City Air Pollution

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More than half of the world's population lives in cities. This is set to rise to around two-thirds by 2050. As people move from rural areas to towns and cities seeking a better standard of living, urbanization has become a feature of economic development. This means as many as 1.3 billion children will be living in cities by the middle of this century, according to some estimates.

As cities become increasingly important to our lives, they have become a big source of greenhouse gas emissions. Because their locations are fixed and they are home to so many people, urban areas are also among the most vulnerable places in the world to the impacts of global warming – such as rising seas levels.

Air pollution is on the increase in cities due to increasing number of vehicles, smoke from factories and power houses, emission from air-conditioners and aircrafts, due to badly managed city waste by burning, burning crop residue.

https://ciff.org/impact/cities-frontline/?gclid=CjwKEAjw4IjKBRDr6p752cCUm3kSJAC-eqRtUBv_Ohax2bwCrp9otSvn4mCjTQ311Xs42WCwVbt9LRoCmH3w_wcB

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What is Air Pollution?

Pollution is now a common place term, that our ears are attuned to. We hear about the various forms of pollution and read about it through the mass media. Air pollution is one such form that refers to the contamination of the air, irrespective of indoors or outside. A physical, biological or chemical alteration to the air in the atmosphere can be termed as pollution. It occurs when any harmful gases, dust, smoke enters into the atmosphere and makes it difficult for plants, animals and humans to survive as the air becomes dirty.

Air pollution can further be classified into two sections- Visible air pollution and invisible air pollution. Another way of looking at Air pollution could be any substance that holds the potential to hinder the atmosphere or the well being of the living beings surviving in it. The sustainment of all things living is due to a combination of gases that collectively form the atmosphere; the imbalance caused by the increase or decrease of the percentage of these gases can be harmful for survival.

Read here more about 40 facts of air pollution.

The Ozone layer considered crucial for the existence of the ecosystems on the planet is depleting due to increased pollution. Global warming, a direct result of the increased imbalance of gases in the atmosphere has come to be known as the biggest threat and challenge that the contemporary world has to overcome in a bid for survival.

Types of Pollutants

In order to understand the causes of Air pollution, several divisions can be made. **Primarily air pollutants** can be caused by primary sources or secondary sources. The pollutants that are a direct result of the process can be called primary pollutants. A classic example of a primary pollutant would be the sulfur-dioxide emitted from factories

Secondary pollutants are the ones that are caused by the inter mingling and reactions of primary pollutants. Smog created by the interactions of several primary pollutants is known to be as secondary pollutant.

Causes of Air pollution

1. Burning of Fossil Fuels: Sulfur dioxide emitted from the combustion of fossil fuels like coal, petroleum and other factory combustibles is one the major cause of air pollution. Pollution emitting from vehicles including trucks, jeeps, cars, trains, airplanes cause immense amount of pollution. We rely on them to fulfill our daily basic needs of transportation. But, there overuse is killing our environment as dangerous gases are polluting the environment. Carbon Monooxide caused by improper or incomplete combustion and generally emitted from vehicles is another major pollutant along with Nitrogen Oxides, that is produced from both natural and man made processes.

2. Agricultural activities: Ammonia is a very common by product from agriculture related activities and is one of the most hazardous gases in the atmosphere. Use of insecticides, pesticides and fertilizers in agricultural activities has grown quite a lot. They emit harmful chemicals into the air and can also cause water pollution.

3. Exhaust from factories and industries: Manufacturing industries release large amount of carbon monoxide, hydrocarbons, organic compounds, and chemicals into the air thereby depleting the quality of air. Manufacturing industries can be found at every corner of the earth and there is no area that has not been affected by it. Petroleum refineries also release hydrocarbons and various other chemicals that pollute the air and also cause land pollution.

4. Mining operations: Mining is a process wherein minerals below the earth are extracted using large equipment. During the process dust and chemicals are released in the air causing massive air pollution. This is one of the reason which is responsible for the deteriorating health conditions of workers and nearby residents.

5. Indoor air pollution: Household cleaning products, painting supplies emit toxic chemicals in the air and cause air pollution. Have you ever noticed that once you paint walls of your house, it creates some sort of smell which makes it literally impossible for you to breathe.

Suspended particulate matter popular by its acronym SPM, is another cause of pollution. Referring to the particles afloat in the air, SPM is usually caused by dust, combustion etc.

Effects of Air pollution

1. Respiratory and heart problems: The effects of Air pollution are alarming. They are known to create several respiratory and heart conditions along with Cancer, among other threats to the body. Several millions are known to have died due to direct or indirect effects of Air pollution. Children

in areas exposed to air pollutants are said to commonly suffer from pneumonia and asthma.

2. Global warming: Another direct effect is the immediate alterations that the world is witnessing due to Global warming. With increased temperatures world wide, increase in sea levels and melting of ice from colder regions and icebergs, displacement and loss of habitat have already signaled an impending disaster if actions for preservation and normalization aren't undertaken soon.

3. Acid Rain: Harmful gases like nitrogen oxides and sulfur oxides are released into the atmosphere during the burning of fossil fuels. When it rains, the water droplets combines with these air pollutants, becomes acidic and then falls on the ground in the form of acid rain. Acid rain can cause great damage to human, animals and crops.

4. Eutrophication: Eutrophication is a condition where high amount of nitrogen present in some pollutants gets developed on sea's surface and turns itself into algae and adversely affect fish, plants and animal species. The green colored algae that is present on lakes and ponds is due to presence of this chemical only.

5. Effect on Wildlife: Just like humans, animals also face some devastating affects of air pollution. Toxic chemicals present in the air can force wildlife species to move to new place and chafnge their habitat. The toxic pollutants deposit over the surface of the water and can also affect sea animals.

6. Depletion of Ozone layer: Ozone exists in earth's stratosphere and is responsible for protecting humans from harmful ultraviolet (UV) rays. Earth's ozone layer is depleting due to the presence of chlorofluorocarbons, hydro

chlorofluorocarbons in the atmosphere. As ozone layer will go thin, it will emit harmful rays back on earth and can cause skin and eye related problems. UV rays also have the capability to affect crops.

When you try to study the sources of Air pollution, you enlist a series of activities and interactions that create these pollutants. There are two types of sources that we will take a look at: **Natural sources and Man-made sources.**

Natural sources of pollution include dust carried by the wind from locations with very little or no green cover, gases released from the body processes of living beings (Carbon dioxide from humans during respiration, Methane from cattle during digestion, Oxygen from plants during Photosynthesis). Smoke from the combustion of various inflammable objects, volcanic eruptions etc along with the emission of polluted gases also make it to the list of Natural sources of Pollution.

While looking at the man-made contributions towards air pollution, smoke again features as a prominent component. The smoke emitted from various forms of combustion like in bio mass, factories, vehicles, furnaces etc. Waste used to create landfills generate methane, that is harmful in several ways. The reactions of certain gases and chemicals also form harmful fumes that can be dangerous to the well being of living creatures.

Solutions for Air Pollution

1. Use public mode of transportation: Encourage people to use more and more public modes of transportation to reduce pollution. Also, try to make use of car pooling. If you and your colleagues come from the same locality and have same timings you can explore this option to save energy and money.

2. Conserve energy: Switch off fans and lights when you are going out. Large amount of fossil fuels are burnt to produce electricity. You can save the environment from degradation by reducing the amount of fossil fuels to be burned.

3. Understand the concept of Reduce, Reuse and Recycle: Do not throw away items that are of no use to you. In-fact reuse them for some other purpose. For e.g. you can use old jars to store cereals or pulses.

4. Emphasis on clean energy resources: Clean energy technologies like solar, wind and geothermal are on high these days. Governments of various countries have been providing grants to consumers who are interested in installing solar panels for their home. This will go a long way to curb air pollution.

5. Use energy efficient devices: CFL lights consume less electricity as against their counterparts. They live longer, consume less electricity, lower electricity bills and also help you to reduce pollution by consuming less energy.

Several attempts are being made world wide on a personal, industrial and governmental levels to curb the intensity at which Air Pollution is rising and regain a balance as far as the proportions of the foundation gases are concerned. This is a direct attempt at slacking Global warming. We are seeing a series of innovations and experiments aimed at alternate and unconventional options to reduce pollutants. Air Pollution is one of the larger mirrors of man's follies, and a challenge we need to overcome to see a tomorrow

http://www.dw.com/en/five-ways-to-improve-air-quality-in-our-cities/a-37149216

Among mega-cities (urban areas with over 14 million inhabitants) Delhi and Cairo had the highest levels of urban air pollution.

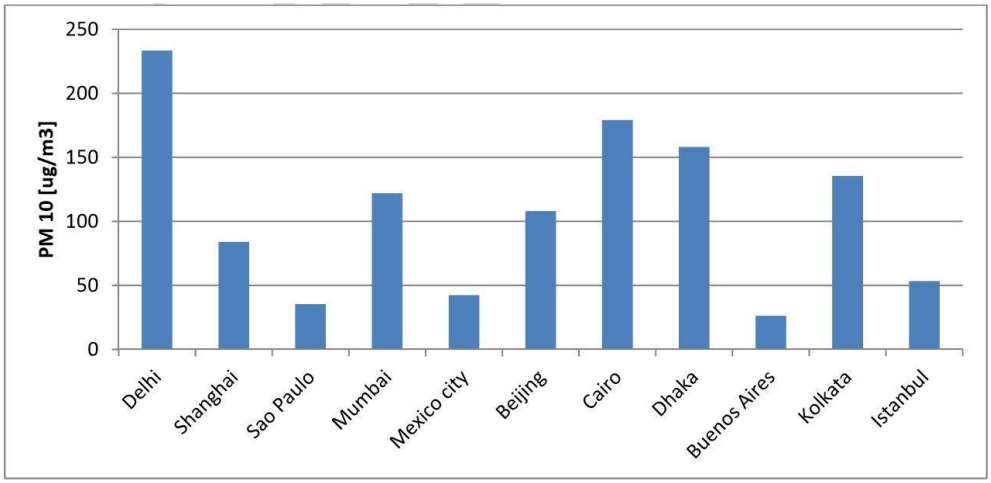

Image: World Health Organization

https://www.theguardian.com/environment/2016/may/12/air-pollution-rising-at-an-alarming-rate-in-worlds-cities

The problem of air pollution in cities isn't new. Back in 1661, diarist John Evelyn published an attack on the 'hellish and dismal cloud of sea-coal' enveloping London at the time, suggesting sweet-smelling trees as a solution.

Pollution generated by the Industrial Revolution (c.1760-1840) even caused insect species to evolve. In a process called industrial melanism, previously pale-coloured peppered moths rapidly evolved dark colouration to camouflage themselves against the soot-blackened tree trunks of industrial cities.

And in 1952, matters came to head when The Great Smog claimed 4,000 Londoners' lives, leading to the Clean Air Acts that enforced the use of smokeless fuels in urban areas.

Final warning from the EC

Air pollution is so last century, then? Well, no. In February, the European commission issued the UK with a 'final warning' for failing to comply with EU air pollution limits for nitrogen dioxide (NO_2) in 16 areas. Nitrogen dioxide comes mainly from vehicle emissions. It's clear more needs doing to reduce NO_2 in our cities. What's happening?

Clean bus technologies

The days of the dirty old diesel bus pumping damaging black fumes into the street are ending, to be replaced with all-electric buses or clean buses with hybrid technology.

London currently runs 2,000 hybrid electric buses and more than 120 all-electric ones. London Mayor Sadiq Khan says: "These new electric buses will

eradicate harmful emissions and will have a significant impact on the quality of our air."

Nottingham has one of Europe's largest electric bus fleets: in addition to its 45 electric buses already in service, it has invested in 13 new single-deckers and is launching the first all-electric Park & Ride scheme.

Bristol's electric buses are a tech revolution – not only do they switch to electric mode from diesel when GPS signals they are in a poor air quality zone, they also wirelessly charge when stationary over induction plates. These plates may be installed along bus routes, allowing buses to recharge as theyM go.

And Brighton's electric bus initiative, The Big Lemon currently goes further with solar-powered electric buses, with their mission 'to enable everyone to get around their community in an affordable, environmentally-sustainable way'.

Bus priority: much more than a bus lane

City planners are realizing that redesigned priority bus routes with dedicated smart traffic lights and bus junctions offer more than just faster journey times. Wider street works during construction may include: safer pedestrian crossings around road junctions and bus stops, attractively remodeled areas and pavements creating green public spaces, tree planting and dedicated provision for cyclists in harmony with the buses.

In Leeds, the government pledged £173m to improve public transport, making it quicker and easier to get about the city using new Park & Ride schemes, bus priority lanes and £71m-worth of new, clean hybrid buses. Glasgow's 10-year city center transport strategy to reduce air pollution includes cycling measures and traffic management. Attractive city transport by bike or green bus encourages more people to leave their cars at home, improving air quality.

Trams

Since the 1980s, tram systems offer frequent, reliable services unaffected by traffic, and produce minimal air pollution. Eight UK cities have tram systems – Blackpool, Croydon, London Docklands, Manchester, West Midlands, Nottingham, Sheffield and Tyne and Wear. City planners are realizing that tram systems work most efficiently when they join up seamlessly with other services – buses, trains, and even airports (such as Manchester).

POOHZ VIA GETTY IMAGES

Clean Air Zones

By 2020, five English cities with the poorest air quality – Leeds, Birmingham, Nottingham, Derby and Southampton will have Clean Air Zones (CAZs). Vehicles that are highly polluting - lorries, coaches, older buses and taxis - face a higher charge if they enter a CAZ.

London proposes to take this further with its Ultra Low Emission Zone (ULEZ). All vehicles will need to meet stringent exhaust emission standards, or pay a daily charge. New London taxis licensed after 1 January 2018 must be zero-emission, with many charging points dedicated exclusively to black cabs.

And from October 2017, a Toxicity Charge (T-Charge) of £10, in addition to the Congestion Charge will apply to the oldest and most polluting vehicles entering central London. Use the T-Charge checker to see if your vehicle will be subject to the charge.

The future - new technologies to improve city air quality

New technologies may also help reduce urban air pollution. Gas to liquids fuel (GTL), low in particles and NO_2 may be used in existing diesel engines. Ezero1 is a hydrogen fuel additive that reduces engine emissions by up to 80%. Even driverless cars, by reducing the stop-start nature of human driving, may contribute to lower emissions. And there's even a smog-filtering tower to suck up dirty urban air and puff out clean.

The latest is that the Spicejet Airlines has introduced Bio-Fuel for flying and had the first flight from Dehradun to Delhi recently. This is a green effort and a giant step towards keeping the environment clean.

The future is certainly looking bright.

Best Regards

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