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Excessive Released Chemical Pollutants in the Environment and Their Toxic Impact on Our Society

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Abstract: **Pollution is usually brought about by the addition of waste product of human activity to the environment. When the waste product are not efficiently assimilated, decomposed or otherwise removed by the natural , biological and physical process of the biosphere . When chemicals are released into environment and disrupt the balance of our ecosystems, threatening our health, polluting the air and contaminating our food. Pollution is when certain compounds are left or disposed of in the environment. The chemicals disrupt the processes of the ecosystem. This causes the biological elements to be killed or harmed. This causes a chemical or a toxic substance. Some toxic chemicals are acetone cyanohydrin, carbon disulphide, cresols, naphthalene and tetraethyl lead, acrylonitrile, carbon tetrachloride, ethylene dichloride and phenol, benzene, styrene, toluene and xylene, acetone and phosphoric acid.**

Keywords: **Acid rain, Fertilizer, Ecosystem, Organic chemical, Chemical pollution.**

1. INTRODUCTION

Chemical pollution occurs when chemicals resulting from human activities enter the environment, contaminating air, water or soil. Acid rain, greenhouse gases and ozone are all examples of chemical pollution. Chemical pollution damages the environment and poses both short-term and long-term health dangers to human beings. A major source of chemical pollution in the air is fossil fuels burned by utilities, industries and motor vehicles. Chemical pollution in soil can be caused by overuse of fertilizers, pesticides and herbicides. Construction and demolition sites are also sources of soil pollution, as are mines, landfills and foundries

2. CHEMICAL POLLUTANTS

Based on their chemical structure chemical pollutants are classified broadly in two classes.

Organic chemical pollutants – Chemicals that are organic in nature or that could be produced by living organisms or are based of matter formed by living organisms. Common organic chemical pollutants include:

- Alcohols (e.g., ethanol, methanol, isopropanol) are used in a large variety of applications and household products;
- Plastics are a result of industrial processes as well as our daily activities involving using and disposing of a large variety of plastics (e.g., bags, bottles, containers)
- Crude oil and petroleum refined products (e.g., gasoline, diesel fuel, kerosene, mineral spirit, motor oil, lubricating oil);
- Solvents (e.g., acetone, MEK, toluene, benzene, xylene) used in industry as well as in many household products;
- Chlorinated solvents (e.g., PCE, TCE, 1,1,1-TCA, 1,2-DCA, 1,1,2-TCA) used in industrial degreasing processes, as well as in dry cleaning, and in various household products;

- PAHs (polyaromatic hydrocarbons) are found in petroleum products, crude oil, but are also a result of burning activities (e.g., from coal power plants as well as historical manufacturing gas plants);
- PCBs (polychlorinatedbiphenyl ethers) which are now banned but were used in transformers and are already present in large amounts in environment
- Trihalomethanes (e.g., chloroform, dibromochloromethane, chlorobromomethane, bromoform) which are common products of water chlorination
- Phenols are usually an indication of waste water and a result of industrial processes;
- Pesticides / Insecticides / Herbicides are commonly used in agriculture and may contain toxic organic chemicals and metals (such as mercury and arsenic)
- Organo-metalic compounds (e.g., organo-arsenicals, organo-mercurials) are usually pesticides / insecticides / herbicides.
- Detergents include a variety of chemical compounds with surface activity.

Inorganic chemical pollutants – Chemicals origin from mineral sources (that are not produced by living organisms). Common inorganic chemical pollutants include:

- Inorganic fertilizers (e.g., nitrates, phosphates) used largely in agriculture and gardening. If present in large amounts in water they can be harmful to human health.
- Metals and their salts – usually from mining.
- Sulfides are usually mined minerals and once disposed in the environment, they may generate sulfuric acid in the presence of precipitation water and microorganisms
- Ammonia is a poisonous gas if released in higher amounts and may cause blindness followed by death;
- The oxides of nitrogen and sulfur are very common air pollutants resulting from vehicle emissions, industrial processes and other human activities
- Acids and bases are used in a variety of industrial applications as well as in chemical laboratories. These are less problematic chemicals because their effect can be easily neutralized in the environment, but if spread in large amounts they may still pose a threat to environment and human health;
- Perchlorate includes the perchloric acids and its various salts. Perchlorate is used in a variety of applications including rocket fuel, explosives, military operations, fireworks, road flares, inflation bags, etc. Perchlorate is problematic because it is persistent and may damage thyroid function in humans.

2. SOURCES OF CHEMICAL POLLUTION AND THEIR EFFECTS

There are many sources of chemical pollution. Our technological advances have made us a species largely reliant on chemicals and these chemicals are toxic to life and our environment. Chemical pollution damages the environment and poses both short-term and long-term health dangers to human beings.

Agriculture Chemicals- Pesticides and Chemicals are used in our agricultural processes. To protect our crops we spray them with pesticides. Excessive use of Pesticides and fertilizers that contain nitrates and phosphates are a source of chemicals that cause water pollution. These chemicals seep into the groundwater and mix with runoff moving to lakes and rivers. Insecticides, Pesticides and fertilizers emit harmful chemicals in the air. Ammonia, which is a byproduct of our agricultural processes, is one of the most dangerous chemicals in our atmosphere.

Industrial Chemicals -Industrial emissions cause water pollution. . Metals and solvents from industrial process can pollute our water bodies and poison aquatic life. Factories release a large amount of hydrocarbons into our atmosphere, adding to the escalating effects of global warming. Mercury is liberate in waste water from paper manufacturers. Instead of remaining inert as expected, the mercury reacted to bacteria in the water and changed to methyl mercury. Now, mercury levels in fish such as swordfish can pose dangers to people who eat it. Hazardous waste comes from factories that do not dispose of them properly.

Household Chemicals – Aerosols and regular household cleaning products may look innocent but a lot of consumer products are pollutants. Just look at the products we use in a daily basis and the warnings on their labels. Your hairspray, household cleaning products and even paint release chemicals that are harmful to your health. Some of these chemicals are lead, arsenic, mercury and cadmium.

Burning of Fossil Fuels- Vehicles emit carbon monoxide in the air, which is a major air pollutant. This is very hard to manage since the number of vehicles on the road grows with the population of the planet.

Natural Causes-Volcanic eruptions can release large amounts of Sulfur Dioxide in the atmosphere which blocks the sunlight, causing our planet to cool down for years. This has happened many times in our history.

3. AIR POLLUTION FACTS

- Breathing polluted air can lower our life expectancy by 2 to 3 years.
- Every 13 seconds, someone dies from air pollution, which makes it the 4th most lethal killer.
- Air pollution can cause lung cancer, asthma, heart problems and skin diseases.
- Transportation such as buses, cars, trucks, ships and trains account for 90% of Cancer risks caused by Air Pollution.
- Diesel exhaust from vehicles have over 40 substances listed as harmful by the U.S Environmental Protection Agency.

4. WHAT CAUSES AIR POLLUTION?

There are different kinds of pollution, some visible and some invisible, some directly caused by humans, some by nature. Any substance that we introduce to the atmosphere which disrupts the balance and has damaging effects to our environment is called Air Pollution.Factories and petroleum refineries release large amounts of hydrocarbons, carbon monoxide and other chemicals into the atmosphere.

5. AIR POLLUTION IN ASIA

Asia represents a major source of air pollution as a result of rapid population growth, explosive industrialization, and few environmental regulations.

Due to the use of high sulfur coal to generate energy, the cities in China are heavily polluted by sulfur dioxide and particulate. The average ash content of Chinese coal is 27%. The sulfur content varies upto 5%. The combustion sources include small domestic stoves as well as large industrial plants. China produces over 15 million tons of SO_2 and 20 million tons of particulate. Industrial emissions of carbon dioxide and greenhouse gases are emitted in large quantities in China. Nitrogen oxide emissions are likely to increase as the production of cars will increase in China. China employs very little air pollution control technology. Acid rain is an important issue in China.

The following figure shows Air pollution Index for major Chinese cities during Aug. 28, 1998 to Sept. 3, 1998.

Air pollution is a serious problem in major cities in India. Delhi's pollution scenario is India's grimmest, and leads the other metros in vehicular pollution levels. The presence of suspended particulate matter is due to the use of coal in power plants. More than 45 million metric tons of ash is produced annually due to the use of low quality coal. In 23 Indian cities with populations of more than one million, auto exhausts and industrial emissions dangerously cross limits . Recent studies reveal that the number of patients with respiratory diseases and allergies has roughly doubled since the start of the 1990s. In Calcutta winter levels for particulate matter are 12 times above the standards. In Mumbai's (Bombay) "gas chamber", the eastern suburb of Chembur, pollution figures zoom to 10 times above the safe levels. India's metropolitan vehicle population has roughly tripled since 1990. The most damaging pollutants come from petrol driven cars and two wheelers. On July 5, 1997, IPAN (Indian Public Affairs Network) published an article of how the growing catalytic converter use could ease Asian cities' air pollution.

The air quality in Indonesia in deteriorating rapidly with industrial expansion. In the capital city, Jakarta, brownish yellow clouds of lead laden smog are common from 2.5 million vehicles. During several periods in 1997, Malaysia experienced haze conditions due to particulate matter from fires burning in Indonesia. Based upon readings from the Malaysian Air Pollutant Index, the air pollution levels registered in the "unhealthy" and occasionally in the "very unhealthy" ranges.

SO_2 is a problem area in South Korea and is being controlled by the use of air pollution control equipment.

Vehicle emissions contribute most significantly to Hong Kong's air pollution problems, diesel powered engines being the prime culprit. In 1996 there were some 300,000 vehicles on Hong Kong's road, and one in three were diesel vehicles that covered two third of the mileage recorded by the total vehicle fleet. Today there are around 480,000 vehicles in Hong Kong, with diesel vehicles accounting for about 60% of the overall mileage.

6. SOLVING THE AIR POLLUTION CRISIS

It's such a global crisis that you might think there's nothing that one person can do to solve it. But you can make a difference. Here's what we can all do to help clean up the air we breathe.

- Patronize clean energy sources such as solar power, wind power and hydro power. We need to encourage the development of these alternative energy sources.
- Use public modes of transportation when you can. Every car off the street is one less vehicle emitting carbon monoxide.
- Buy Electric Vehicles when you can.
- Conserve energy. The less energy we consume, the less need for fossil fuels to be burned.
- Use household products that are Eco-Friendly.
- Buy energy efficient devices.

There is a worldwide effort on all levels to reduce the rise of Air Pollution. Governments are supporting technological advances that will give us a cleaner source of energy. Let's all do our share and keep the air we breathe clean for us and for future generations.

7. ENVIRONMENTAL DEGRADATION FACTS

Every year, we extract an estimated 55 billion tons of fossil energy, minerals, metals and bio mass from the Earth.

- The world has already lost 80% of its forests and we're continually losing them at a rate of 375 km2 per day!
- At the current rate of deforestation, 5-10% of tropical forest species will become extinct every decade.
- Every hour, 1,692 acres of productive dry land become desert.
- 27% of our coral reefs have been destroyed. If the rate continues, remaining 60% will be gone in 30 years.
- We have a garbage island floating in our ocean, mostly comprised of plastics - the size of India, Europe and Mexico combined!

We are using up 50% more natural resources than the Earth can provide. At our current population, we need 1.5 Earths, which we do not have

8. THE STEPS BEING TAKEN

If we have the power to cause all these degradation to our environment, we also have the power to correct it. Individuals can help prevent chemical pollution by making simple changes in their habits and activities. Governments, organizations and environmental groups are joining together to correct the mistakes that we have committed in the past. From our end, we can make a contribution too.

- Go Green. Buy products that are environment friendly.
- Don't forget to Reduce, Re-use and Recycle. We must stop our habit of wastage.
- Let people know. Share your views on the degradation that's happening and raise awareness. Every person you enlighten, counts.

- Report any kind of activity that degrades our environment such as dumping waste in water bodies, burning of plastic, improper disposal of garbage and the like.
- Plant trees wherever you can. More plants will mean more allies to absorb and deter the greenhouse effect.
- Do not buy products that are manufactured in ways that pollute and degrade the environment.

9. CONCLUSION

There are too many to mention, these are just some examples. We've come to rely on chemicals too much that it pervades every corner of the world, every facet of our lives Global warming and ozone layer depletion are both direct results of Air Pollution. , the waste streams from chemical industry are now strictly controlled and treated before being released in the environment .The everyday detergents are chemical compounds that may pollute our environment! It is enough to read the label of various products we are using to confirm that they are made by a variety of chemicals. There are so many little things that we can do to save our planet, our environment, ourselves. We must understand and let other people understand that the survival of our future generation depends on what we do now.

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