratory or multiple laboratories** to enable the Board to perform its functions effectively.

**Air Quality Index Chart**

Index Value	Name
0-50	Good
51-100	Moderate
101-150	Unhealthy for sensitive group
151-200	Unhealthy
201-300	Very unhealthy
301-500	Hazardous



# Functions of state pollution control board

- Planning and implementation of programmes for **prevention, control or abatement of air pollution** and **advise the State Government** on such matters.
- **Collection and dissemination of information** regarding air pollution and organize training and mass awareness programmes regarding air pollution control, prevention and abatement.
- To **inspect, at reasonable times, any control equipment, industrial plant or manufacturing process** and **give orders to the people** in charge to further the purposes of combating air pollution.
- To inspect and assess the air quality at designated air pollution control areas as it may think necessary.

- To lay down standards for the emission of air pollutants into the atmosphere from automobiles or industries, or any other pollutant from any source.
- To advise the State Government regarding the suitability of any location which is to be used for setting up any industry, keeping in mind the air quality which would be impacted if that industry is set up.
- To set up labs in their States, to enable the State Board to perform its functions effectively.



# Penalties

- A person managing an industry is penalized if emissions produced are in excess of air quality standards laid down by board.
- Board also makes applications to court for restraining persons causing air pollution.
- Contravention of any of the provisions of act or any order or direction issued is punishable with imprisonment for a term of three months or fine upto 10000 rs or both. If the contravention continues, then additional fine of 5000 rs per day.
- Section 46 states that no civil court shall have jurisdiction in any matter which an Appellate Authority formed under this Act is empowered by this Act to decide, nor should an injunction be granted in respect of any action taken under the pursuance of the powers of this Act.

# WILD LIFE PROTECTION ACT 1972

- Legislation to protect and manage wildlife- plants and animals.
- Enacted due to lacunae in previous wild birds and animal protection act, 1912
- Its jurisdiction covers entire India.
- Originally, it contains 6 schedules with varying degrees of protection to wildlife
- Schedule I and II provide absolute protection to wildlife included in it and have higher penalties for offences conducted under them. Example- blackbuck, chameleon
- Schedule III and IV also provide protection but the penalties are lower. Example- chital and sambar
- Schedule V contains vermin animals like fruit bats, common crow, rats, etc. which can be freely hunted
- Schedule VI contains specific endemic plants which are prohibited from cultivation and planting

- The Act was amended subsequently in 1982, 1986, 1991 and 1993 to accommodate provision for its effective implementation.
- An expert committee, constituted by the Indian Board of Wildlife considers amendments to the Act, as and when necessary.
- Five types of protected areas established under the act- **sanctuaries, national parks, conservation reserves, community reserves and tiger reserves.**
- Current 2022 amendment provides more power to central government, reduces the number of schedules to V and increases penalties. For General violation- Rs 1,00,000 from Rs 25,000 and for specially protected animals 25,000 from Rs 10,000.
- Chief Wildlife Warden is appointed by state to control, manage and maintain all sanctuaries in a state.

# Objectives of the act

- To prohibit hunting of wild animals
- To give powers to the officers for punishing the offender
- To support the convention of international trade in endangered species of flora and fauna(CITES), 1976
- To support man and biosphere programme, 1971
- To regulate trade in wildlife

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

It regulates agencies responsible for checking water pollution and the ambit of pollution control boards both at the centre and states.

The Water (Prevention & Control of Pollution) Act, 1974 was adopted by the Indian parliament with the aim of prevention and control of Water Pollution in India.

## **The salient features of Water (Prevention And Control Of Pollution) Act, 1974**

- To prevent and control water pollution.
- Maintenance and restoration of quality of all types of surface and groundwater.
- Establishment of Central and State Boards for pollution control. The Central and State Pollution Control Boards are given comprehensive powers to advise, coordinate, and provide technical assistance for the prevention and control of water pollution.
- Under Water Act 1974, Sewage or pollutants cannot be discharged into water bodies including lakes and it is the duty of the state pollution control board to intervene and stop such activity.



- It prohibits disposal of any poisonous, noxious or polluting matter to the flow of water in a stream.
- Violation of the Act which includes fine and imprisonment. Anyone failing to abide by the laws is liable for imprisonment under Section 24 & Section 43 ranging from not less than one year and six months to six years along with monetary fines.
- The act provides for constitution of central and state pollution control boards and also a provision for joint board.

## Functions of the Central Board :

- To advise the Central Government on any matter concerning the prevention and control of water pollution
- To co-ordinate the activities of the State Boards and provide technical assistance and guidance
- To collect, compile and publish technical and statistical data relating to water pollution
- To establish or recognize a laboratory or laboratories for analysis of samples of water from any stream or well or of samples of any sewage or trade effluents

## Functions of the State Board :

- To plan a comprehensive programme for the prevention, control or abatement of pollution of streams and wells in the State and to secure the execution
- To advice the state government on matters of water pollution
- To Inspect and lay down, modify effluent standards for the sewage and trade effluents
- Evolve economical and reliable methods of treatment of sewage and trade effluents

- The Act sets up the Central Water Laboratory and State Water Laboratory respectively.
- Civil courts do not have jurisdiction to entertain any suit or proceeding in respect of any matter which an appellate authority constituted under this act

# Forest Conservation Act, 1980

- The first legal draft on forest was the Indian Forest Act, 1865 which was replaced by the Indian Forest Act, 1927 during the colonial period. It was confined to British interests and focused on timber management.
- After independence, the need to conserve the forests was felt and therefore, the President of India enforced the Forest (Conservation) Ordinance, 1980.
- Later, the Forest(Conservation) Act, 1980 was enacted.
- It was passed to protect the forests of the country and the matters related to it.
- The act was amended in 1988.
- Its jurisdiction covers entire country.
- It consists of five sections.

# Objectives of the act

- To maintain ecology and to preserve the forest of our country.
- To regenerate the forests by afforestation.
- To protect flora, fauna and other ecological components of forest.
- To protect the integrity, territory and individuality of the forests.
- To prevent deforestation that leads to land erosion and subsequent degradation of the land.
- To prevent the conversion of forests into agricultural lands, or grazing lands, or building of business or residential units.

## This Act has the following features:

- State governments and other authorities are restricted to make decisions on certain matters without prior permission of central government.
- Entire power vests with central government to carry out provisions of this act.
- There are penalties for the infringement of the provisions of this Act.
- An advisory committee may be formed under this act for advising the Central government in matters related to forest conservation.
- Penalty was added by the amendment made in 1988. Whoever violates or abets the violation of any law shall be punished with simple imprisonment for any prescribed term which may increase up to 15 days.



# International agreements

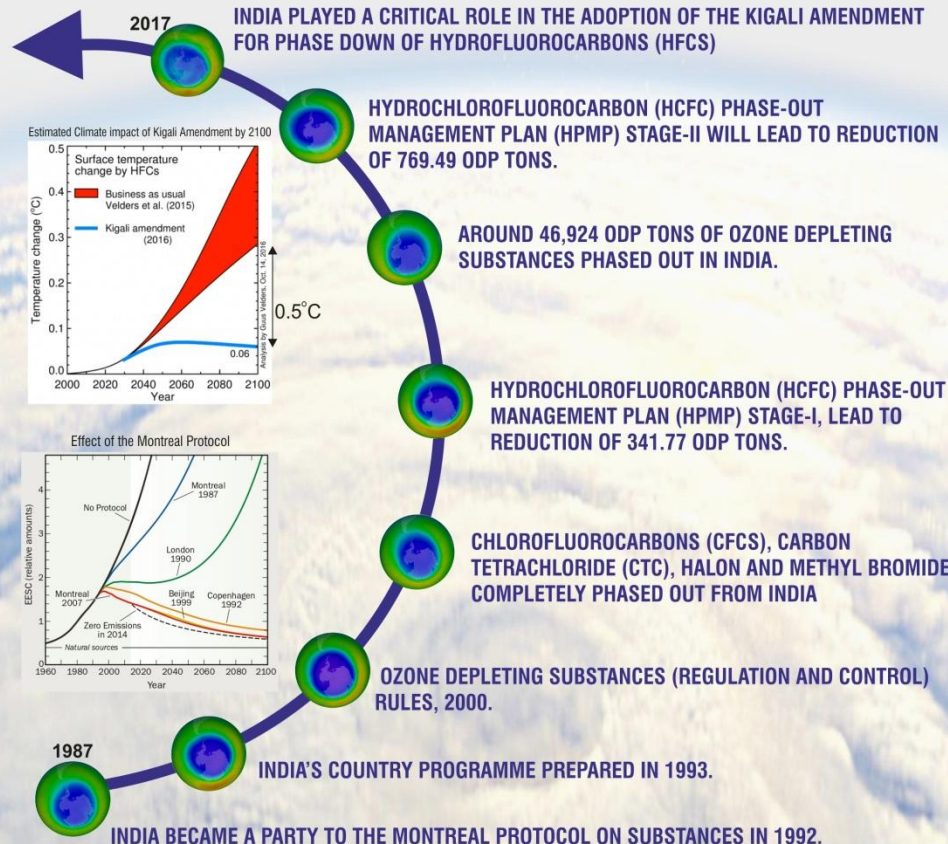
## **1) Montreal protocol:**

- International agreement to protect ozone layer by phasing out production of ozone depleting substances.
- In 1970s and 1980s, effect of chlorofluorocarbons as ozone depleting substances became evident.
- Vienna convention for protection of ozone layer was adopted in 1985
- Further discussions by countries across world led to an agreement in 16 September 1987 which came into force in 1 January 1989 as Montreal protocol.
- 198 parties have ratified Montreal protocol

- It is considered as most successful international agreement.
- Because of steps taken under Montreal protocol, ozone depletion over Antarctica has slowed down.
- All of the ozone depleting substances controlled by the Montreal Protocol contain either chlorine or bromine.
- However, nitrous oxides are not controlled by Montreal protocol.
- Treaty provides for a timetable for reduction and subsequent elimination of ozone depleting substances.
- This includes a 10-year phase-out for developing.

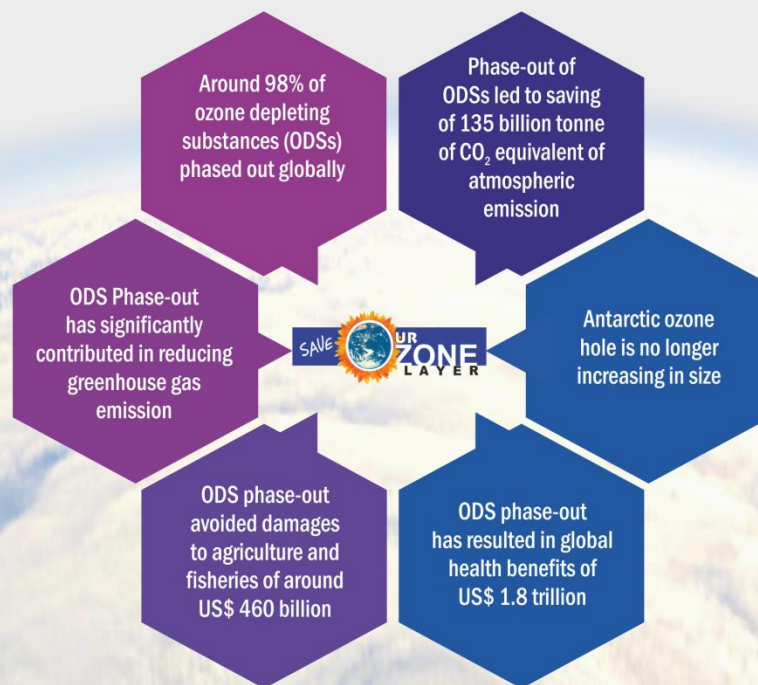


## IMPLEMENTATION OF MONTREAL PROTOCOL: INDIA'S ACHIEVEMENT





## ACHIEVEMENTS OF MONTREAL PROTOCOL



### India's Achievements:

Played crucial role in adoption of Kigali Amendment to the Montreal Protocol for phase-down of Hydrofluorocarbons.

India has met its compliance targets under ongoing HCFC phase out.

Chlorofluorocarbons (CFCs), Carbontetrachloride (CTC), Halon and Methyl Bromide completely phased out from India.

## 2) Kyoto protocol

- Extension of United nations framework convention on climate change
- To reduce greenhouse gas emissions
- Adopted in 1997 but did not go into effect until 2005
- It applies to greenhouse gases like carbon dioxide, nitrous oxide, methane, per fluorocarbons, hydro fluorocarbons and sulphur hexafluoride
- In 2012, it was extended with Doha amendment
- Burden for emission was placed on developed nations
- Protocol's approach was common but differentiated responsibility and respective capabilities
- It also established carbon credits system

### 3) Convention on biological diversity

- It is a multilateral treaty for biodiversity conservation
- It was opened for signature in Rio Earth summit in 1992 but entered into force in 1993
- The secretariat – Montreal, Canada
- It is ratified by 196 members except United states
- The governing body/conference of parties meet every two years to review the progress, set priorities and commit work plans.

- Three main objectives-

- 1) Conservation of biodiversity

- 2) Sustainable use of its components

- 3) Fair and equitable sharing of the benefits arising out of utilization of genetic resources

- Parties acknowledge that special provision is needed to meet the needs of developing countries particularly the least developed and small island countries; Including the provision of new and additional financial resources and appropriate access to relevant technology

- Global environmental facility governs needs of developing countries in meeting the demands

# Nagoya protocol

- Supplementary agreement to CBD
- Legal framework for effective implementation of CBD objective of fair and equitable sharing of benefits arising out of genetic resources
- Adopted in 2010 but entered into force in 2014
- Also covers traditional knowledge arising out of genetic benefits
- India ratified the protocol in 2012

# Cartagena protocol:

- Supplementary agreement to CBD
- It deals with biosafety issues concerning Living Modified Organisms
- It was adopted in 2000 but came into force in 2003
- It also sets up a bio-clearing house to enable information exchange on LMOs



# Nature reserves

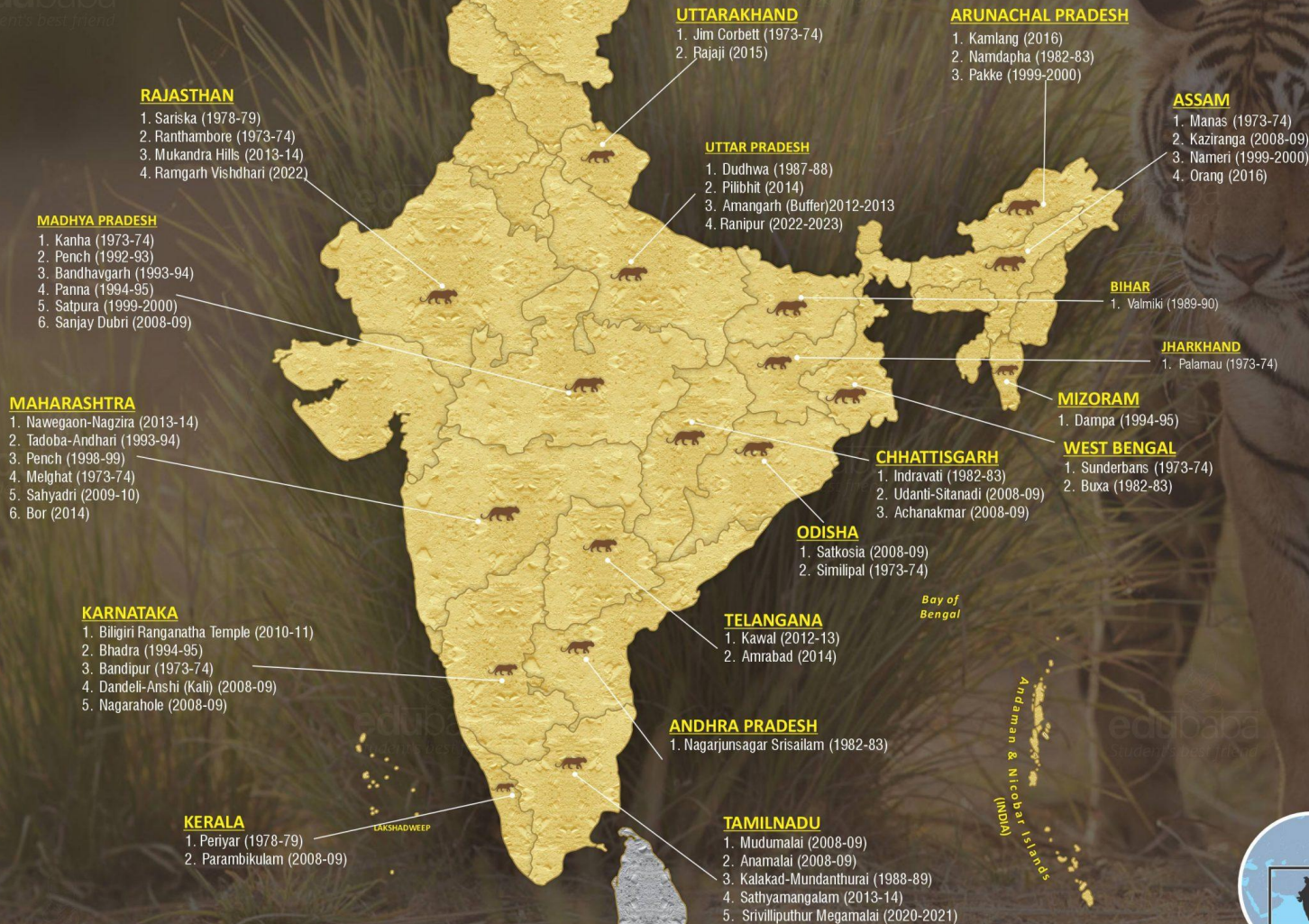
- It is a protected area of importance for flora, fauna or geological features.
- It is reserved for conservation and research.
- These fall into various categories depending on the level of protection given by local laws.
- These include wildlife sanctuaries, biosphere reserves and other protected areas.

# NATURE RESERVES IN INDIA

NAME	LOCATION	IMPORTANT ANIMALS/PLANTS
Achanakmar-Amarkantak	Madhya Pradesh and Chhattisgarh	Chausingha (four horned antelope)
Agasthyamalai	Kerala	Nilgiri Tahr
Cold desert	Ladakh and Himachal Pradesh	Snow leopard
Dihang-Dibang	Arunachal Pradesh	Mishmi Takin
Dibru-Saikhowa	Assam	Water buffalo
Project Tiger reserves of India	Kanha, Ranthambore	Tiger conservation
Great Nicobar	Andaman and Nicobar islands	Salt water crocodile
Gulf of Mannar	Between India and Srilanka	Dugong
Kachchh	Gujarat	Indian wild ass
Manas	Assam	Pygmy hog
Elephant reserves of India	Sonitpur, Dandeli	Elephant conservation
Nanda Devi	Uttarakhand	Himalayan black bear

# TIGER RESERVES OF INDIA

edubaba  
Student's best friend



# TRIBAL POPULATION AND RIGHTS

- Tribal rights in India are dealt by the Schedule Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) act, 2006
- This law concerns the rights of forest dwelling communities to land and other resources present in the forest.

Some important provisions are as follows:

1. Right to hold or live in forest land
2. Community rights such as nistar
3. Right of ownership, access to collect, use and dispose of minor forest produce.
4. Uses of entitlements such as fish and other products of water bodies, grazing and traditional seasonal resource.
5. Right to community tenures of habitat and habitation for primitive groups and pre-agricultural communities.

6. Rights over disputed land
7. Rights for conversion of Pattas/leases/grants issued by any local council or any state government on forest land to titles.
8. Rights of settlement and conversion of forest villages.
9. Right to protect, regenerate or conserve or manage any community forest resource which they have been traditionally protecting and conserving for sustainable use.
10. Rights recognized under any state law or autonomous district council or autonomous regional council
11. Right to access biodiversity and community right to intellectual property and traditional knowledge.

Excludes- traditional right of hunting or trapping, extracting a part of body of any species of wild animals



## **Eligibility:**

Rights under the act are confined to those primarily residing in forest and are dependent on forest and forest land for a livelihood.

## **Process for recognition of rights:**

1. Gram sabha/ village assembly passes a resolution recommending whose rights to which resources should be recognized.
2. Resolution is screened and approved at taluka and district level.
3. screening committee comprises of three government officials and 3 elected members of local body at that level

# HUMAN WILDLIFE CONFLICT IN INDIAN CONTEXT

- Limited land, resources and increasing human population
- Wandering of animals in human colonies in search of food

## Causes:

- Population explosion
- Deforestation
- Increased road density
- Destruction of animal corridors
- Agricultural expansion

## Examples of human wildlife conflict:

1. Leopard- Human conflict: seen venturing in human habitats due to reduction in prey base, habitat loss and poaching.
2. Human-Tiger conflicts: Seen in Sundarbans and Kaziranga
3. Human – Elephant conflicts- destruction of natural movement corridors



<https://howtoconserve.org/2015/12/04/human-wildlife-conflict/>