Seminar on Environmental Pollution

Introduction

Pollution is the introduction of contaminants into the natural environment that cause harm. Pollution can take the form of any substance (solid, liquid, or gas) or energy (such as radioactivity, heat, sound, or light). Pollutants, the components of pollution, can be either foreign substances/energies or naturally occurring contaminants.

Although environmental pollution can be caused by natural events, the word pollution generally implies that the contaminants have a human source, such as manufacturing, extractive industries, poor waste management, transportation or agriculture. Pollution is often classed as point source (coming from a highly concentrated specific site, such as a factory, mine, construction site), or nonpoint source pollution (coming from a widespread distributed sources, such as microplastics or agricultural runoff).

Many sources of pollution were unregulated parts of industrialization during the 19th and 20th centuries until the emergence of environmental regulation and pollution policy in the later half of the 20th century. Sites where historically polluting industries released persistent pollutants may have legacy pollution long after the source of the pollution is stopped. Major forms of pollution include air pollution, water pollution, litter, noise pollution, plastic pollution, soil contamination, radioactive contamination, thermal pollution, light pollution, and visual pollution.

Pollution has widespread consequences on human and environmental health, having systematic impact on social and economic systems. In 2019, pollution killed approximately nine million people worldwide (about one in six deaths that year); about three-quarters of these deaths were caused by air pollution. A 2022 literature review found that levels of anthropogenic chemical pollution have exceeded planetary boundaries and now threaten entire ecosystems around the world. Pollutants frequently have outsized impacts on vulnerable populations, such as children and the elderly, and marginalized communities, because polluting industries and toxic waste sites tend to be collocated

with populations with less economic and political power. This outsized impact is a core reason for the formation of the environmental justice movement, and continues to be a core element of environmental conflicts, particularly in the Global South.

Because of the impacts of these chemicals, local and international countries' policy have increasingly sought to regulate pollutants, resulting in increasing air and water quality standards, alongside regulation of specific waste streams. Regional and national policy is typically supervised by environmental agencies or ministries, while international efforts are coordinated by the UN Environmental Program and other treaty bodies. Pollution mitigation is an important part of all of the Sustainable Development Goals.

Definitions and types:

The term "pollution" in the modern environmental sense was rare before the 1860s. The old sense referred to the desecration of something sacred. According to Adam Rome" To describe what we now call air pollution--i.e., the gaseous, chemical, and metallic by-products of combustion and industrial processes--people usually talked of "the smoke nuisance." There were several variations of that term --"the smoke problem," "the smoke evil," even "the smoke plague."

Various definitions of pollution exist, which may or may not recognize certain types, such as noise pollution or greenhouse gases. The United States Environmental Protection Administration defines pollution as "Any substances in water, soil, or air that degrade the natural quality of the environment, offend the senses of sight, taste, or smell, or cause a health hazard. The usefulness of the natural resource is usually impaired by the presence of pollutants and contaminants." In contrast, the United Nations considers pollution to be the "presence of substances and heat in environmental media (air, water, land) whose nature, location, or quantity produces undesirable environmental effects."

The major forms of pollution are listed below along with the particular contaminants relevant to each of them:

Air pollution: the release of chemicals and particulates into the atmosphere. Common gaseous pollutants include carbon monoxide, sulfur dioxide, chlorofluorocarbons (CFCs) and nitrogen oxides produced by industry and motor vehicles. Photochemical ozone and smog are created as nitrogen oxides and hydrocarbons react to sunlight. Particulate matter, or fine dust is characterized by their micrometre size PM10 to PM2.5.

Electromagnetic pollution: the overabundance of electromagnetic radiation in their non-ionizing form, such as radio and television transmissions, Wi-fi etc. Although there is no demonstrable effect on humans there can be interference with radio-astronomy and effects on safety systems of aircraft and cars.

Light pollution: includes light trespass, over-illumination and astronomical interference.

Littering: the criminal throwing of inappropriate man-made objects, unremoved, onto public and private properties.

Noise pollution: which encompasses roadway noise, aircraft noise, industrial noise as well as high-intensity sonar.

Plastic pollution: involves the accumulation of plastic products and microplastics in the environment that adversely affects wildlife, wildlife habitat, or humans.

Soil contamination occurs when chemicals are released by spill or underground leakage. Among the most significant soil contaminants are hydrocarbons, heavy metals, MTBE, herbicides, pesticides and chlorinated hydrocarbons.

Radioactive contamination, resulting from 20th century activities in atomic physics, such as nuclear power generation and nuclear weapons research, manufacture and deployment. (See alpha emitters and actinides in the environment.)

Thermal pollution, is a temperature change in natural water bodies caused by human influence, such as use of water as coolant in a power plant.

Visual pollution, which can refer to the presence of overhead power lines, motorway billboards, scarred landforms (as from strip mining), open storage of trash, municipal solid waste or space

debris.

Water pollution, caused by the discharge of industrial wastewater from commercial and industrial waste (intentionally or through spills) into surface waters; discharges of untreated sewage and chemical contaminants, such as chlorine, from treated sewage; and releases of waste and contaminants into surface runoff flowing to surface waters (including urban runoff and agricultural runoff, which may contain chemical fertilizers and pesticides, as well as human feces from open defecation).

Natural causes:

One of the most significant natural sources of pollution are volcanoes, which during eruptions release large quantities of harmful gases into the atmosphere. Volcanic gases include carbon dioxide, which can be fatal in large concentrations and contributes to climate change, hydrogen halides which can cause acid rain, sulfur dioxides, which are harmful to animals and damage the ozone layer, and hydrogen sulfides, which are capable of killing humans at concentrations of less than 1 part per thousand. Volcanic emissions also include fine and ultrafine particles which may contain toxic chemicals and substances such as arsenic, lead, and mercury.

Wildfires, which can be caused naturally by lightning strikes, are also a significant source of air pollution. Wildfire smoke contains significant quantities of both carbon dioxide and carbon monoxide, which can cause suffocation. Large quantities of fine particulates are found within wildfire smoke as well, which pose a health risk to animals.

Human generation:

Motor vehicle emissions are one of the leading causes of air pollution. China, United States, Russia, India, Mexico, and Japan are the world leaders in air pollution emissions. Principal stationary pollution sources include chemical plants, coal-fired power plants, oil refineries, petroc

Environmental Pollution:

Air Pollution, Water Pollution, Sea Pollution, Soil Pollution