



**SANATAN DHARM COLLEGE MUZAFFARNAGAR**  
(Affiliated to Maa Shakumbhari University, Saharanpur)



---

**Topic**

**LAWS AND INITIATIVES TO CONTROL  
ENVIRONMENTAL POLLUTION**

**For**

**Subject Zoology**

**&**

**B.Sc. VI Sem**

**DR. ARUN RATN, Ph.D.**  
[CSIR-JRF/SRF, CSIR-NET/LS  
GATE, CEEB-BIT (DBT-JNU)]  
**(ASSISTANT PROFESSOR)**  
(arunratnbt14@gmail.com)  
**DEPARTMENT OF ZOOLOGY,**  
**SANATAN DHARM (P.G.) COLLEGE,**  
**MUZAFFARNAGAR-251001,**  
**UTTAR PRADESH (INDIA).**

To control environmental pollution, the Government of India passed following laws and taken following initiatives:

**Initiatives in India to control pollution:**

- **Environment protection act, 1986**, to protect and improve the quality of our environment (air, water and soil).
- The first measure to control pollution was the **Water(Prevention and Control of Pollution)Act, 1974** for safeguarding our water resources. This act was amended in **1988**.
- After seven years of gap government further realized that there is air pollution as well and for that purpose, the government enacted the **Air (Prevention and Control of Pollution)Act, 1981**.
- The **Air Act** is based on the same line as the **Water Act**. Air Act, 1981 was enacted under **Article 253 of the Constitution of India**. It was a result of an international commitment made by India in the **Stockholm Conference**.
- This Act provides for the **prevention, control, and abatement** of Air Pollution.
- This air act/law was amended in **1987**. This was the first attempt by the government of India to include **noise pollution** into the air pollution.
- **National Auto Fuel Policy/Auto fuel policy (to cut down the vehicular pollution in India)**: Norms for fuels means steadily **reducing the Sulphur and aromatic hydrocarbons content in petrol and diesel fuels**.

| <b>Mass standards/Bharat Emission stage in India</b> | <b>Year</b>                                 | <b>Amount of Sulphur</b>                                                                                                                          |
|------------------------------------------------------|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Euro 0 norms                                         | <b>1996</b>                                 | <b>10,000 ppm</b>                                                                                                                                 |
| BS II (or Euro II norms)                             | <b>1999-2005</b>                            | <b>500 ppm</b>                                                                                                                                    |
| BS III (or Euro III norms)                           | October, <b>2010</b> (for 4, 3, 2 wheelers) | To control its content at <b>350 ppm in diesel</b> and <b>150 ppm in petrol</b> . Aromatic hydrocarbons content at <b>42% of concerned fuel</b> . |
| BS IV or Euro IV norms                               | 2010- by April 1, <b>2017</b>               | <b>50 ppm</b> , hydrocarbons content at <b>35% of concerned fuel</b> .                                                                            |
| BS V                                                 | by April 1, <b>2019</b>                     | <b>&lt;50 ppm</b>                                                                                                                                 |
| BS VI (Euro VI - 2020)                               | by April 1, <b>2021</b>                     | Permissible quantity of Sulphur in BS VI fuel: <b>10 ppm</b>                                                                                      |

**The Indian Fisheries Act, 1987**

**The Indian Ports Act, 1907**

**The Motor Vehicles Act, 1988 (effective from 1<sup>st</sup> July, 1989)**

**National Clean Air Programme (NCAP):**

- To review and outlook of clean air action plans.

- National Clean Air Programme (NCAP), launched in **2019**, is India's flagship program for better air quality in 122 cities.
- A proposal was prepared by the **Ministry of Health and Family Welfare (MoHFW)**, for an exposure-centric management approach for integrating the health impacts of air pollution into the policy dialogue in India (Sagar et al., 2016).
- In **January 2019**, the **Ministry of Environment, Forest and Climate Change (MoEFCC)** launched the National Clean Air Programme (NCAP) to prepare clean air action plans with an objective **to reduce PM2.5 pollution by 20–30% by 2024** as compared to 2017, in 122 cities (NCAP, 2019).
- **Plans:**
  - The background information on pollution sources and their contribution
  - Legal backing for the clean air action plan
  - Cost of measures
  - Existing institutional accountability regime

#### **Comprehensive Action Plan (CAP):**

- The Central Government has notified a Comprehensive Action Plan (CAP) in **2018** identifying timelines and implementing agencies for actions identified **for prevention, control and mitigation of air pollution in Delhi and NCR**.

#### **Graded Response Action Plan (GRAP):**

- Graded Response Action Plan (GRAP) was notified on **January 12, 2017**, for prevention, **control and abatement of air pollution in Delhi and NCR**. It identifies graded measures and implementing agencies for response to **four AQI categories**, namely, **moderate to Poor, Very Poor, Severe and Severe+ or Emergency**.
- The initiatives taken by the Government for the abatement and **control of air pollution** in Delhi and NCR since 2016 have bore good results. As per **Continuous Ambient Air Quality Monitoring Stations (CAAQMS)** data, the number of 'Good', 'Satisfactory', and 'Moderate' days has progressively increased to 159 in 2018, as compared to 152 in 2017 and 106 in 2016, and the number of 'Poor', 'Very Poor' and 'Severe' days has reduced to 206, compared to 213 in 2017 and 246 in 2016.
- In Delhi, reduction in PM2.5 levels in 2018 is **7.3% over 2017** and **14.8% over 2016**.
- In Delhi, reduction in PM10 levels in 2018 is **8.6% over 2017** and **16.5% over 2016**.
- There is overall improvement in air quality of Delhi in 2019 (From Jan 2019 – 18<sup>th</sup> November, 2019) successively since 2016. Number of 'Good' to 'Moderate' days increased to **175** in 2019, as compared to **158** in 2018, and number of 'Poor' to 'Severe' days reduced to 147, compared to 164 in 2018.

### Air quality index (AQI):

- AQI categories, namely, **moderate to Poor, Very Poor, Severe and Severe+ or Emergency**.
- An AQI between 0 and 50 is considered '**good**', 51 and 100 '**satisfactory**', 101 and 200 '**moderate**', 201 and 300 '**poor**', 301 and 400 '**very poor**', and 401 and 500 '**severe**'.

### System of Air Quality and Weather Forecasting and Research (SAFAR):

- Launched on **17 February 2015**, by Indian Institute of Tropical Meteorology (IITM), Pune, (Ministry of Earth Science, Govt. of India).
- SAFAR envisages a research based management system where strategies of air pollution mitigation.
- Under the plan scheme "Metropolitan Advisories for Cities for Sports, Tourism (Metropolitan Air Quality and Weather Services), **Ministry of Earth Sciences (MoES)**, Govt. of India, has introduced a major national initiative, "**System of Air Quality and Weather Forecasting and Research**" known as "**SAFAR**" for greater metropolitan cities of India to provide **location specific information on air quality** in near real time and **its forecast 1-3 days in advance** for the first time in India. It has been combined with the early warning system on **weather parameters**.
- The SAFAR system is developed by **Indian Institute of Tropical Meteorology, Pune**, along with ESSO partner institutions namely **India Meteorological Department (IMD)** and **National Centre for Medium Range Weather Forecasting (NCMRWF)**.
- The implementation of SAFAR is made possible with an active collaboration with local **municipal corporations** and various local educational institutions and governmental agencies in that Metro city.
- The ultimate objective of the project is **to increase awareness among general public regarding the air quality** in their city well in advance so that appropriate mitigation measures and systematic action can be taken up for betterment of air quality and related health issues. It engineers awareness drive by educating public, prompting self-mitigation and also to help develop mitigation strategies for policy makers.

### National Ambient Air Quality Standards (NAAQS):

- For developing a programme for the effective management of **ambient air quality** and to reduce the damaging effects of air pollution, development of national ambient air quality standards (NAAQS) is a pre-requisite. Central Pollution Control Board had adopted **first ambient air quality standards on November 11, 1982** as per the Section 16(2) of the Air (Prevention and Control of Pollution) Act, 1981.

- These standards have been revised by CPCB in **1994**, and later in **2009**. Table 1 and 2 show the NAAQS as adopted by CPCB.

**Table 1: National Ambient Air Quality Standards (NAAQS) – 1994 [2]**

| Pollutant                               | Time Weighted Average | Concentration in Ambient Air |                                     |                        |
|-----------------------------------------|-----------------------|------------------------------|-------------------------------------|------------------------|
|                                         |                       | Industrial Area              | Residential, Rural, and Other Areas | Sensitive Area         |
| Sulphur dioxide (SO <sub>2</sub> )      | Annual average        | 80 µg/m <sup>3</sup>         | 60 µg/m <sup>3</sup>                | 15 µg/m <sup>3</sup>   |
|                                         | 24 hours average      | 120 µg/m <sup>3</sup>        | 80 µg/m <sup>3</sup>                | 30 µg/m <sup>3</sup>   |
| Oxides of Nitrogen as NO <sub>2</sub>   | Annual average        | 80 µg/m <sup>3</sup>         | 60 µg/m <sup>3</sup>                | 15 µg/m <sup>3</sup>   |
|                                         | 24 hours average      | 120 µg/m <sup>3</sup>        | 80 µg/m <sup>3</sup>                | 30 µg/m <sup>3</sup>   |
| Suspended particulate matter (SPM)      | Annual average        | 360 µg/m <sup>3</sup>        | 140 µg/m <sup>3</sup>               | 70 µg/m <sup>3</sup>   |
|                                         | 24 hours average      | 500 µg/m <sup>3</sup>        | 200 µg/m <sup>3</sup>               | 100 µg/m <sup>3</sup>  |
| Respirable particulate matter (≤ 10 µm) | Annual average        | 120 µg/m <sup>3</sup>        | 60 µg/m <sup>3</sup>                | 50 µg/m <sup>3</sup>   |
|                                         | 24 hours average      | 150 µg/m <sup>3</sup>        | 100 µg/m <sup>3</sup>               | 75 µg/m <sup>3</sup>   |
| Lead                                    | Annual average        | 1 µg/m <sup>3</sup>          | 0.75 µg/m <sup>3</sup>              | 0.50 µg/m <sup>3</sup> |
|                                         | 24 hours average      | 1.5 µg/m <sup>3</sup>        | 1 µg/m <sup>3</sup>                 | 0.75 µg/m <sup>3</sup> |
| Carbon monoxide (CO)                    | 8 hours average       | 5 mg/m <sup>3</sup>          | 2 mg/m <sup>3</sup>                 | 1 mg/m <sup>3</sup>    |
|                                         | 1 hours average       | 10 mg/m <sup>3</sup>         | 4 mg/m <sup>3</sup>                 | 2 mg/m <sup>3</sup>    |
| Ammonia (NH <sub>3</sub> )              | Annual average        | 0.1 mg/m <sup>3</sup>        |                                     |                        |
|                                         | 24 hours average      | 0.4 mg/m <sup>3</sup>        |                                     |                        |

**Table 2: National Ambient Air Quality Standards (NAAQS) – 2009 [3]**

| Pollutant                                                              | Time Weighted Average | Concentration in Ambient Air                    |                                                              |
|------------------------------------------------------------------------|-----------------------|-------------------------------------------------|--------------------------------------------------------------|
|                                                                        |                       | Industrial, Residential, Rural, and Other Areas | Ecologically Sensitive Area (notified by Central Government) |
| Sulphur dioxide (SO <sub>2</sub> ), µg/m <sup>3</sup>                  | Annual 24 hours       | 50<br>80                                        | 20<br>80                                                     |
| Nitrogen dioxide (NO <sub>2</sub> ), µg/m <sup>3</sup>                 | Annual 24 hours       | 40<br>80                                        | 30<br>80                                                     |
| Particulate matter (< 10 µm) or PM <sub>10</sub> , µg/m <sup>3</sup>   | Annual 24 hours       | 60<br>100                                       | 60<br>100                                                    |
| Particulate matter (< 2.5 µm) or PM <sub>2.5</sub> , µg/m <sup>3</sup> | Annual 24 hours       | 40<br>60                                        | 40<br>60                                                     |
| Ozone (O <sub>3</sub> ), µg/m <sup>3</sup>                             | 8 hours 1 hour        | 100<br>180                                      | 100<br>180                                                   |
| Lead (Pb), µg/m <sup>3</sup>                                           | Annual 24 hours       | 0.50<br>1.0                                     | 0.50<br>1.0                                                  |
| Carbon monoxide (CO), mg/m <sup>3</sup>                                | 8 hours 1 hour        | 02<br>04                                        | 02<br>04                                                     |
| Ammonia (NH <sub>3</sub> ), µg/m <sup>3</sup>                          | Annual 24 hours       | 100<br>400                                      | 100<br>400                                                   |
| Benzene (C <sub>6</sub> H <sub>6</sub> ), µg/m <sup>3</sup>            | Annual                | 05                                              | 05                                                           |
| Benzo(a)Pyrene (BaP) – particulate phase only, ng/m <sup>3</sup>       | Annual                | 01                                              | 01                                                           |
| Arsenic (As), ng/m <sup>3</sup>                                        | Annual                | 06                                              | 06                                                           |
| Nickel (Ni), ng/m <sup>3</sup>                                         | Annual                | 20                                              | 20                                                           |

## National River Conservation Plan (NRCP):

- Programs of other major rivers were subsequently approved in **1995** under NRCP. After launching of NRCP in 1995, **it was decided to merge GAP II with NRCP.**
- The objective of NRCP is **to reduce the pollution load in rivers** through implementation of various pollution abatement works, thereby improving their water quality.

#### **National River Conservation Directorate (NRCD):**

- The Central Ganga Authority established in **1985** under the chairmanship of the Prime Minister, lays down the policies for works to be taken up under the Ganga Action Plan. With the approval of the **National River Conservation Plan (NRCP) in July 1995**, the Central Ganga Authority has been re-designated as the NATIONAL RIVER CONSERVATION DIRECTORATE (NRCD). The NRCD coordinates the implementation of the schemes under the Ganga and other Action Plans.

#### **National Action Plan on Climate Change (NAPCC):**

- The National Action Plan on Climate Change (NAPCC) was launched in **2008** by the Prime Minister's Council on Climate Change.
- It aims at creating awareness among the representatives of the public, different agencies of the government, scientists, industry and the communities on the threat posed by climate change and the steps to counter it.
- There are **8 national missions** forming the core of the NAPCC which represent multi-pronged, long term and integrated strategies for achieving key goals in climate change. These are-
  - ❖ National Solar Mission
  - ❖ National Mission for Enhanced Energy Efficiency
  - ❖ National Mission on Sustainable Habitat
  - ❖ National Water Mission
  - ❖ National Mission for Sustaining the Himalayan Ecosystem
  - ❖ National Mission for A Green India
  - ❖ National Mission for Sustainable Agriculture
  - ❖ National Mission on Strategic Knowledge for Climate Change

NAPCC is guided by following principles-

- ❖ Protection of poor and vulnerable sections of society through inclusive and sustainable development strategy, sensitive to climate change.
- ❖ Achievements of national growth through qualitative changes enhancing ecological sustainability.

- ❖ Deployment of appropriate technologies for both adaptation and mitigation of GreenHouse Gases emissions extensively and at an accelerated pace.

### **National Air Quality Monitoring Programme (NAMP):**

- To monitor and control of various air pollutants, Central Pollution Control Board (CPCB) has been provided with various powers and functions under the Air (Prevention and Control of Pollution) Act, 1981. Subsequent to this, CPCB had launched a nationwide program viz. **National Ambient Air Quality Monitoring Programme (NAAQM) in 1984**, which has been renamed as **National Air Quality Monitoring Programme (NAMP)**. The number of operating monitoring stations under NAMP has increased steadily to 612 by 2015 covering 254 cities across the nation (29 states and 5 UTs). Under this programme, there are 11 monitoring stations functioning in Delhi.

### **International Initiatives:**

- **First global Convention or conference for the Protection of the Ozone Layer** was adopted on **22 March 1985** (the year, Scientists discovered ozone hole in South Pole) at **Vienna, Austria**.
- The discovery of the Antarctic "**ozone hole**" by **British Antarctic Survey scientists Farman, Gardiner and Shanklin** (first reported in a paper in Nature in **May 1985**) came as a shock to the scientific community, because the observed **decline in polar ozone** was far larger than anyone had anticipated.
- The **Montreal Protocol** on Substances that Deplete the Ozone Layer was an international treaty which was organized in **1987 for a 50% cut in the use of CFCs by 1998**. India did not sign this protocol at that time. This protocol came into force in **1<sup>st</sup> January, 1989**.
- **Kigali Amendment to Montreal Protocol**
- On **October 15, 2016**, with the United States' leadership, 197 countries adopted an amendment to phase down HFCs under the Montreal Protocol in **Kigali, Rwanda**.
- The Kigali Amendment aims for the phase-down of hydrofluorocarbons (HFCs) by cutting their production and consumption.
- The goal is to achieve over **80% reduction in HFC consumption by 2047**.
- Given their zero impact on the depletion of the ozone layer, HFCs are currently used as replacements of hydrochlorofluorocarbons (HCFCs) and chlorofluorocarbons (CFCs) in air conditioning, refrigeration and foam insulation, however they are powerful greenhouse gases.
- The **Kigali Amendment to the Montreal Protocol** is legally binding and will come into force from **January 1, 2019**.
- Under the amendment :
  - Developed countries will reduce HFC consumption beginning in 2019.
  - Most developing countries will freeze consumption in 2024,
  - Some developing countries including India with unique circumstances will freeze consumption in 2028.
  - The plan also provides financing to certain countries, to help them transition to climate-friendly alternatives.

- With the Kigali Amendment, the Montreal Protocol has become an even more powerful instrument against global warming.
- Aim: To **protect the climate** and the ozone layer, also during the 28<sup>th</sup> Meeting of the Parties to the Montreal Protocol, in October of 2016, on Substances that Deplete the Ozone Layer.
- **Joseph Farman**: the “**Saving the Ozone Layer**” conference, **1989**. On this topic, the three day international conference was organized jointly **in London in March 1989** by the British Government and the UNEP.
- **16 September** is International Day for the Preservation of the Ozone Layer.
- The theme for World Ozone Day is “**Ozone for life: 35 years of ozone layer protection**” in 2020. And **2019** its theme was “**32 years and healing**”. The theme of World Ozone Day 2021 is “**Ozone for Life: 36 Years of Ozone Layer Protection**”.
- **The Kyoto Protocol** is an international treaty which extends the **1992 United Nations Framework Convention on Climate Change (UNFCCC)** that commits state parties to **reduce greenhouse gas emissions**, based on the scientific consensus that (part one) **global warming** is occurring and (part two) that **human-made CO<sub>2</sub> emissions** are driving it.
- The **Kyoto Protocol was adopted in Kyoto, Japan, on 11 December 1997** and entered into force on **16 February 2005**. There are currently 192 parties (Canada withdrew from the protocol, effective December 2012) to the Protocol.
- The Kyoto Protocol implemented the objective of the UNFCCC **to reduce the onset of global warming by reducing greenhouse gas concentrations in the atmosphere** to "a level that would prevent dangerous anthropogenic interference with the climate system".
- The Kyoto Protocol applies to the **six greenhouse gases** listed in Annex A: carbon dioxide (CO<sub>2</sub>), Methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF<sub>6</sub>).

### **The United Nations Framework Convention on Climate Change (UNFCCC):**

The United Nations Framework Convention on Climate Change (UNFCCC) is an international environmental treaty addressing climate change, negotiated and signed by 154 states at the **United Nations Conference on Environment and Development (UNCED)**, informally known as the **Earth Summit, held in Rio de Janeiro from 3 to 14 June 1992**.

It established a Secretariat headquartered in **Bonn** and entered into force on **21 March 1994**. The Kyoto Protocol, which was signed in 1997 and which entered into force in 2005, was the first implementation of measures under the UNFCCC until 31 December 2020.

The protocol was superseded by the Paris Agreement, which entered into force in 2016. As of 2020, the UNFCCC has 197 signatory parties. Its supreme decision-making body, the Conference of the Parties (**COP**), meets annually to assess progress in dealing with climate change.

#### **2019: COP 25/CMP 15/CMA 2, Madrid, Spain**

The 25<sup>th</sup> session of the **Conference of the Parties (COP 25)** to the UNFCCC was planned to take place from **11 to 22 November 2019 in Brazil**. Upon election as President of Brazil, Jair Bolsonaro withdrew Brazil from hosting the event.

COP 25 was then planned to take place in Parque Bicentenario Cerrillos in Santiago de Chile, Chile from 2 to 13 December with a pre-sessional period from 26 November to 1 December 2019 with up to 25,000 delegates scheduled to attend.

### **2021: COP 26/CMP 16/CMA 3, Glasgow, United Kingdom**

COP 26 was originally scheduled to take place from **9 to 19 November 2020, in Glasgow, United Kingdom**, but was postponed to **1 to 12 November 2021 due to the COVID-19 pandemic**.

### **2022 and onward:**

**COP 27** was originally expected to take place in **November 2021**, but was moved to **2022** due to the rescheduling of COP 26 from 2020 to 2021.

The UNFCCC seeks for the stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic human-induced interference with the earth's climate system. Such a level should be achieved within a timeframe sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.

The ultimate **objective** of the Convention is to stabilize greenhouse gas concentrations "at a level that would prevent dangerous anthropogenic (human induced) interference with the climate system.

The secretariat of the United Nations Framework Convention on Climate Change is located in Bonn, Germany.

### **UNFCCC Secretariat (UN Climate Change):**

- ❖ It was established in 1992 when countries adopted the UNFCCC.
- ❖ Located in Bonn, Germany.
- ❖ Focuses on facilitating intergovernmental climate change negotiations.
- ❖ Provides technical expertise and assistance on analysis and review of climate change reports presented by the parties.
- ❖ Plays a crucial role in implementation of the Kyoto Protocol and the Paris Agreement.

## **Paris Agreement:**

The Paris Agreement (French: l'accord de Paris) is an agreement within the United Nations Framework Convention on Climate Change (UNFCCC), **on climate change mitigation, adaptation, and finance, signed in 2016**.

The agreement's language was negotiated by representatives of 196 state parties at the 21st Conference of the Parties of the UNFCCC in Le Bourget, near Paris, France, and adopted by consensus on 12 December 2015.

As of March 2021, 191 members of the UNFCCC are parties to the agreement. Of the six UNFCCC member states which have not ratified the agreement, the only major emitters are Iran, Iraq and Turkey, though Iraq's President has approved that country's accession. The United States withdrew from the agreement in 2020, but rejoined in 2021.

The Paris Agreement's long-term temperature goal is to keep the rise in global average temperature to well below 2 °C (3.6 °F) above pre-industrial levels; and to pursue efforts to limit the increase to 1.5 °C (2.7 °F), recognizing that this would substantially reduce the risks and impacts of climate change.

This should be done by reducing emissions as soon as possible, in order to "achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases" in the second half of the 21st century.

It also aims to increase the ability of parties to adapt to the adverse impacts of climate change, and make "finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development."