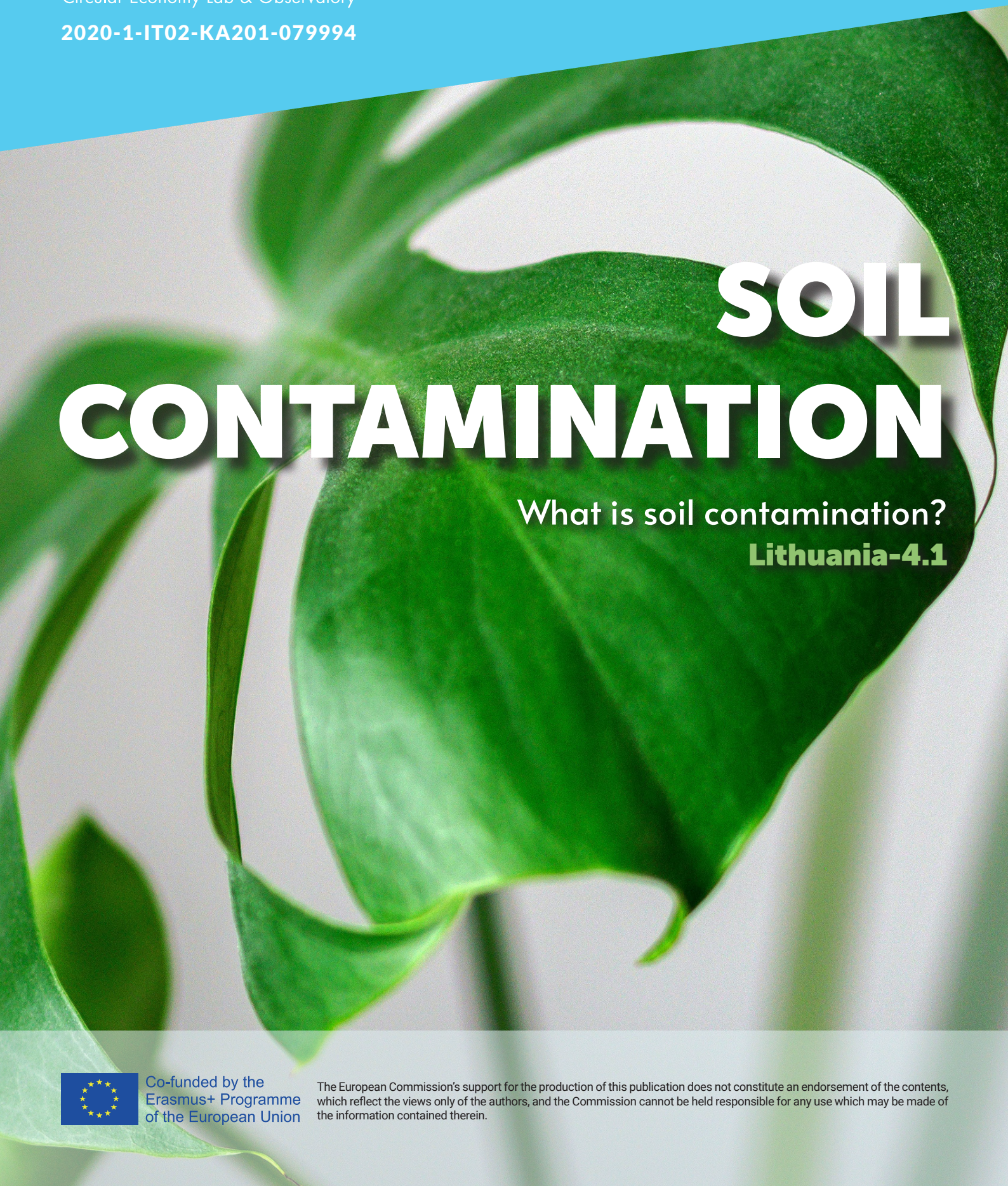
Circular Economy Lab & Observatory

2020-1-IT02-KA201-079994



SOIL CONTAMINATION

What is soil contamination?

Lithuania-4.1

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Certain human activities cause certain emissions or chemicals that can contaminate the soil. These substances change the composition and structure of the soil. This causes the soil to lose nutrients and its ability to be fertile. Living creatures living inside the soil layer and all vegetation growing in it are affected. These circumstances can cause real disasters in ecosystems that are the habitats of many species.

Natural pollution

Soil can also become contaminated naturally when certain phenomena occur that drag and filter natural chemical elements into the ground. Due to the introduction of chemicals of this nature into the soil, the concentration of these chemicals is too high for the soil to remain fertile. Some examples of natural pollution are volcanic eruptions, fires, and acid rain, which release concentrations of harmful gases into the atmosphere. When precipitation falls, the poisonous gas settles in water droplets and eventually filters into the soil. These toxins cause loss of soil fertility and quality.

Human and environmental risks

Contaminated soils can present a human health risk by several routes. Contaminants released at the Earth's surface can be transported vertically and laterally into surface and ground waters and eventually become ingested by private and municipal water users. Contaminants adsorbed onto soil can be inhaled or ingested by humans directly.

They can also be taken up by plants, accumulated in animal tissues, and eventually detected in the foods ingested by humans. Dermal exposure to soils contaminated with toxic chemicals may lead to absorption through the skin. In each route described, deleterious effects of the contaminant depend on both the amount absorbed or ingested and the inherent toxicity of the contaminant [1].

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Contamination of soil can also be harmful to the environment. Biomagnification of a contaminant, in which a contaminant becomes more concentrated in tissues as it moves up the food chain, can cause ecological harm at various trophic levels [2]. Soil contamination can also limit land value by preventing its optimal use and cause corrosion to buildings and structures. Since soil pollution is regularly escorted through a reduction in the accessibility of nutrients, the plants restrict it to thrive in such soils.

Soils tainted with inorganic aluminum can establish toxicity to flora. This kind of pollutant often augments the salinity of the soil, making it unwelcoming for the growth of vegetation. Plants that are nurtured in polluted soil may additionally increase a high amount of soil pollutants through a system called bioaccumulation.

When these plant lives are eaten or eaten up via herbivores, all of the accrued pollutions are handed up the meals chain. This can result in the loss and extinction of many animal species. Also, these pollutants can ultimately make their manner to the pinnacle of the meals chain and appear as diseases in human beings.

Since the unstable contaminants within the soil can be transmitted away into the surroundings with the aid of winds. They can seep into the underground water reserves.

The soil pollutants may be a right away contributor to air and water pollutants. Furthermore, it could add to acid rain employing discharging a big amount of ammonia into the atmosphere. Acidic soils are unfriendly to several microorganisms that perk up soil texture and assist in the decay of natural dependence. Crop yield is notably influenced by this shape of pollutants [3].

Soil contaminationby infiltration

When we pollute water using different chemicals, there is an infiltration process between the soil and the water. During filtration, all water contamination remains in the soil.

People also throw a large amount of waste of all kinds, whether from home, work, health, industry, etc. It goes straight into the ground at a specific location.

Then a process of degradation of these residues occurs due to environmental exposure and as a result leaching. What is released is nothing more than chemicals mixed with water and released into the soil.

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Added to this is the pollution that comes from run-off from the leaching of pollutants from the ground during heavy rainfall. There are several types of runoff, the best known being surface runoff, which can carry contaminants such as fertilizers, oil, pesticides, herbicides, and more. Both rainwater and snowmelt can contaminate the ground.

Heavy metals in soil
Heavy metals are a consequence of modern industry. Affected soils become impoverished and heavily contaminated, and contaminants can seep into groundwater. Thus, heavy metal pollution is one of the most important problems of a. Removal of metals by conventional physical and chemical methods is expensive and often inadequate.

The removal of harmful pollutants is difficult due to the abundance and variety of pollutants. Most soils are contaminated not only with heavy metals, but also with other pollutants (petroleum products). Cleaning the soil from heavy metals and other pollutants by digging it and transporting it to another place is widely used.

Recently, however, scientists have proposed the use of various plants to clean the soil at the source of pollution, where it spreads. Phytoremediation is a new approach to removing pollutants from the environment (Jankaitė, 2007). It is an emerging technology for the treatment of contaminated soils.

Due to its relatively low price and versatility, it is effectively used to clean surface soil layers. Naturally occurring heavy metals in soil are not harmful to living organisms. Remediation of contaminated soil is necessary to eliminate the risk of human toxicity. Some of them (especially Cr, Ni, Co, Cd, As and Pb) can become carcinogenic.

Heavy metals are found in various food chains, the violations of which lead to serious health problems for microorganisms, plants, animals and humans. Such toxicity is associated with the occurrence of oxidative stress in DNA and inhibition of DNA processes. Accumulation of heavy metals in stems, leaves, and fruits can cause various problems (decreased mitochondrial respiration, chloroplast loss, stomatal closure, slowed transpiration and photosynthesis intensity, growth reduction and chlorosis).

Some diseases are associated with increases in Cd, Se and Pb in the soil later on are of greatest concern because their exposure can cause mental retardation and behavioral problems, especially in children.

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Soil contamination possible solutions

Soil pollution is a complex problem that ought to be solved. It is essential that we all realize how important soil is to us. The earlier we realize this, the better we will be able to solve the problem of soil pollution.

It is a complex problem, and thus, it requires everyone, from an individual to the government, to work in complete unison. Listed below are a few things that could help in reducing soil pollution. First of all, reduce use of chemical fertilizers.

Chemical fertilizers do more harm than good. While proper amounts could enhance the fertility of the soil, an excess of it actually poisons the soil. The excess of chemical fertilizers could pollute the soil in several ways. It could mess with the pH levels of the soil.

It could also destroy the good microorganisms in the soil. Not only that, but the runoff from such soils also causes water pollution as well. Thus, using chemical fertilizers is like a double-edged sword.

2. Reforestation and afforestation should be promoted. One of the major causes of soil pollution is soil erosion, which is caused due to deforestation. It is natural that, with an ever-growing population, humankind needs more and more space to expand their civilization. Often, it is achieved at the cost of the health of the soil.

To prevent this from happening, reforestation of a deforested area should be promoted. Also, afforestation should be promoted and encouraged in the barren lands. The roots of the plants bind the soil particles together and even capture good microorganisms in the soil. It also ensures the maintenance of the underground water table.

3. Recycle and reuse products. These steps not only reduce waste generation but also ensure that soil pollution is reduced. At present, plastic forms a significant portion of the generated waste. More often than not, this wastes is buried in landfills.

In these landfills, these plastics and other materials decompose slowly and release toxic materials into the soil. These toxic substances are very harmful to the health of the soil and are a major source of soil pollution. By reusing and recycling things, we would ensure that lesser wastes are dumped in these landfills, and this, in turn, would reduce soil pollution.

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4. Get the locals involved. In order to ensure that a problem like soil pollution is solved, it is essential that every individual must get involved. It is with their involvement that things can work out better. Awareness programs could be designed so that people understand soil pollution better. If people are aware, they will help, even subconsciously.

5. Promote use of natural manure. Natural manure is one of the best sources of nutrients for the soil. It is harmless and completely organic. It adds essential nutrients to the soil and restores the health of the soil. It has no harmful by-products that could harm the soil or the environment in any way [4].

Conclusions

Technical waste collection, accumulation, disposal, decontamination means. They can be summarized as clearing settlements means. Technological tools. These are technologies that apply waste no, or very little, advanced waste is generated implementation of decontamination technologies. Hygienic protection zones between pollution sources and residential buildings installation.

Legal, organizational and administrative measures. The number of fossil fuel powered vehicles reduction, increase in pollution taxes and technical standards of auto transport pollution regulation at inspection stations. Limiting the use of fertilizers in agriculture, responsible compliance with the specified number of shipments. Road maintenance with less damage to the environment the use of means that do. Development of organic agriculture.

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2020-1-IT02-KA201-079994

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