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Review Article

Air Pollution a Major Health Hazard In Future

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A B S T R A C T

Population, pollution and poverty are the major problems faced by the globe. These problems are interconnected with each other. Population is the major problem that leads to other problems. The population explosion along with urbanization and industrialization has greatly increased the intensity of environmental pollution. More than two million annual deaths and billions of cases of diseases are attributed to pollution. All over the world, people experience the negative effects of environmental degradation ecosystems decline, including water shortage, fisheries depletion, natural disasters due to deforestation and unsafe management and disposal of toxic and dangerous wastes and products. Indigenous peoples suffer directly from the degradation of the ecosystems that they rely upon for their livelihoods. Climate change is exacerbating many of these negative effects of environmental degradation on human health and wellbeing and is also causing new ones, including an increase in extreme weather events such as hot, cold spells of temperature or wet or dry spells of rainfall or cyclones or floods. Last year floods in States of Kerala and Karnataka were also attributed to climatic changes. Recent Delhi climatic conditions are also very alarming. The above facts clearly show the close link between the environment and the enjoyment of human rights, and justify an integrated approach to environment and human rights. The good practices were collected at the international, national and regional levels in collaboration through regional/sub-regional consultations as well as questionnaires and surveys Environmental factors must be favorable for the existence and development of living organisms. It is prime responsibility of human to protect, preserve and to sustain nature for the well being of every organism on this earth.

Keywords: Nature, Human, Natural resources, Pollution, Sustain nature.

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INTRODUCION

Air pollution occurs when harmful or excessive quantities of substances including gases (such as carbon dioxide, carbon monoxide, sulfur dioxide, nitrous oxides, methane and chlorofluorocarbons (CFCs), particulates(both organic and inorganic), and biological molecules are introduced into Earth's atmosphere. Air pollution contributes substantially to premature mortality and disease burden globally, with a greater impact in low-income and middle-income countries than in high-income countries. India has one of the highest exposure levels to air pollution globally. The major components of air pollution are ambient particulate matter pollution, household air pollution, and to a smaller extent ozone in the troposphere, the lowest layer of atmosphere. In India, the major sources of ambient particulate matter pollution are coal burning for thermal power production, industry emissions, construction activity and brick kilns, transport vehicles, road dust, residential and commercial biomass burning, waste burning, agricultural stubble burning, and diesel generators. Household air pollution is caused mainly by the residential burning of solid fuels for cooking and to some extent heating, the major types of which are wood, dung, agricultural residues, coal, and charcoal. Ground level ambient ozone is produced when nitrogen oxides and volatile organic compounds emitted from transport vehicles, power plants, factories, and other sources react in the presence of sunlight. Rapidly developing countries such as India face the dual challenge of exposures from both ambient and household air pollution.

The 51% of pollution is caused by the industrial pollution, 27% by vehicles, 8% by crop burning and 5% by Diwali fire cracks[1].The Air (prevention control act) act was passed in 1981 to regulate air pollution but has failed to reduce pollution because of poor enforcement of the rules.

TYPES OF AIR POLLUTANTS

Primary Air Pollutants:

Carbon dioxide (CO2): Because of its role as a greenhouse gas it has been described as "the leading pollutant and "the worst climate pollutant". Carbon dioxide is a natural component of the atmosphere, essential for plant life and given off by the human respiratory system and are emitted annually by burning of fossil fuels.

Sulfur oxides (SO_x) – particularly sulfur dioxide, a chemical compound with the formula SO_2. SO_2 is produced by volcanoes and in various industrial processes. Coal and petroleum often contain sulfur compounds, and their combustion generates sulfur dioxide.

Nitrogen oxides (NO_x) – Nitrogen oxides, particularly nitrogen dioxide, are expelled from high temperature combustion, and are also produced during thunderstorms by electric discharge,

Carbon monoxide (CO) – CO is a colorless, odorless, toxic gas. It is a product of combustion of fuel such as natural gas, coal or wood. Vehicular exhaust contributes to the majority of carbon monoxide let into our atmosphere. It creates a smog type formation in the air that has been linked to many lung diseases and disruptions to the natural environment and animals.

Volatile organic compounds (VOC) – VOCs are a well-known outdoor air pollutant. They are categorized as either methane (CH_4) or non-methane (NMVOCs). Methane is an extremely efficient greenhouse gas which contributes to enhanced global warming.

Particulate matter / particles, alternatively referred to as particulate matter (PM), atmospheric particulate matter, or fine particles, are tiny particles of solid or liquid suspended in a gas.

Persistent free radicals connected to airborne fine particles are linked to cardiopulmonary disease.

Toxic metals such as lead and mercury, especially their compounds.

Chlorofluorocarbons (CFCs) – harmful to the ozone layer. These are gases which are released from air conditioners, refrigerators, aerosol sprays, etc

Ammonia– emitted mainly by agricultural waste.

Odors — such as from garbage, sewage, and industrial processes

Radioactive pollutants– produced by nuclear explosions, nuclear events, war explosives, and natural processes such as the radioactive decay of radon.

Secondary Air Pollutants:

Particulates created from gaseous primary pollutants and compounds in photochemical smog.

Ground level ozone (O_3) formed from NO_x and VOCs. Ozone (O_3) is a key constituent of the troposphere.

Peroxyacetyl nitrate ($C_2H_3NO_5$) – similarly formed from NO_x and VOCs.

SOURCES OF AIR POLLUTION

Burning of Fossil Fuels and Biomass

Fossil Fuels, wood and biomass burning is the primary reason for near-permanent haze and smoke observed above rural and urban India, and in satellite pictures of the country. Fuelwood and biomass cakes are used for cooking and general heating needs. These are burnt in cook stoves known as *chullah* or *chulha* piece in some parts of India. These cook stoves are present in over 100 million Indian households, and are used two to three times a day, daily. Some reports, including one by the World Health Organization, claim 300,000 to 400,000 people die of indoor air pollution and carbon monoxide poisoning in India because of biomass burning and use of challahs. It affects our lungs. In air pollution there are harmful gases that are present in air[2]. The air pollution is also the main cause of the Asian brown cloud which is delaying the start of the monsoon. Burning of biomass and firewood will not stop unless electricity or clean burning fuel and combustion technologies become reliably available and widely adopted in rural and urban India.

India is the world's largest consumer of fuel wood, agricultural waste and biomass for energy purposes. From the most recent available nationwide study, India used 148.7 million tons coal replacement worth of fuel-wood and biomass annually for domestic energy use. India's national average annual per capita consumption of fuel wood, agricultural waste and biomass cakes was 206 kilogram coal equivalent(3). The overall contribution of fuel wood, including sawdust and wood waste, was about 46% of the total, the rest being agricultural waste and biomass dung cakes. Traditional fuel (fuel wood, crop residue and dung cake) dominates domestic energy use in rural India and accounts for about 90% of the total. In urban areas, this traditional fuel constitutes about 24% of the total[3]. India burns tenfold more fuel wood every year than the United States; the fuel wood quality in India is different from the dry firewood of the United States; and, the Indian stoves in use are less efficient, thereby producing more smoke and air pollutants per kilogram equivalent.

Fuel Adulteration

Some Indian taxis and auto-rickshaws run on adulterated fuel blends. Adulteration of gasoline and diesel with lower-priced fuels is common in South Asia, including India[4]. Some adulterants increase emissions of harmful pollutants from vehicles, worsening urban air pollution. Financial incentives arising from differential taxes are generally the primary cause of fuel adulteration. In India and other developing countries, gasoline carries a much higher tax than diesel, which in turn is taxed more than kerosene meant as a cooking fuel, while some solvents and lubricants carry little or no tax.

Adulterated fuel increases tailpipe emissions of hydrocarbons (HC), carbon monoxide (CO), oxides of nitrogen (NO_x) and particulate matter (PM). Air toxin emissions which fall into the category of unregulated emissions of primary concern are benzene and poly aromatic hydrocarbons (PAHs), both well known carcinogens. Kerosene is more difficult to burn than gasoline, its addition results in higher levels of HC, CO and

PM emissions even from catalyst-equipped cars. The higher sulfur level of kerosene is another issue.

Traffic Problems

Traffic problems are severe in India's cities and towns. Traffic congestion is caused by several reasons, some of which are: increase in number of vehicles per kilometer of available roads, a lack of intra-city divided-lane highways and intra-city expressways networks, lack of inter-city expressways, traffic accidents and chaos due to poor enforcement of traffic laws.

Traffic congestion reduces average traffic speed. At low speeds, scientific studies reveal that vehicles burn fuel inefficiently and pollute more per trip. For example, a study in the United States found that for the same trip, cars consumed more fuel and polluted more if the traffic was congested, than when traffic flowed freely. At average trip speeds between 20 and 40 kilometers per hour, the cars pollutant emission was twice as much as when the average speed was 55 to 75 kilometers per hour. At average trip speeds between 5 and 20 kilometers per hour, the cars pollutant emissions were 4 to 8 times as much as when the average speed was 55 to 70 kilometers per hour[5]. Fuel efficiencies similarly were much worse with traffic congestion.

Traffic gridlock in Delhi and other Indian cities is extreme[6]. The average trip speed on many Indian city roads is less than 20 kilometers per hour; a 10 kilometer trip can take 30 minutes, or more. At such speeds, vehicles in India emit air pollutants 4 to 8 times more than they would with less traffic congestion; Indian vehicles also consume a lot more carbon footprint fuel per trip, than they would if the traffic congestion was less. Emissions of particles and heavy metals increase over time because the growth of the fleet and mileage outpaces the efforts to curb emissions[7]. In cities like Bangalore around 50% of children suffer from asthma[8].

Greenhouse Gas Emissions

India was the third largest emitter of carbon dioxide in 2017 at 6.82% share of CO2 emissions, after China (27.21%) and the United States (14.58%)[9].

HEALTH PROBLEMS

The most important reason for concern over the worsening air pollution in the country is its effect on the health of individuals. Exposure to particulate matter for a long time can lead to respiratory and cardiovascular diseases such as asthma, bronchitis, COPD, lung cancer and heart attack. The Global Burden of Disease Study for 2010, published in 2013, had found that outdoor air pollution was the fifth-largest killer in India and around 620,000 early deaths occurred from air pollution-related diseases in 2010(10). According to a WHO study, 13 of the 20 most-polluted cities in the world are in India; however, the accuracy and methodology of the WHO study was questioned by the Government of India[10]. India also has one of the highest number of COPD patients and the highest number of deaths due to COPD.

Over a million Indians die prematurely every year due to air pollution, according to the non-profit Health Effects Institute[11]. Over two million children—half the children in Delhi—have abnormalities in their lung function, according to the Delhi Heart and Lung Institute[11]. Over the past decade air pollution has increased in India significantly. Asthma is the most common health problem faced by Indians and it accounts for more than half of the health issues caused by air pollution[12, 13].

Ambient air pollution in India is estimated to cause 67000 deaths annually and particularly aggravates respiratory and cardiovascular conditions including chronic bronchitis, lung cancer and asthma. Ambient air pollution is linked to an increase in hospital visits, with a higher concentration of outdoor pollution particulates resulting in emergency room visit increases of between 20-25% for a range of conditions associated with higher exposure to air pollution. Approximately 76% of households in rural India are reliant on solid biomass for cooking purposes which contributes further to the disease burden of ambient air pollution experienced by the population of India.

CONTROL DEVICES

The following items are commonly used as pollution control devices in industry and transportation. They can either destroy contaminants or remove them from an exhaust stream before it is emitted into the atmosphere.

Electrostatic Precipitators - An electrostatic precipitator (ESP), or electrostatic air cleaner is a particulate collection device that removes particles from a flowing gas (such as air), using the force of an induced electrostatic charge. Electrostatic precipitators are highly efficient filtration devices that minimally impede the flow of gases through the device, and can easily remove fine particulates such as dust and smoke from the air stream.

Baghouses - Designed to handle heavy dust loads, a dust collector consists of a blower, dust filter, a filter-cleaning system, and a dust receptacle or dust removal system (distinguished from air cleaners which utilize disposable filters to remove the dust).

Particulate Scrubbers - Wet scrubber is a form of pollution control technology. The term describes a variety of devices that use pollutants from a furnace flue gas or from other gas streams. In a wet scrubber, the polluted gas stream is brought into contact with the scrubbing liquid, by spraying it with the liquid, by forcing it through a pool of liquid, or by some other contact method, so as to remove the pollutants.

Scrubbers

- Baffle spray scrubber, Cyclonic spray scrubber, Ejector venturi scrubber, Mechanically aided scrubber, Spray tower, Wet scrubber
- NOx control - Low NOx burners, Selective catalytic reduction (SCR), Selective non-catalytic reduction (SNCR)
- NOx scrubbers - Exhaust gas recirculation, Catalytic converter (also for VOC control)
- VOC abatement - Adsorption systems, using activated carbon such as Fluidized Bed Concentrator, Flares, Thermal oxidizers, Catalytic converter, Biofilters, Absorption (scrubbings) Cryogenic, condensers, Vapor recovery systems
- Acid Gas /SO_2 control - Wet scrubbers, Dry scrubbers, Flue-gas desulfurization

- Mercury control - Sorbent Injection Technology, Electro-Catalytic Oxidation (ECO), K-Fuel

INDIVIDUSAL RESPONSIBILITY

- Conserve energy - at home, at work, everywhere.
- Look for the ENERGY STAR label when buying home or office equipment.
- Carpool, use public transportation, bike, or walk whenever possible.
- Follow gasoline refueling instructions for efficient vapor recovery, being careful not to spill fuel and always tightening your gas cap securely.
- Keep car, boat, and other engines properly tuned.
- Consider purchasing portable gasoline containers labeled “spill-proof,” where available.
- Be sure your tires are properly inflated.
- Use environmentally safe paints and cleaning products whenever possible.
- Mulch or compost leaves and yard waste.
- Consider using gas logs instead of wood.
- Choose a cleaner commute - share a ride to work or use public transportation.
- Combine errands and reduce trips, Walk to errands when possible.
- Avoid excessive idling of your automobile.
- Refuel your car in the evening when it is cooler.
- Conserve electricity and set air conditioners no lower than 78 degrees.
- Defer lawn and gardening chores that use gasoline-powered equipment, or wait until evening.
- Reduce the number of trips you take in your car.
- Reduce or eliminate fireplace and wood stove use.
- Avoid burning leaves, trash, and other materials.
- Avoid using gas-powered lawn and garden equipment.

CONCLUSION

Man is the only species on this land causing environmental pollution. He goes on exploiting natural resources for his need and greed’s. Every organism has the right to live on this earth, but we cannot deny their right to live. So man has to rethink his attitude towards the nature. He must look at the natural resources as needy but not greedy. We can survive without food for few months, we can also survive without water for few days, but we cannot survive without air for few minutes. This is the importance of air. We and all living organisms need clean air continuously for every survival. Recent air pollution in Delhi capital in very alarming, some of them went for oxygen bunks for clean air to respire. In future we are going to have oxygen bunks like petrol bunks. Nature existence depends upon us but at the same time our existence depends on it. It is prime responsibility of human to protect, preserve and to sustain nature for the well being of every organism on this earth.

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