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The Indian Government's Environmental Stewardship: A Review of Pollution Control Efforts

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Abstract: ***This paper aims to explore and understand the role that the Indian Government has played or is playing in curbing the rapid expansion of pollution, which significantly affects human health and the environment, particularly in terms of different types of contamination. Air Contamination, Water Contamination, Soil Contamination, Noise Pollution, Land Pollution, Photo Contamination, etc., have brought about immutable adverse changes in the lives of all those who breathe in air, drink water, and live in soil. In addition, the synthetic and natural non-living creations are also influenced detrimentally. The citizens of a nation, whether educated or uneducated, are equally responsible for the destruction of every component of the environment. Worthless is not mentioning here the appreciable endeavours that the Government has put on its part through its policies that are framed, although not implemented with vigour on objective grounds, to rein in the outburst of pollution. National Ambient Air Quality Standards, National Air Quality Monitoring Programme, National Air Quality Index (AQI), Hari Diwali and Swasth Diwali campaign, National Clean Air Programme (NCAP), Graded Response Action Plan (GRAP), National Ambient Noise Monitoring Network Programme, Horn Not OK Please campaign, Scheme of Assistance for abatement of pollution, Scheme of Common Effluent Treatment Plants, standards for emission of environmental pollutants, water pollutants and noise pollutants, National Green Corps (NGC), Sewage Treatment Plants Effluent Discharge Standards, Recognition of Environmental laboratories under Environment (Protection) Act, Apex committee, SAMEER App, E-Track for Industries, Swachh Bharat Abhiyan, Namami Gange Programme, National Solar Mission and Pradhan Mantri Ujjwala Yojana etc. are the prime and prominent initiative steps taken by the Govt. which has brought fruit in one and more sections of the society putting the graph of harms produced by contaminants to plateau and/or negative slope.***

Keywords: ***Air Contamination, Indian Government, Pollution Control, National Green Corps (NGC), Air Quality Index (AQI), Contamination, Water Contamination***

I. INTRODUCTION

The word "pollution" is derived from the Latin word "polluere," which means to contaminate any feature of the environment. Pollution is an undesirable change in physical, chemical or biological characteristics of our air, water or land that may or will harmfully affect human life, flora, fauna and materials [1].

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This occurs only when short-term economic gains are made at the cost of long-term ecological losses to humanity. It affects all components of the environment, viz. the atmosphere, lithosphere, hydrosphere, as well as the biosphere, terribly. Pollution-causing agents are known as Pollutants, which can be broadly classified into two categories: primary pollutants (consequences observed immediately after release into the environment) and secondary pollutants (adverse results are seen after interaction with moisture, sunlight, or other pollutants). Based on ecological perspective, pollutants are classified as Degradable or Non-Persistent pollutants (Rapidly broken by chemical reaction and natural processes. E.g. Domestic sewage, discarded vegetables etc), Slowly Degradable or Persistent pollutants (Remain in the environment for decades unchanged and their degradation is highly slow. E.g. Pesticides like DDT, industrial chemical waste like polychlorobiphenyls, Dioxins and Furans etc) and Non-Degradable pollutants (Never get degraded and remain unaltered in environment. E.g. Toxic metals, Plastic, Nuclear waste etc.). Furthermore, based on their physical state, they are classified as Particulate matter and Gaseous Pollutants. In addition to these basic categories, pollutants come in numerous varieties, including organic, inorganic, pathogens, suspended solids, nutrients, agricultural pollutants, thermal, radioactive, naturally occurring, synthetic, biotic, and abiotic.

II. CONTAMINATION TYPES

Based on the resource contamination, the following categories are worth discussing:

Air Pollution: A mixture of solid and gaseous particles in air that results from automobile emissions, factories' chemical wastes/smokes, dust, pollen, and mould spores, which remain suspended in air. Common air contaminants include carbon oxides, sulfur oxides, CFCs, and nitrogen oxides.

Water pollution occurs when toxic substances enter water bodies, such as lakes, rivers, and oceans, and then become dissolved in them, remain suspended in the water, or deposit on the bed, eventually rendering the water worthless. Common causes include the discharge of sewage into water bodies, chemical contaminants, industrial waste, domestic waste, and mining practices.

Soil pollution: The presence of unwanted, poisonous substances in soil, often in high concentrations, makes it less fertile and poses a risk to the ecosystem and human health, and is considered soil pollution. The contaminants include salts such as phosphates, carbonates, sulfates, and nitrates, as well as other organic compounds, including lipids, fatty acids, hydrocarbons, polycyclic aromatic hydrocarbons (PAHs), and alcohols.

Thermal pollution, also known as thermal enrichment, is the degradation of water quality by any process that elevates the temperature of water in water bodies. The main contributors to thermal heat pollution are thermal or nuclear power plants, industrial effluents such as those from petroleum refineries, pulp and paper mills, chemical plants, steel mills, and smelters, sewage effluents, biochemical activities, and deforestation.

Noise pollution occurs when sound reaches hazardous levels, causing cardiovascular disorders, hypertension, high stress levels, tinnitus, hearing loss, and sleep disturbances. Noise above 65 decibels (dB) is considered noise pollution. To be precise, noise becomes harmful when it exceeds 75 decibels (dB) and is painful above 120 dB. Its major causes are vehicles, aircraft, industrial machines, loudspeakers, crackers, etc. When used at high volume, other appliances also contribute to noise pollution, such as televisions, transistor radios, and radios.

Light or Photo Pollution: It is the excessive and poorly implemented use of lighting during the day or night, leading to headaches, irritability, anxiety, an increased risk of cancer due to reduced melatonin production, sleep disturbances, ecosystem disruption, and energy wastage. Street lights, security lights, floodlights at sports venues, and excess glare from clubs and pubs are the chief causes of this disturbance.

Land Pollution: This involves the decline in the quality of the Earth's land surface in terms of its landscaping and ability to support life forms. Land pollution occurs when garbage is not disposed of properly, thereby introducing toxins and chemicals into the soil. Mineral exploitation also leads to the disruption of the land surface.

III. GLOBAL RESPONSE TO POLLUTION

To combat the pervasive impact of pollution on societies, the world's ministries of environment gathered at the United Nations Environmental Assembly 2017 and expressed their political commitment to working towards a pollution-free planet. The governments also adopted resolutions targeting specific aspects of pollution, including air quality, water pollution, soil pollution, marine litter, microplastics, chemicals, and waste. An implementation plan was devised, cutting across all these resolutions, to promote accelerated action, enhancing capacities to address pollution, and achieving the Sustainable Development Goals. The environment assembly has welcomed the plan and recognized it as the key vehicle for prompt implementation. Sustainable Development Goals related to pollution are:

- No poverty
- Zero hunger
- Good health
- Quality education
- Gender equity
- Clean water and Sanitation
- Affordable and Clean energy
- Decent work and Economic growth
- Industry, Innovation and Infrastructure
- Reduced inequalities
- Sustainable cities and communities
- Responsible consumption and production
- Climate action
- Life below water
- Life on land
- Peace, justice, and Strong Institutions
- Partnerships for the goal

IV. GOVERNMENT INITIATIVES TOWARDS THE CONSTRUCTION OF A POLLUTION-FREE ENVIRONMENT

To tackle the widespread problem of pollution, which is woefully affecting every living and non-living being on the planet, both directly and indirectly, commendable steps have been taken by government authorities and bodies to save the nation from the disastrous repercussions of pollution.

A. Initiatives for the mitigation of Air pollution

- National Ambient Air Quality Standards, which encompass 12 pollutants, were established under the EPA in 1986. Additionally, 115 emission and effluent standards have been established for 104 different industrial sectors, in conjunction with 32 general standards for ambient air.
- The government is executing a Nationwide programme of ambient air quality monitoring, known as the National Air Quality Monitoring Programme (NAMP). The network consists of seven hundred and three manual operating stations covering three hundred and seven cities in twenty-nine states and six union territories of the country [2].
- Concerning vehicular pollution, the steps taken include the introduction of cleaner fuels like CNG, LPG, ethanol blending, universalization of BS-IV by 2017, leapfrogging from BS-IV to BS-VI fuel standards by 1st April 2020, ongoing promotion of the public transport network of metro, buses, E-rickshaws and promotion of car-pooling, streamlining, granting pollution under control certificates, land disciplinary vehicle maintenance, etc.
- The National Air Quality Index (AQI) was launched by the Prime Minister in 2015, initially covering 14 cities, and has since been extended to 34 cities. The AQI is a tool for the effective communication of air quality status to people in terms which are easy to understand [2].
- To engage people in the effort, the govt. Launched a campaign called 'HariDiwali and SwasthDiwali' during September 2017, involving over two thousand schools in Delhi and over two lakh schools in the country.
- The Central Government has launched National Clean Air Programme (NCAP) under the Central Sector "Control of Pollution" Scheme as a long-term, time-bound, national level strategy to tackle the air pollution problem across the country in a comprehensive manner with targets to achieve 20% to 30% reduction in PM10 and PM2.5 concentrations by 2024 keeping 2017 as the base year for the comparison of concentration
- Graded Response Action Plan (GRAP) was notified on January 12, 2017, for prevention, control and abatement of air pollution in Delhi and NCR [2]. It identifies graded measures and

implementing agencies for responses to four AQI categories: Moderate to Poor, Very Poor, Severe, and Severe + or Emergency.

B. Initiatives for the mitigation of Noise pollution

As a follow-up to section 5.2.8(IV) of the National Environmental Policy-2006, ambient noise has been included as a regular parameter for monitoring in specified urban areas. A protocol for the National Ambient Noise Monitoring Network Programme has been prepared and circulated to the state pollution control boards. The Indian government has also launched various campaigns to raise awareness about the harmful effects of noise pollution. For instance, the National Pollution Control Day is observed every year on December 2 to highlight the importance of controlling pollution, including noise pollution. The government has also launched public awareness campaigns, such as the "Horn Not OK Please" campaign, to encourage people to reduce unnecessary honking. The government has also taken steps to address noise pollution from transportation. For example, the Ministry of Road Transport and Highways has issued guidelines to reduce noise from vehicles. The government has also introduced stricter noise standards for two-wheelers and four-wheelers. In March 2011, the Union government set up the National Ambient Noise Monitoring Network (NANMN) through CPCB and the state pollution control boards (SPCBs) to monitor noise on a 24/7 basis in India's seven largest cities [3] which include Mumbai, Delhi, Kolkata, Chennai, Bangalore, Lucknow and Hyderabad.

C. Scheme of Common Effluent Treatment Plants

The concept emerged to establish a cooperative movement for pollution control and management. The primary objective of the CETPs is to minimise the treatment cost borne by individual member units while protecting the environment to the maximum extent possible. The government had undertaken a Central Sponsored Scheme (CSS) to enable small-scale industries to set up new and upgrade existing CETPs, covering all states in the country. The central subsidy has been increased from 25% to 50% of the project cost. The management of CETP is to be entrusted to a special purpose vehicle registered under an appropriate status. The performance of the guarantee at full design load is to be ensured upfront.

D. Control of Pollution: Development of Standards

The Ministry of Environment, Forest and Climate Change formulates and notifies standards for the emission of environmental pollutants, water pollutants, and noise pollutants from industries, operations, or processes to protect and improve the quality of the environment and abate environmental pollution. The Ministry of Environment, Forests, and Climate Change is implementing the Environment Education, Awareness, and Training Scheme to promote environmental awareness among all sections of society and to mobilise people's participation in the conservation of the environment. Under the National Green Corps (NGC) programme of the Ministry, approximately one lakh schools have been identified as Eco-clubs, where nearly thirty lakh students are actively participating in various environmental protection and conservation activities, including those related to air pollution. MoEFCC has also notified environmental standards for 84 sectors, out of which the effluent standards have been notified for 45 industrial sectors, and the emission standards have been notified for 63 industrial sectors [2].

E. 42 Action Points

CPCB has issued a comprehensive set of directions under Section 18 (1) (b) of the Air (Prevention and Control of Pollution) Act, 1986, for the implementation of 42 measures to mitigate air pollution in the major cities, including Delhi [2]. These measures address various sources of pollution, including vehicle emissions, dust kicked up from roads, unintentional emissions, the burning of biomass and municipal solid waste, industrial pollution, construction and demolition activities, and general steps to combat pollution. Initially, a set of 42 action points was issued for implementation in the NCR, and later, these directions were expanded to include state boards for implementation in other cities that do not meet the air quality standards.

F. Sewage Treatment Plants Effluent Discharge Standards

The issue has gained significance due to the stress on water bodies, which are being increasingly polluted and may have severe repercussions for maintaining a quality environment in the country. The discharge of effluent from sewage treatment plants is governed by strict standards set by the Central Pollution Control Board (CPCB). The standards are designed to ensure that the effluent discharged into water bodies is not harmful to the environment or human health. The effluent discharge standards for sewage treatment plants that discharge into rivers, lakes or other inland surface waters are more stringent than those for plants that discharge into the sea. Similarly, the standards for plants that treat domestic sewage are different from those that treat industrial wastewater. In the notified standard, the permitted pH range of treatment effluent is 6.5 to 9.0, Biochemical Oxygen Demand(BOD) is less than 50mg/l, Total Suspended Solid (TSS) is less than 10mg/l, Chemical Oxygen Demand(COD) is less than 10mg/l, total Nitrogen is less than 5mg/l and Fecal Coliform is less than 500 MPN/100ml.

G. SAFAR Program

The SAFAR program [4] was first introduced in Delhi during the 2010 Commonwealth Games to provide air quality forecasts. Later on, the program was expanded to cover three other major cities. In a more recent development, the Ministry of Earth Sciences, in collaboration with the U.S. National Centre for Atmospheric Research, implemented air quality forecasting for Delhi. This included the assimilation of satellite data to achieve a high level of spatial resolution. However, it is essential to note that India currently lacks a regularly updated national emissions inventory. This absence has the potential to impact the quality of modelling that relies on accurate emission inventories.

H. Recognition of Environmental Laboratories under the Environment (Protection) Act

The successful implementation of an environmental protection programme essentially requires identifying and

quantifying pollution sources and pollutants, conducting a baseline survey, establishing standards, and establishing monitoring systems.

The Environment (Protection) Act, 1986, provides the legislative framework for preventing and controlling environmental pollution in India. One of the key provisions of the Act is the recognition of ecological laboratories to ensure the accuracy and reliability of environmental data generated through laboratory testing. The ecological laboratory plays a very important role in assessing the status of the environment, comprising both abiotic (soil, water and air) and biotic (flora, fauna and human beings) components [1] The recognition process involves a comprehensive evaluation of the laboratory's technical capabilities, quality management systems, and compliance with relevant standards and guidelines. Laboratories that meet the criteria are granted recognition by the Central Pollution Control Board (CPCB) or the State Pollution Control Board (SPCB). Recognition of environmental laboratories is crucial for maintaining the integrity of ecological monitoring and ensuring the implementation of effective pollution control measures. It facilitates the identification of pollution sources and provides accurate data to support informed decision-making and the formulation of effective policies. It also enhances public trust in the environmental monitoring process by ensuring that competent and reliable laboratories generate data.

I. Programme on Environmental Health

The Ministry has been implementing a programme on environmental health. An Apex committee and a working Group have been reconstituted for the screening and evaluation of project proposals related to environmental health. Under this scheme, below mentioned actions have been taken:

- Action plan for monitoring air quality in polluted cities.
- National water quality monitoring and publishing annual water quality reports.
- National Ambient Noise Monitoring and publishing the report.
- Carrying out and sponsoring research activities on environmental protection.

J. Scheme of Assistance for the abatement of pollution

The scheme was conceptualized in 1992 during the seventh five-year plan with the objective inter alia to strengthen the CPCB and SPCBs/PCCs for enforcing statutory provisions for pollution abatement [6]. The scheme is part of a centrally sponsored umbrella scheme for pollution abatement. Under this scheme, grants are provided to the state pollution control board/UT Pollution Control Committees, Environmental Departments of states/UTs, central/State research institutions, and other government agencies. Agencies and organizations to strengthen their technical capabilities to achieve the objectives of the policy statement.

K. SAMEER App

The SAMEER App [5] is developed and available for android and IOS devices to display AQI. The App is crafted by the Central Pollution Control Board (CPCB) in India, aimed at mitigating the menace of air pollution. This app furnishes users with up-to-date air quality data and timely alerts in the event of poor air quality in their vicinity. Additionally, it disseminates crucial information regarding pollution sources and health advisories, particularly for vulnerable populations. Through this app, citizens can report pollution incidents and monitor the status of their complaints. The app also features a mechanism that provides access to emissions data from industrial units, allowing users to monitor compliance with pollution control regulations. The Sameer App is a potent tool in raising awareness and empowering citizens to combat air pollution.

L. Swachh Bharat Abhiyan

The Swachh Bharat Abhiyan [7] or Clean India Mission is another significant initiative launched in 2014. This mission aims to make India open-defecation free and promote cleanliness and sanitation across the country. The initiative also focuses on solid waste management, which is a major contributor to environmental pollution in India. Under this mission, the government has constructed over 100 million household toilets, built community toilets, and provided safe sanitation facilities in public places. The initiative has also led to a significant reduction in open defecation and an increase in the number of waste disposal facilities across the nation.

M. The National River Conservation Plan and Namami Gange Programme

The National River Conservation Plan (NRCP) is another government initiative aimed at controlling environmental pollution in India. The NRCP was established in 1985 to enhance the water quality of the country's rivers. The plan includes measures like sewage treatment, riverfront development, afforestation, and public participation. The government has also established the Namami Gange programme [7] which is a comprehensive initiative launched by the Government of India in 2014, to clean and rejuvenate the Ganges river, which is considered as one of the holiest rivers in India. The programme is one of the largest and most ambitious river cleaning projects in the world, covering 11 states and over 4,000 towns and cities along the river. The programme involves a wide range of activities, including sewage treatment, river surface cleaning, solid waste management, afforestation, and public awareness campaigns. The Namami Gange programme is being implemented through a multidisciplinary approach, involving various government agencies, civil society organisations, and the private sector.

N. Protection of energy resources

To reduce dependence on fossil fuels and promote the use of renewable energy, the government has implemented several measures. The National Solar Mission, launched in 2010, aims to achieve 100 GW of solar energy capacity by 2022. The government has also launched schemes, such as the Pradhan Mantri Ujjwala Yojana, which provides LPG connections to households below the poverty line to reduce the use of solid fuels like wood and charcoal for cooking.

V. CONCLUSION

In conclusion, pollution is an undesirable change in the environment that has harmful

effects on living organisms and non-living items. It is caused by pollutants, which can be primary or secondary and can be classified as degradable, Slowly degradable, or non-degradable. Pollution can take various forms, including air pollution, water pollution, soil pollution, thermal pollution, noise pollution, and light pollution. To address the widespread issue of pollution, governments worldwide have taken initiatives and implemented measures. These include the establishment of air quality monitoring programs, the introduction of cleaner fuels and vehicle emission standards, the launch of awareness campaigns, and the implementation of pollution control schemes and standards. Governments have also focused on sewage treatment, recognition of environmental laboratories, and promoting environmental health. The global response to pollution has been addressed through the United Nations Environmental Assembly and the adoption of resolutions targeting specific aspects of pollution. These efforts align with the Sustainable Development Goals, which aim to achieve a pollution-free planet while addressing other critical issues. In India, the government has implemented several initiatives to combat pollution. These include the National Clean Air Programme, the Graded Response Action Plan, and the Swachh Bharat Abhiyan. The government has also developed apps, such as SAMEER, and online portals, like E-Track, for industries to monitor and address pollution-related issues. While these efforts are commendable, individuals, communities, industries, and governments need to collaborate to reduce pollution and create a cleaner, healthier environment for current and future generations.

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REFERENCES

1. https://parivesh.nic.in/writereaddata/ENV/envlab/envlabguideline.pdf
2. Government of India. (2021). National Clean Air Programme. Retrieved from https://www.india.gov.in/spotlight/national-clean-air-programme
3. https://www.livemint.com/Politics/NPlsLA45a8UhT9hZNovMQK/Govt-working-on-new-noise-pollution-standards.html
4. Brauer, M., Guttikunda, S. K., Nishad, K. A., Dey, S., Tripathi, S. N., Weagle, C., & Martin, R. V. (2019). Examination of monitoring approaches for ambient air pollution: A case study for India. *Atmospheric Environment*, *216*, 116940.[CrossRef]
5. https://pib.gov.in/newsite/PrintRelease.aspx?relid=194865
6. https://www.cseindia.org/assistance-for-abatement-of-pollution-7677
7. https://affairscloud.com/modi-schemes-environmental-and-health-part-4-pdf/

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Ashish Kumar, Assistant Professor in Chemistry at Khalsa College for Women, Sidhwan Khurd, Ludhiana, Punjab. I have been working in this esteemed institution since 2018. I began my career in teaching as a lecturer in 2014, following the completion of an M.Sc. (Hons.) from Guru Nanak Dev University, Amritsar, Punjab, with distinction, for which I was honoured with a Gold Medal. A research project named "Synthesis of Fe(II) and Ni(II) complexes of Schiff Base ligands" was undertaken and completed successfully by me in the 3rd semester of my master's degree as a part of the curriculum. In addition to my passion for teaching, I have a keen interest in Poetry writing and engaging in art and crafts, as they help my soul attain ecstasy. In the field of research, I am a newcomer who is eager to explore the hidden facts and mysteries in the realm of science and share them with the aspirants of an evolved and developed era.