**Environmental pollution** is “the contamination of the physical and biological components of the earth/atmosphere system to such an extent that normal environmental processes are adversely affected”. (1)

“**Pollution** is the introduction of contaminants into the environment that cause harm or discomfort to humans or other living organisms, or that damage the environment” which can come “in the form of chemical substances, or energy such as noise, heat or light”. “Pollutants can be naturally occurring substances or energies, but are considered contaminants when in excess of natural levels.” (2)

**Pollution** is “the addition of any substance or form of energy (e.g., heat, sound, radioactivity) to the environment at a rate faster than the environment can accommodate it by dispersion, breakdown, recycling, or storage in some harmless form”. (3)

“**Pollution** is a special case of habitat destruction; it is chemical destruction rather than the more obvious physical destruction. Pollution occurs in all habitats—land, sea, and fresh water—and in the atmosphere.” (4)

“Much of what we have come to call **pollution** is in reality the nonrecoverable matter resources and waste heat.” (5)

“Any use of natural resources at a rate higher than nature's capacity to restore itself can result in**pollution** of air, water, and land.” (6)

“**Pollution** is habitat contamination”. (7)

**Introduction to Environmental Pollution**

Although pollution had been known to exist for a very long time (at least since people started using fire thousands of years ago), it had seen the growth of truly global proportions only since the onset of the industrial revolution during the 19th century.

The industrial revolution brought with it technological progress such as discovery of oil and its virtually universal use throughout different industries.

Technological progress facilitated by super efficiency of capitalist business practices (division of labour – cheaper production costs – overproduction – overconsumption – overpollution) had probably become one of the main causes of serious deterioration of natural resources.

At the same time, of course, development of natural sciences led to the better understanding of negative effects produced by pollution on the environment.

Environmental pollution is a problem both in developed and developing countries. Factors such as population growth and urbanization invariably place greater demands on the planet and stretch the use of natural resources to the maximum.

It has been argued that the carrying capacity of Earth is significantly smaller than the demands placed on it by large numbers of human populations. And overuse of natural resources often results in nature’s degradation.

It’s interesting to note that natural resources had been stored virtually untouched in the Earth for millions of years.

But since the start of the industrial revolution vast amounts of these resources had been exploited within a period of just a couple of hundred of years at unimaginable rates, with all the waste from this exploitation going straight in to the environment (air, water, land) and seriously damaging its natural processes.

**Types of Environmental Pollution**

There are three major types of environmental pollution:

* Air pollution
* Water pollution
* Soil pollution (contamination)

For a list of other pollution types, please see the [Types of Pollution](http://www.tropical-rainforest-animals.com/Types-of-Pollution.html) article.

Some of the most important **air pollutants** are sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, volatile organic compounds (VOCs) and airborne particles, with radioactive pollutants probably among the most destructive ones (specifically when produced by nuclear explosions).

**Water pollutants** include insecticides and herbicides, food processing waste, pollutants from livestock operations, volatile organic compounds (VOCs), heavy metals, chemical waste and others.

Some **soil pollutants**are: hydrocarbons, solvents and heavy metals.

## Sources of Environmental Pollution

### Fossil Fuel Sources of Environmental Pollution

Common sources of fossil fuel pollution are: (9)

**Industry:**

* Power-generating plants
* Petroleum refineries
* Petrochemical plants
* Production and distribution of fossil fuels
* Other manufacturing facilities

**Transport:**

* Road transport (motor vehicles)
* Shipping industry
* Aircraft

Fossil fuel combustion is also a major source of carbon dioxide (CO2) emissions and perhaps the most important cause of [global warming](http://www.tropical-rainforest-animals.com/What-Is-Global-Warming.html). Learn more about the [causes](http://www.tropical-rainforest-animals.com/Global-Warming-Causes.html) and [effects](http://www.tropical-rainforest-animals.com/Global-Warming-Effects.html) of global warming here.

### Other (Non-Fossil Fuel) Sources of Environmental Pollution

Among other pollution sources, **agriculture** (livestock farming) is worth mentioning as the largest generator of ammonia emissions resulting in air pollution. Chemicals such as pesticides and fertilizers are also widely used in agriculture, which may lead water pollution and soil contaminationas well.

**Trading activities** may be another source of pollution.

For example, it’s been recently noted that packaging of products sold in supermarkets and other retail outlets is far too excessive and generates large quantities of solid waste that ends up either in landfills or municipal incinerators leading to soil contaminationand air pollution.

**Residential sector** is another significant source of pollution generating solid municipal waste that may end up in landfills or incinerators leading to soil contaminationand air pollution.

**How can we control environmental pollution?**

It's clear that fossil fuels are among the biggest sources of pollution. We need to find alternative renewable sources of energy which can replace fossil fuels in the future.

[Green investment](http://www.tropical-rainforest-animals.com/green-investment.html) provides a great platform to explore and develop new and clean sources of energy such as [solar electricity](http://www.tropical-rainforest-animals.com/solar-electricity.html).

[Building your own solar panels](http://www.tropical-rainforest-animals.com/build-your-own-solar-panel.html) and using diy solar energy systems to meet at least part of your home electricity needs is another emerging opportunity for diy enthusiasts. This can really make a positive difference to the environment and reduce current pollution levels.

## Environmental Pollution Effects on Humans, Other Animals & Plants

**General Environmental Pollution Effects**

Miguel A. Santos notes that a very important aspect of the effect of pollution is its dose (or concentration) required to cause environmental damage. (10)

He defines pollution response as “the change in the effect of a pollutant in response to a change in its concentration”. (11)

In this respect, he identifies 3 different types of response evoked by the environment to different pollution concentrations: (12)

* Linear effect
* Greater-than-linear effect
* Threshold effect

In the linear effect, environmental damage increases linearly with pollution concentrations. In other words, “ the total damage or risk is directly proportional to the accumulated exposure”. (13)

This effect occurs with radioactive substances as well as mercury, lead, cadmium and asbestos.

In the greater-than-linear effect, environmental damage increases with an increase in pollution concentrations but at a decreasing rate. This means that, as pollution concentrations continue to increase the environmental damage will continue to decrease. (14)

This is the case with thermal pollution.

In the threshold effect, pollution produces no effect until a certain threshold in pollution concentrations is achieved. In other words, “so long as a given threshold is not exceeded, the damage from pollution would be completely repaired as quickly as it is produced”. (15)

This effect is found with [biodegradable pollutants](http://www.tropical-rainforest-animals.com/Environmental-Pollutants.html#biodegpol).

It is also important to mention synergistic effects of pollutants on the environment. While interacting with each other, pollutants can produce greater impacts than when acting individually. (16)

A good example of that is a synergy between asbestos exposure and smoking in causing lung cancer. (17)

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

All types of environmental 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 (for example, extra or missing limbs in [frogs](http://www.tropical-rainforest-animals.com/Tropical-Frogs.html)).

Experts admit that environmental 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.

### Environmental 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 the [Air Pollutants](http://www.tropical-rainforest-animals.com/Air-Pollutants.html) article.

The following effects of environmental pollution on humans have been reported:

**Air pollution**

* 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**

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 contamination**

* 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 contamination 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

### Environmental Pollution Effects 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

**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 (24)

**Soil Contamination**

* 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](http://www.tropical-rainforest-animals.com/Animal-Extinction.html)

### Environmental 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 (27)
* 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 slat) in water (28)
* Plants may be killed by mud from construction sites as well as bits of wood and leaves, clay and other similar materials (29)
* Plants may be killed by herbicides in water; herbicides are chemicals which are most harmful to plants (30)

**Soil Contamination**

* May alter plant metabolism and reduce crop yields (31)
* Trees and plants may absorb soil contaminants and pass them up the food chain

[Top](http://www.tropical-rainforest-animals.com/Environmental-Pollution.html#top)

## Environmental Pollution Effects on Wider Environment

Apart from destroying the aquatic life in lakes and streams, acid rain can also corrode metals, damage surfaces of buildings and monuments, and cause soil acidification.

Pollution of water may cause oxygen depletion in marine environments and severely affect the health of whole ecosystems. (32)

## Environmental Pollution - Conclusion

Environmental pollution is causing a lot of distress not only to humans but also animals, driving many animal species to endangerment and even extinction.

The transboundary nature of environmental pollution makes it even more difficult to manage – you cannot build stone walls along the borders of your country or put customs cabins at every point of entry to regulate its flows into your country.

Everything on our planet is interconnected, and while the nature supplies us with valuable environmental services without which we cannot exist, we all depend on each other’s actions and the way we treat natural resources.

It’s widely recognised that we are hugely overspending our current budget of natural resources – at the existing rates of its exploitation, there is no way for the environment to recover in good time and continue “performing” well in the future.

Perhaps we should adopt a holistic view of nature – it is not an entity that exists separately from us; the nature isus, we are an inalienable part of it, and we should care for it in the most appropriate manner. Only then can we possibly solve the problem of environmental pollution.