

What is Pollution?

Pollution, we hear it every other day at school, college and read about it in newspapers. So what is it? Pollution occurs when pollutants contaminate the natural surroundings; which brings about changes that affect our normal lifestyles adversely. Pollutants are the key elements or components of pollution which are generally waste materials of different forms. Pollution disturbs our ecosystem and the balance in the environment. With modernization and development in our lives pollution has reached its peak; giving rise to global warming and human illness.

Pollution occurs in different forms; air, water, soil, radioactive, noise, heat/ thermal and light. Every form of pollution has two sources of occurrence; the point and the non-point sources. The point sources are easy to identify, monitor and control, whereas the non-point sources are hard to control. Let us discuss the different types of pollutions, their causes and effects on mankind and the environment as a whole.

Types & Causes of Pollution

Air Pollution is the most prominent and dangerous form of pollution. It occurs due to many reasons. Excessive burning of fuel which is a necessity of our daily lives for cooking, driving and other industrial activities; releases a huge amount of chemical substances in the air everyday; these pollute the air.

Smoke from chimneys, factories, vehicles or burning of wood basically occurs due to coal burning; this releases sulphur dioxide into the air making it toxic. The effects of air pollution are evident too. Release of sulphur dioxide and hazardous gases into the air causes global warming and acid rain; which in turn have increased temperatures, erratic rains and droughts worldwide; making it tough for the animals to survive. We breathe in every polluted particle from the air; result is increase in asthma and cancer in the lungs.

Water Pollution has taken toll of all the surviving species of the earth. Almost 60% of the species live in water bodies. It occurs due to several factors; the industrial wastes dumped into the rivers and other water bodies cause an imbalance in the water leading to its severe contamination and death of aquatic species. If you suspect that nearby water sources have been contaminated by a corporation then it might be a good idea to hire an expert to see your options.

Also spraying insecticides, pesticides like DDT on plants pollutes the ground water system and oil spills in the oceans have caused irreparable damage to the water bodies. Eutrophication is another big source; it occurs due to daily activities like washing clothes, utensils near lakes, ponds or rivers; this forces detergents to go into water which blocks sunlight from penetrating, thus reducing oxygen and making it inhabitable.

Water pollution not only harms the aquatic beings but it also contaminates the entire food chain by severely affecting humans dependent on these. Water-borne diseases like cholera, diarrhoea have also increased in all places.

Soil pollution occurs due to incorporation of unwanted chemicals in the soil due to human activities. Use of insecticides and pesticides absorbs the nitrogen compounds from the soil making it unfit for plants to derive nutrition from. Release of industrial waste, mining and deforestation also exploits the soil. Since plants can't grow properly, they can't hold the soil and this leads to soil erosion.

Noise pollution is caused when noise which is an unpleasant sound affects our ears and leads to psychological problems like stress, hypertension, hearing impairment, etc. It is caused by machines in industries, loud music, etc.

Radioactive pollution is highly dangerous when it occurs. It can occur due to nuclear plant malfunctions, improper nuclear waste disposal, accidents, etc. It causes cancer, infertility, blindness, defects at the time of birth; can sterilise soil and affect air and water.

Thermal/heat pollution is due to the excess heat in the environment creating unwanted changes over long time periods; due to huge number of industrial plants, deforestation and air pollution. It increases the earth's temperature, causing drastic climatic changes and extinction of wildlife.

Light pollution occurs due to prominent excess illumination of an area. It is largely visible in big cities, on advertising boards and billboards, in sports or entertainment events at the night. In residential areas the lives of the inhabitants is greatly affected by this. It also affects the astronomical observations and activities by making the stars almost invisible.

Pollution Effects

On Humans, Animals, Plants and The Environment

Pollution effects are indeed **many** and wide-ranging.

There is no doubt that excessive levels of pollution are causing a lot of damage to human & animal **health**, tropical **rainforests**, as well as the wider **environment**.

All types of pollution – air, water and soil pollution – have an impact on the living environment.

The effects in living organisms may range from mild discomfort to serious diseases such as cancer to physical deformities; ex., extra or missing limbs in frogs.

Experts admit that pollution effects are quite often underestimated and that more research is needed to understand the connections between pollution and its effects on all life forms.

Pollution Effects on Humans

We know that pollution causes not only physical disabilities but also psychological and behavioral disorders in people.

We are discussing the effects of air pollution and specific air pollutants in more detail in our Air Pollution Effects article.

The following pollution effects on humans have been reported:

Air Pollution Effects

Reduced lung functioning

- Irritation of eyes, nose, mouth and throat
- Asthma attacks
- Respiratory symptoms such as coughing and wheezing
- Increased respiratory disease such as bronchitis
- Reduced energy levels
- Headaches and dizziness
- Disruption of endocrine, reproductive and immune systems
- Neurobehavioral disorders
- Cardiovascular problems
- Cancer
- Premature death

Water Pollution Effects

Waterborne diseases caused by polluted drinking water:

- Typhoid
- Amoebiasis
- Giardiasis
- Ascariasis
- Hookworm

Waterborne diseases caused by polluted beach water:

- Rashes, ear ache, pink eye
- Respiratory infections
- Hepatitis, encephalitis, gastroenteritis, diarrhoea, vomiting, and stomach aches

Conditions related to water polluted by chemicals (such as pesticides, hydrocarbons, persistent organic pollutants, heavy metals etc):

- Cancer, incl. prostate cancer and non-Hodgkin's lymphoma
- Hormonal problems that can disrupt reproductive and developmental processes

- Damage to the nervous system
- Liver and kidney damage
- Damage to the DNA
- Exposure to mercury (heavy metal):
 - *In the womb*: may cause neurological problems including slower reflexes, learning deficits, delayed or incomplete mental development, autism and brain damage
 - *In adults*: Parkinson's disease, multiple sclerosis, Alzheimer's disease, heart disease, and even death

Other notes:

- Water pollution may also result from interactions between water and contaminated soil, as well as from deposition of air contaminants (such as acid rain)
- Damage to people may be caused by fish foods coming from polluted water (a well known example is high mercury levels in fish)
- Damage to people may be caused by vegetable crops grown / washed with polluted water (author's own conclusion)

Soil Pollution Effects

- Causes cancers including leukaemia
- Lead in soil is especially hazardous for young children causing developmental damage to the brain
- Mercury can increase the risk of kidney damage; cyclodienes can lead to liver toxicity
- Causes neuromuscular blockage as well as depression of the central nervous system
- Also causes headaches, nausea, fatigue, eye irritation and skin rash

Other notes:

- Contact with contaminated soil may be *direct* (from using parks, schools etc) or *indirect* (by inhaling soil contaminants which have vaporized)
- Soil pollution may also result from secondary contamination of water supplies and from deposition of air contaminants (for example, via acid rain)
- Contamination of crops grown in polluted soil brings up problems with food security
- Since it is closely linked to water pollution, many effects of soil contamination appear to be similar to the ones caused by water contamination

An Extreme Oil Pollution Case

Pollution of pristine Ecuador rainforest by Texaco / Chevron oil corporation represents perhaps one of the most outrageous cases of oil pollution ever.

Some levels of pollutants left by the company on its sites of oil exploration have been calculated to exceed the US safety standards by as much as **1,000 times**, causing such side effects as children born with fused fingers and deformed eyes, high cancer rates, etc.

For more details, check out the Oil Pollution of Ecuador Rainforest article.

Pollution Effects on Animals

Effects of Pollution on Animals - Air Pollution

- *Acid rain* (formed in the air) destroys fish life in lakes and streams
- Excessive *ultraviolet radiation* coming from the sun through the ozone layer in the upper atmosphere which is eroded by some air pollutants, may cause skin cancer in wildlife
- *Ozone* in the lower atmosphere may damage lung tissues of animals

Effects of Pollution on Animals - Water Pollution

- *Nutrient pollution* (nitrogen, phosphates etc) causes overgrowth of toxic algae eaten by other aquatic animals, and may cause death; nutrient pollution can also cause outbreaks of fish diseases
- *Chemical contamination* can cause declines in frog biodiversity and tadpole mass
- *Oil pollution* (as part of chemical contamination) can negatively affect development of marine organisms, increase susceptibility to disease and affect reproductive processes; can also cause gastrointestinal irritation, liver and kidney damage, and damage to the nervous system
- *Mercury* in water can cause abnormal behavior, slower growth and development, reduced reproduction, and death
- *Persistent organic pollutants* (POPs) may cause declines, deformities and death of fish life
- Too much sodium chloride (ordinary salt) in water may kill animals

Other notes:

- We also assume that some higher forms of **non-aquatic animals** may have similar effects from water pollution as those experienced by humans, as described above

Effects of Pollution on Animals - Soil Pollution

- Can alter metabolism of microorganisms and arthropods in a given soil environment; this may destroy some layers of the primary food chain, and thus have a negative effect on predator animal species
- Small life forms may consume harmful chemicals which may then be passed up the food chain to larger animals; this may lead to increased mortality rates and even animal extinction

Pollution Effects on Trees and Plants

Air Pollution

Acid rain can kill trees, destroy the leaves of plants, can infiltrate soil by making it unsuitable for purposes of nutrition and habitation

- *Ozone holes* in the upper atmosphere can allow excessive ultraviolet radiation from the sun to enter the Earth causing damage to trees and plants
- *Ozone* in the lower atmosphere can prevent plant respiration by blocking stomata (openings in leaves) and negatively affecting plants' photosynthesis rates which will stunt plant growth; ozone can also decay plant cells directly by entering stomata

Water Pollution

- May disrupt photosynthesis in aquatic plants and thus affecting ecosystems that depend on these plants
- Terrestrial and aquatic plants may absorb pollutants from water (as their main nutrient source) and pass them up the food chain to consumer animals and humans
- Plants may be killed by too much sodium chloride (ordinary salt) in water
- Plants may be killed by mud from construction sites as well as bits of wood and leaves, clay and other similar materials
- Plants may be killed by herbicides in water; herbicides are chemicals which are most harmful to plants

Soil Pollution

- May alter plant metabolism and reduce crop yields
- Trees and plants may absorb soil contaminants and pass them up the food chain

References

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