Environmental Pollution And Effect on Human Health And The Living of Creatures

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Abstract. Pollution takes many different forms from the atmosphere to the oceans pollution is everywhere and is a global problem. Natural pollution is mainly divided into air pollution, water pollution and land pollution. Air pollution is mainly caused by small particles emitted from large amounts of energy. Water pollution is caused by human-made waste and its impending set of consequences. Land pollution is mainly caused by human activities, especially the use and management of different materials. These three types of pollution are interrelated, and the cause of one type of pollution may become the result of another. This paper discusses the main sources of pollution in the atmosphere, water and land, and the potential dangers that pollution may pose to humans and some other species that may be greatly threatened. The paper suggests that human should now manipulate their destruction of the environment, and act greenly to prevent the aggravation of the polluting process.

Keywords: Pollution; particles; harm; health.

1. Introduction

Modern civilization relies on industrialization to create economic growth and living conditions improvement, while serious health toll of creatures has been exacted in a wide range of biosphere. A study recently published argumentations that public health could be improved by transitioning the utilization of currently applied energy to green and clean energy, but that requires human beings a more forward-looking perspective and their awareness of the seriousness of the polluted environment. Studies that have been done in the recent years confirmed that pollution is the main reason causing environmental degradation including the increasing worsening of croplands fertility, temperature stability, air and water quality, and human's living quality. Emission of pollutants into the atmosphere lessens the visibility and lightness by bringing mass tiny particles, which are products of human activities especially the process of urbanization. More and more land is taken and overused, then ultimately they become polluted and are abandoned. So less suitable places would be available for the livings. Creatures' habitats, diet and respiration are all influenced by pollution, which might destroys their body functions, advance their health risks, and finally leads them to death. The purpose of this paper is to identify the three most serious types of pollution, explain what pollution is and list the corresponding research findings for each type of pollution. Also to relate pollution and the harm they do to the environment, calling attention to the deteriorating environment and taking action to protect it.

2. Air pollution

Air pollution, mostly contributed by the burning of fossil fuels such as coal, oil and fossil gas, emits small and toxic particles into the atmosphere which then penetrate human bodies, causing damage to the brain, and physical disabilities and mental problems. In a study done by Kutcher et al. in 2019 for the BMC public health, a sample of 1644 people was randomly selected and put into the investigation of whether they had great concern about air pollution damaging their body functions in several particular aspects. The results indicated three greatest concerns--that low-income populations, older people, and children, consider themselves more prone to suffer from particle pollutants in the air, having problems such as lung cancer, heart disease, and asthma or even Alzheimer's disease for

the elderly [1]. Seeing the threats around the globe, it became necessary for different countries and their governments to respond to the risky information and take actions to prevent this anxiety of population and the origin of anxiety--which is the phenomenon of air pollution. In the case of covid-19, a lung disease causing the death of a massive population around the globe, air pollution was considered a predisposition to health issues, particularly pulmonary tissue in human body. According to a German report on the size of pollutant particle and its correlation with coronavirus infections, higher COVID-19 fatalities was determined by long-term fine particulate air pollution [2]. Remarkably, the presence of PM2.5 over the size of 1μg square meters is almost directly linked to 199.26, with a standard deviation of 29.66 of COVID-19 cases per 100,000 residents. The severity has warned people that the air condition cannot be seen as positive, so further methods to prevent and control become an issue that needs to be discussed and determined. In some other countries, for example, China, control of air pollution has already been in progress. In the past thirty years, Chinese economics was mainly supported by fossil fuels, while China kept lowering its fossil fuel emission, the transition sec gradually changed from the mere control of emissions to management of air quality. The most precautious method should be noted as de-carbonization. Till now, the most challenging mission in the process of controlling air pollution is to tackle the PM 2.5 issue, since it is contributed by multiple sources and precursors [3]. In China, comprehensive control actions with multi-party coordination on provincial and even national levels have been implemented to decrease fossil fuel impacts on the adverse ecology and society. First, it was the challenge of decoupling SO2, NOx and PM2.5.

2.1. SO2

For SO2, control zones are implemented in areas of high acidity and high sulfur precipitation deposition. According to NAAQS limits and based on the surpassing of ambient SO2 concentrations, this method is used.

2.2. NOx

For NOx, since its sources are distributed among combustions of high-temperature and across multiple sectors, it results in greater difficulty and higher payment for NOx emission mitigation. To solve this, policymakers targeted the thermal power plants, which were the main sector responsible for at least 30% of the national total emissions of NOx. Low NOx burners are also suggested, which is a technology that works moderately to control NOx.

2.3. PM 2.5

For PM 2.5, PM2.5 concentrations are primarily sensitive to the emissions of NH3 and organic compounds (e.g., non-methane volatile organic compounds (NMVOCs), intermediate volatility organic compounds (IVOCs), and primary organic aerosols (POAs)according to an RSM study. Therefore, in 2015, an all-embracing VOC control program was initiated, targeting on petrochemical industry, surface coating industry, organic chemical industry and packaging and printing industry. Through these methods with dynamic systems, the air quality would no longer be a serious problem causing bad health conditions for people.

3. Water pollution

3.1. Influence on the marine primary producers.

Pollution takes part in different forms besides being toxic and harmful particles in the atmosphere. The marine ecosystem has also been influenced by the global pollution process. The ocean, home to over 1.4 to 1.6 million species, one of the greatest biomes on earth, is now losing a wide variety of its species due to the deterioration of the marine environment. One of the most obvious phenomena accounts for the coral reef. As the part of marine biome with the largest biodiversity, its condition is

now growing in a trend of declining. Along with several Australian initiatives, The United States Coral Reef initiative come up with a report on coral reefs, that till 1995, only 40% of the coral reefs were still safe and well preserved. Of the rest 60%, half of them were threatened seriously, and half were already in the critical state, with almost no returning possibility [4]. Upon meticulous examination, human population density, and eutrophication took the dominance in deteriorating the marine primary producers locally and regionally, there are also other evident causes such as global warming caused by the increasing greenhouse gas and thus the gradually increasing pH value of the ocean water; there is ozone depletion followed by exposure of UV light in shallow-reef biota [4]. The greatest concern, however, is still created by anthropogenic inputs. Human-triggered processes like direct pollution, sedimentation and nutrient loading would most likely pose the greatest threat to marine primary producers soon.

3.1.1 Eutrophication

Physiological speaking, Eutrophication would destabilize the finely attuned symbiotic alga-host. association's functions. Zooxanthellae would show a significant decrease when making photosynthesis in individuals, while their total production was still high. Available abundant necessary nutrients would lead the zooxanthellae to compete against benthic primary producers which are often evasive and uncontrollable species like seaweed. Eventually, after the original marine primary producers are overgrown by algae, leaving them to die. In short, benthic communities benefit from an extra amount of nutrient supply, this reduces sulfate and forms hydrogen sulfate, which put great living stress on marine plants.

3.1.2 Sedimentation

In this case, mass burial buries native marine primary producers in an environment that lacks light and oxygen supplies. Producers will die soon only in a few hours. Its negative effect is similar to that of the effect caused by high water turbidity.

3.1.3 Sewage disposal

They are usually from raw sewage and organic wastewater from manufacturing or industry companies. The organic matter in the wastewater consumes oxygen and thus causes oxygen depletion in the water area, which prevents native marine creatures to keep their basic living conditions.

3.2. Effects of Plastics on Marine Biodiversity

Except for primary producers, marine plastic pollution threatens mammals, birds and fish. They come in multiple forms, and one of the most serious forms is plastic pollution. Plastics recycles in the Pacific Ocean, Indian Ocean, and Atlantic Ocean, causing entanglement, invasive species and death. According to the statistics, about 280 million tons of plastic are produced and wasted in a year [5]. Although useful, convenient and lightweight, once plastics enter nature, they do not biodegrade, instead, they photo degrade into small pieces, and gradually penetrate the growing routine of primary producers, thus consumers, which are us, and every creature that needs energy. In the study given by EPA in 2014, plastic waste has taken up to 12 percent of the world's total solid waste. This enormous number has become a great deal of the whole world. It is believed that plastic products could be turned back into their oil state, but collecting the waste plastic and transforming them requires uncountable financial support, as this technology is still not well developed in the world. Cetaceans, turtles and fish view microplastic as phytoplankton and consume them. Plastic debris that remains the marine animals lingers in their body, reducing animals' stomach capacity (because plastics can also not be digested), hindering their growth rate, and internal injuries such as the aberrant twining of intestines. Compare to those marine creatures, birds consume less plastic in their bodies mainly because their food source comes directly from fish and indirectly from plastic pieces. But birds cannot determine and distinguish between the color of the food they eat and the color of the plastic pieces.

3.3. Plastic pollution in the Great Lakes.

Bigger lakes consist of containments from smaller lakes. When the pollution level of the smaller anabranch is high, it is inevitable that the bigger lakes and rivers are also badly polluted. Factories along the anabranch also contribute to pollution. Often in observations and experiments that check the water quality of lakes, it would be found that the pollutants are often times of that in the ocean. It can be hypothesized from the fact that the volume of the ocean body is great, so the pollutants per square meter seem smaller. But the total pollution of the ocean should be greater than that of lakes and rivers, since ocean is the alternate meeting place of all of them. In many cases, lives suffer from the damage of the presence of plastic. Sometimes when plastic is made into the shape of bags or contaminants, it would become the accumulator of other kinds of waste, both industrial and biological, thus worsening the water quality.

3.4. Impacts of water pollution on human health.

The same plants and animals, humans are also influenced by water pollution. The main problem associated with the degradation of water quality that might harm humans is viruses. The WHO recordings of infectious disease approximately two decades ago indicate that waterborne diseases take most of such diseases, including cholera, acute diarrhea, legionellosis, and typhoid fever [6].

4. Landmass pollution

The most problems that occur in the destruction of lands come from overuse, excavation, mass distribution and nutrient enrichment. Coal excavation and combustion, vehicle emission, waste disposal, etc. these rapid processes of urbanization increases the contamination of heavy elements in lands, which now causes problems with trees and crops, and human health. Nowadays urban soil has a high concentration of Cadmium, Copper, Lead and Zinc. These heavy metals enter human lives and activities through the urbanization process given above, which destroys plants directly by damaging the root, reducing their growth, and ultimately causing the plant to be unable at making photosynthesis to death. When humans have excess soil with heavy metal in life by any kind of contact, they would get serious problems with their skin, bones and organs, leading to dysfunctions disease [7].

According to the scientific report in 2022, the values of the hazard quotient of Cd are greater than 1, while other metals are smaller than 1. Different metals' impacts on children and adults are also not the same. For children, the Harvard quotient for the heavy metals rank from Cd>Zn>Cu>Pb>Ni. While for adults, the rank comes from Cu>Cd>Pb>Zn>Ni. Children are thus more exposed to the risk of Cd. Since children's nervous system is rapidly developing and are thus sensitive to tiny environmental changes, even a little amount of Cd enters children's body, which causes great damage to the developing nervous system. Consequently, the mental health and mental growth of children would be greatly and irreversibly damaged, leaving health problems afterwards when they enter adulthood.

4.1. Landfilling

As one of the most common methods of dealing with waste, landfilling can be categorized into three types: respectively municipal solid waste landfill, industrial waste landfill, and hazardous waste landfill [8]. When the waste is to be put into lands or buried, it would have to go through strict inspections to evaluate whether they accord with certain regulations. Their quality as well as quantity, would need to be measured so their release would be guaranteed to have a less negative impact on soil. However, it is still not preventable that illegal and uncontrolled landfilling is prevalent in many developing countries.

Landfilling is associated with environmental problems such as organic and inorganic substances leaching that lead to underground water pollution. Leaching gather to form potential runoffs that take away necessary nutrients for native plantations and crops, entering the ocean and causing marine pollution. Once the environment of a particular place is altered, it will be no longer suitable for certain

plants or animals to thrive, thus decreasing biodiversity. Small particles or chemical volatile matters would leave the waste that fills the land and penetrates the atmosphere, causing air pollution and volatiles bad odor. Bad odor, however, is linked with respiratory disease, especially among children, who have weak immune systems to resist invading harmful chemical gases. Some people might even develop cancer.

4.2. Fertilizers

A massive population requires a great deal amount of food supplies to stay away from starvation. While massive food sources are often induced by large quantities of commercial fertilizers and pesticides, which is toxic to plants, crops and land. As the toxic matter accumulates in the land, the pH of the land would become lower, thus becoming unsuitable for the growth of certain plantations. Fertility of the land also decreases, as a result, the number of products harvested would decrease. Consequently, farmers need to make a change in their cultivation areas and left the toxin-polluted land aside. However, it takes a long time for a massively polluted land to adjust to a stable state suitable for plants grow again [9-10].

5. Conclusion

Any kind of pollution can harm the living. The writing purpose of the passage is to inform us of some of the most serious pollutions that are taking place in the world, and it intends to raise people's awareness of the worsening environmental condition damaged by pollution. The process of urbanization is always continuous and inevitable. But whatever time we are in, a green life should be our constant pursuit. Good condition of the environment is the welfare of all livings on this planet, it directly determines our living quality and health. Nowadays there have already been ways to reduce the burden brought by pollution, while the technology is still not mature enough to convert the earth back to the state before industrialization. Humans should now think of methods to eliminate every possible pollution cause, or they have to get access to advanced pollution processors as soon as possible.

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