

“We have an extremely Faustian choice - will we accept our harmful and risky behavior as an inevitable price for population and economic growth, or will we look at ourselves and look for new environmental ethics?”

Thus wrote the famous biologist Edward O. Wilson in the book *Conscience: The Unity of Knowledge*.

A few decades later, environmental warnings are increasing in public.

Therefore, Serbia is no different from other countries, because it faces different forms of environmental pollution - through water, air to land.

Polluted land throughout Serbia is a consequence of the growth of industrial production, but also of a poor waste management system.

Heavy metals, carcinogens and various potentially carcinogenic compounds are currently polluting hundreds of sites across Serbia, according to a United Nations statement.

“After four years of preliminary land exploration and analysis at 32 possible” hotspots, “14 abandoned industrial sites have been identified as priorities for clean-up,” the UN said.

These are areas near 12 cities across Serbia, including Nis, Smederevo, Kraljevo, Krusevac, Sabac and others.

The Environmental Protection Agency says they are aware of the problem, but that additional resources are needed to resolve them.

Serbia has only taken the first step

In order to reduce the impact of pollution on the ecosystem and human health, as well as improve soil quality, the next steps should be more detailed testing and risk assessments for other potentially contaminated sites.

“This should then be followed by remediation of these and other contaminated sites and remediation of contaminated land - if funds are provided,” the United Nations said.

According to the director of the Environmental Protection Agency, Filip Radovic, the first step has been made.

“Now we have a big job in this area that will require additional support,” he says.

On the basis of the results, the United Nations also issued recommendations for cleaning and remediation of soil at top priority locations.

“Organic pollutants and heavy metals from these plants can reach the soil as well as nearby rivers.

In this way, they can endanger the quality of food and water and lead to a loss of biodiversity,” the UN said.

What are the health hazards?

Soil pollution in these areas is caused by heavy metals such as zinc, copper, lead, mercury, as well as confirmed carcinogens - chromium or cadmium.

These substances are released from active industrial processes or are present in accumulated hazardous waste from factories and industrial plants.

Among the most dangerous metal pollutants for humans, animals and the environment are lead, mercury and cadmium.

Lead and its compounds are used in the petroleum industry, the manufacture of batteries, paints, ceramics, in cable lining material, in computers. Whether inhaled or ingested, lead affects almost all organs in the human body, accumulates in the bones and brain and can cause damage to the nervous system, kidneys, and even lead to death. Some of its compounds are carcinogenic.

Mercury is used in measuring instruments and additives. This heavy metal can cause a variety of neurological disorders, and especially affect brain and intellectual capacity. It can cause impaired vision, hearing, impaired ability to communicate, and also lead to various behavioural changes, depressions and decreased concentration.

Cadmium is obtained as a by-product in zinc processing, and is mostly used in the electrical and metal processing industries. It is contained in batteries, batteries, and is released when burning plastic and rubber. It accumulates in the surface layers of soil and has carcinogenic properties, causing kidney damage. It is a carcinogenic substance.

In general, heavy metals from industrial processes and from contaminated sites affect neurological development, have adverse effects on the nervous, digestive and immune systems, as well as on the lungs and kidneys.

How is soil cleared of pollution

Cleaning up contaminated soil, or remediation, is a form of remediation of existing pollution to reduce the concentration of harmful substances to a level that does not pose a threat to the environment and human health.

For 14 contaminated sites in Serbia that have been identified as priorities, appropriate methods such as combination excavation, safe location, stabilization and solidification, phytoremediation and others have been recommended.

“Several different cleaning technologies have been proposed, but only for those sites identified in the study as needing remediation,” they say at the UN.

Excavation, relocation to a safe location and solidification (immobilization) is a classic

remediation technique, which in specific cases has been suggested for sites where limited, massive contamination has been identified. The disadvantages of this process are that the locations and disposal of solidifications must be ensured, especially when inorganic harmful substances are involved.

Stabilization and solidification are combined or single methods that, with respect to effects, have an affordable price.

Stabilization is achieved by reducing the mobility of pollutants by reducing their solubility while reducing the permeability of the substrate. At the same time less toxic forms of heavy metals are obtained.

Solidification changes the physical state of the harmful substances, but not the chemical composition. This is not a simple technology, since metals are not susceptible to degradation but can only be translated into more, less mobile and toxic forms.

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