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Review Article

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The Consequences Of Environmental Pollution Can Be Fatal

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Abstract
Environmental pollution is the import of a foreign chemical substance or energy in a stable form into the environment in a concentration or quantity, which at a given moment causes direct damage to the environment, parts of nature, living beings or human health. Pollution or contamination means the presence of a foreign chemical substance in the environment, in a concentration or volatile form that does not cause direct harm to human health or other living organisms in a short time. Pollution is sought to be prevented by controlling the source of pollution. Man's actions endanger and pollute the soil, air and water. Pollution can cause illness and even death in chronic patients.

Keyword: Environment, Air, Soil, Water, Pollution

Introduction

The scientific community has been taking samples and identifying the source of the materials in those samples for many years – this is the basis of all environmental forensics, the identification and source apportionment of compounds in environmental samples [1]. What is different, however, is that with source apportionments comes blame, and blame these days means costs.Environmental forensics could be summarized as an investigation of what is in the environment, where it has come from and using that data to prosecute those who have contravened particular laws. There are other aspects to environmental forensics which include data mining and prediction to understand better what is going on, helping industries at the design stage to ensure they comply with relevant legislation and simply reconstructing environmental histories – who did what, when and where?

The field of environmental forensics emerged in the 1980s as a consequence of legislative frameworks enacted to enable parties, either states or individuals, to seek compensation with regard to contamination or injury due to damage to the environment [2]. Environmental laws, including CERCLA ("Superfund") in the United States and Environmental Liability Directive in the European Union (EU), are based on the polluter pays and precautionary principles and require the parties responsible for the release of hazardous substance to report the release, investigate the nature and extent of the release and to then remediate it to some objective cleanup standard.

Risk

Risk assessment is a system of analysis that includes four tasks [3]:

1. Identification of a substance (a toxicant) that may have adverse health effects
2. Scenarios for exposure to the toxicant
3. Characterization of health effects
4. An estimate of the probability (risk) of occurrence of these health effects

The decision that the concentration of a certain toxicant in air, water, or food is acceptable is based on a risk assessment.

Toxicants are usually identified when an associated adverse health effect is noticed. In most cases, the first intimation that a substance is toxic is its association with an unusual number of deaths. Mortality risk, or risk of death, is easier to determine for populations, especially in the developed countries, than mor- bidity risk (risk of illness) because all deaths and their apparent causes are re- ported on death certificates, while recording of disease incidence, which began in the relatively recent past, is done only for a very few diseases. Death certificate data may be misleading: An individual who suffers from high blood pressure but is killed in an automobile accident becomes an accident statistic rather than a cardiovascular disease statistic. In addition, occupational mortality risks are well documented only for men; until the present generation, too few women worked outside the home all their lives to form a good statistical base.

These particular uncertainties may be overcome in assessing risk from a particular cause or exposure to a toxic substance by isolating the influence of that particular cause. Such isolation requires studying two populations whose environment is virtually identical except that the risk factor in question is present in the environment of one population but not in that of the other. Such a study is called a cohort study and may be used to determine morbidity as well as mortality risk. One cohort study, for example, showed that residents of copper smelting communities, who were exposed to airborne arsenic, had a higher incidence of a certain type of lung cancer than residents of similar industrial communities where there was no airborne arsenic.

Crime

Environmental forensics focuses on reconstruction of past contamination (pollution) events based on the evidence that is left (e.g., identifying the source and age of environmental contaminants and allocating responsibility for contamination) [4]. The forensic evidence is acquired through a series of techniques, starting with historical file review and potentially ending with application of cutting- edge scientific testing techniques. The environmental forensic testing techniques are generally referred to using the generic term fingerprinting. Similar to fingerprints used in homicides or other crimes to identify a criminal, contaminant fingerprints are used to identify the contamination source or responsible party who is ultimately going to pay for the damages. As in the case of criminal forensics, the justice and legal systems play a major role in the process. Typically, a lawsuit is filed, and evidence acquired through environmental forensic studies is used in litigation support. However, distinct from criminal forensics, environmental forensics also has many useful applications that do not involve legal proceedings or disputes, such as those in contaminated site investigation and remediation. While these nonlegal applications are growing, the link between criminal and environmental forensics is obvious and will continue to influence environmental forensics science and make it unique.

Although criminal and environmental forensics are distinct fields, they have some main common elements. They are both triggered by "crimes"; they both use scientific investigative methods to identify and confirm responsible parties, and ultimately, they both ensure that justice occurs in order to compensate the damaged parties and restore order.The distinction between the two forensic fields resides basically in the type of "crime," including the criminal means. While criminal forensics applies to human crimes, environmental forensics refers to "environmental crimes," in other words, environmental contamination episodes.

Thus, the direct and primary receptor of an environmental crime is the environment (including land, air, surface water, and groundwater). Yet, in many cases, the environment is neither the only nor the final receptor. That is because the ecosystem and humans may ultimately become affected while in contact with the contaminated environment. It is this potential to affect human health and ecosystems that makes environmental crimes of equal, if not higher, "long- term" importance than any other crimes. It is the potential for devastating long- term effects on humans, ecosystems, and natural resources that may threaten our future. Hence, the importance of understanding and dealing with environmental crime and the need for adequate environmental forensic tools and approaches are acute.

Microorganisms

Microorganisms are generally good indicators of environmental contamination as they are ubiquitous in all environments; however, that is not to say that all bacteria are everywhere [5]. Particular contaminants have an associated microbial community which consists of microorganisms capable of surviving in the presence of the contaminant. It is possible that these organisms have also developed the metabolic capacity to utilize these contaminants, offering the opportunity to remediate the contaminant. Two broad classes of microorganisms associated with the contaminant can be described:

First, those organisms that were present and constituted part of the contaminant. Faecal contamination is an example of an environmental contaminant which has an associated microflora. In this instance, specific genera of microorganisms are used both to identify and to quantify the level of contamination. In this scenario, it is desirable to monitor a microbial population that is capable of long-term survival in the environment, but which is unable to grow in the environment.

Second, the monitoring of a microbial population which is present in the environment but which may have not been associated with the contaminant at source, but when released into the environment naturally occurring microorganisms become associated with the contaminant through their utilization of the contaminant. In this instance, the identification of the microorganisms allows identification of the contaminant in the environment but does not quantify any changes in concentration of as contaminant as it moves through an environment. An example would be an oil spill where naturally occurring microorganisms capable of degrading components of the pollutant can be detected.

POP

Globally there are many 100,000 existing chemicals on the market [2] and they are an integral part of our modern life. Since the 1960s, following the publication of Rachel Carson's book Silent Spring, mounting scientific evidence has suggested that certain chemicals pose a significant risk to the environment and human health. The United Nations Environmental Programme (UNEP) has identified a number of these chemicals as substance of very high concern (SVHC) and categorizes them as persistent, bioaccumulative, and toxic (PBT). Chemicals categorized as PBT do not break down easily in the environment, accumulate in the tissues of organisms, and are toxic. Persistent organic pollutants (POPs) are a subset of the PBT category, others include trace metals and organo-metal compounds. As the name suggests POPs are compounds which are organic (natural or anthropogenic) in nature and resist biological, chemical, and photolytic degradation. The UNEP defines POPs as "...chemical substances that persist in the environment, bioaccumulate through the food web, and pose a risk of causing adverse effects to human health and the environment".

There are thousands of chemicals which may be classified as POPs including whole families of chemicals, for example polychlorinated biphenyls (PCBs), polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans (PCDD/PCDF), polybrominated diphenyl ethers (PBDEs), and organochlorinated pesticides (e.g., dichlorodiphenyltrichloroethane, DDT). Sources of POPs may be broadly classified as agrochemical (pesticides), industrial (synthesized for industrial use), or unintentional by-products (products of combustion or industrial synthesis of other chemicals).

Soil
Soil is the primary media via which microbial analysis is available in forensic investigations [6]. The specific composition of soil varies widely due to the presence of these components in different proportions at different geographical locations. For many soils, the organic component does not exceed 5% by volume. Water makes up about 20–30% of the average soil volume and is essential for the survival of the soil microbial community and plant life.

Analysis of soil microorganisms has historically been ignored by the environmental forensic scientific community. This is primarily due to the limitations of traditional culturing techniques, which allow only a small subset of organisms to be isolated and characterized. A limited number of studies have been performed that use soil microbiology for environmental forensic purposes, using culturing, enzymatic analysis, and functional diversity analysis. However, the rapid growth of molecular biology has resulted in techniques that can circumvent the requirement to isolate and culture microorganisms as a prerequisite to identification. Soil microbial diversity is now routinely characterized using simple molecular techniques based on variations in microbial DNA. To date, molecular analysis of microbial diversity and community composition has been used to analyze microbial populations in many diverse environments including marine and fresh waters, soils, composts, and landfills.

Air Quality
Air quality measurements are designed to measure all types of air contaminants, with no attempt to differentiate between naturally occurring contaminants and those that result from human activity [3].

Air quality monitoring instrumentation has been developed in three phases, or "generations." First-generation devices were developed when little or no precedent existed for measuring very small quantities of gases in the atmosphere, nor was much money available for their development. Accordingly, they are simple, inexpensive, and usually do not require power to operate. They are also inconvenient, slow, and of questionable accuracy.

Second-generation measurement equipment evolved when more accurate data and more rapid data collection were required. It uses power-driven pumps and other collection devices, and can sample a larger volume of air in a relatively short time. Gas measurement is usually by wet chemistry--that is, collected gas is either dissolved into or reacted with a collecting fluid.

Third-generation devices differ from their predecessors in that they provide continuous readout. The measurement of pollutant concentrations is almost in- stantly translated by a readout device, so that the pollution may be measured while it is happening.

Water
Nowadays the concept of human security on a global scale may be extended from its traditional meaning of worldwide political and military security to also embrace the idea that every citizen should be able to benefit from sustainable socio-economic development [7]. From amongst different natural resources, water has been recognized as the key environmental resource for social security, economic growth and prosperity. Human security can therefore be seen to be related to environmental preservation (water, ecosystems and biodiversity) and to socio-economic stability and sustainable development.

Historically speaking, internationally shared water resources in transboundary river catchments have always been of importance. Rivers and lakes have often been used to determine frontiers between countries (e.g. the Rhine between France and Germany, the Rio Grande between the USA and Mexico and the Evros/Meric between Greece and Turkey). There have been numerous conflicts but also cases of cooperation over transboundary water resources. In many cases, one or several countries may occupy parts of the upstream or downstream area of the river catchment. This makes the issue of water sharing even more complicated (e.g. the Nile between Egypt and the Sudan, the Middle East conflict over the Jordan River and the Danube between many European countries).

On a global scale, the importance of transboundary water resources is far from negligible: according to reports submitted to the UN, about 50% of the world's landmass (excluding Antarctica) is located in internationally shared water catchments. About 40% of the world's population lives in internationally shared water catchments, extending over more than 200 international river basins.

In the Mediterranean, transboundary water resources are extremely important. In SEE, 90% of the area lies in international basins. The Nile basin is shared by 10 countries from deepest Africa to Egypt. In North Africa and in the Middle East, transboundary aquifers are very important.

Groundwaters
Compared with surface water management, groundwater is poorly managed [8]. As a natural resource, groundwater is crucial for humans as well as the environment, and used for domestic, municipal, industrial and agricultural purposes. With increased and unplanned urbanisation, and unlimited water abstraction for activities such as mining or construction, rules guiding sustainable management of groundwater are now a must. Groundwater or water in the ground stored in aquifers contains 97 per cent of all the nonfrozen freshwater on the planet. Because of its use as potable water, both quantity and quality are important aspects of groundwater management. Sustainability of groundwater management is influenced by what happens on the ground (eg pesticide contamination, agricultural runoff, wastewater discharge and accidental spillage), in the atmosphere (eg contaminated rainfall and salinisation as a result of climate change) and regulatory framework (eg pricing, monitoring and licence permits).

Groundwater being a natural resource over which states have permanent sovereignty, the regulatory frameworks for groundwater management vary from one state to another with a series of environmental, water, agricultural and industrial regulations. This multiplicity of overlapping regulations, lack of coordination among various agencies and the power sharing between states and local governments make its management a most diffi cult process. This becomes more complex when water aquifers are shared between two or more countries.

Globalisation

Globalisation has great momentum in the early twenty-first century for both economic and political reasons [9]. At the same time, it poses fundamental challenges for environmental values as environmental problems are worsening at all scales from the local to the global. The scientific community has given urgent warnings according to which we are changing natural systems in serious and irreversible ways which may put our civilisation at risk.

The multiplicity of justifications for environmental protection and the diversity of environmental challenges confronting us call for pluralism in environmental matters. While there are increasingly good reasons to protect the environment for its own sake, many scholars have demonstrated that economic development and human well-being depend critically on a diverse and healthy natural environment. Environmental protection also often makes good economic sense. This is especially true for people in the developing countries who critically depend on environmental resources for their livelihoods and who are extremely vulnerable to adverse environmental change. Environmental protection is also warranted because of the importance of natural systems for social cohesion, cultural traditions and spiritual life.

It is thus no wonder that environmental values and justice are becoming increasingly important in the globalising world. Those who seek to protect the environment because of its cultural significance will not have the same priorities as those who value its economic contribution, or those who nurture natural systems for their intrinsic beauty, or those who want to take a precautionary approach to complex natural systems. So we need to be sensitive to all environmental values that underpin these and other positions and develop institutions that enable broad participation in the making of difficult environmental decisions. The processes used to resolve differences in viewpoints must recognise that there are legitimately diverse viewpoints which arise from the plurality of values. In some instances, it will be possible to find compromises that command broad acceptability and help to build political coalitions encompassing different viewpoints. For example, using fisheries or forests in sustainable ways makes economic sense and protects resource stocks, ecosystem services and social institutions that depend on them. Other environmental issues such as climate change can make a compromise difficult to attain. In those cases, the challenge is to institute processes that all will agree to be reasonable, thus enhancing the prospect that those who disagree with the outcome will be prepared to accept it.

Security

Population growth, needed economic growth, and social pressures for improved infrastructure coupled to the need for human health and ecological protection and environmental security make systematic and transparent environmental decisionmaking a complex and often difficult task [10]. Evaluating complex technical data and developing feasible risk management options requires procedural flexibility that may not be part of existing evaluative structures. Experience has demonstrated that direct transposition of risk assessment and risk management frameworks (e.g. those developed in the United States and European Union) may not work in regions whose social, legal, historical, political and economic situations are not suitable or prepared for acceptance of these methodologies. Flexible decision-making, including the use and development of acceptable or unacceptable risk levels based on the critical nature of an infrastructure type, is one potential approach to assist risk managers in their decision-making. Unfortunately, the newness of the discussions on the interrelatedness of environmental security and critical infrastructure has yet to produce a unified and comprehensive treatment of the fields.

Conclusion

Environmental pollution is the import of pollution into the environment that causes harm to humans and other living organisms. Pollutants can be natural substances or energy, and are considered pollutants when there are more than the permitted level. Environmental pollution occurs when the environment can no longer process and neutralize harmful human by-products such as toxic exhaust gases without causing structural or functional damage to the system. The study of environmental protection is important because of the negative impact on key environmental functionalities such as providing clean air and clean water without which life on Earth would not exist. The main reason for environmental pollution is people. We should all think about it well.

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