Soil pullution with Cd and Pb Is it a health concern in Sri Lanka?

by K.M.P.P.Kumari

Heavy metals cause the huge problems to human beings and other animals in the environment. The most common heavy metal contaminants found in soils are Cadmium (Cd), Lead (Pb), zinc (Zn), chromium (Cr), copper (Cu), mercury (Hg) and nickel (Ni). Among them, high concentrations of Cd and Pb in soils have become a threat to the environment and living organisms worldwide.

From where heavy metals come to the environment?

Heavy metals are found naturally on the Earth's crust and some are emerged due to human activities. Naturally, volcanic activities and weathering of rocks release heavy metals to the environment. Human activities such as metal mining, waste from metal-based industries and from landfills, waste dumps and livestock manures add heavy metals to the environment. Application of metal containing fertilizers, sludge, animal manure and pesticides can lead to contamination of agricultural soils with heavy metals. For example, Cd in phosphotic fertilizers and Pb in glyphosate-based herbicides contain toxic heavy metals.

What happen when metal enters to soil?

Soil plays a major role in controlling of heavy metal entering into water and food. Soil acts as a filter and sinks for most contaminants. The main way of retaining metals in soils is by binding metallic cations such as Cd2+ and Pb2+ to the soil colloids. Soil colloids are the smallest soil particles (smaller than 1µm in diameter) which can either be mineral or organic particles. Thus, soil reduces the possibility of leaching metals into ground water.

How metal enters into human body?

Heavy metals enter to the human body by inhalation, ingestion and through skin. Lead enters to human body through the inhalation of contaminated dust particles and aerosols which are suspensions of liquid and solid particles in the atmosphere. Scientists have identified that Accidental soil ingestion is the most significant pathway of entering lead to human. In the United States, lead remains the most frequently encountered toxic metal, through the contaminated dust and aerosol outside. Cadmium enters into the body through inhalation of contaminated smoke or air, consumption of contaminated food and water.

What are the health risks?

Cadmium and lead in human body cause several health issues. Itai itai is a disease reported in Jinzu river basin in Toyama Prefecture, Japan during 1968 due to Cd poisoning. In this heavily industrialized region, the river was contaminated by slag from a mine located upstream and the soil in the surrounding rice fields become contaminated with heavy metals including Cd through sustained irrigation. Most of people have been exposed by use stream water from the Jinzu River not only for rice cultivation but also for household use and as drinking water. Accumulation of Cd in the human body can damage kidneys, liver and heart and in severe cases it may cause death. Lead poisoning also can damage kidneys, liver, heart, brain and the nervous system. Both, Cd and Pb are known as substances causing cancers (carcinogens) in human.

How serious the issue of pollution globally?

The World Health Organization (WHO) recommended safe limits of Cd in both wastewater and a soil for agriculture is 0.003 mg/L and for Pb these limits are 0.01 mg/kg and 0.1 mg/kg, respectively. Lead is more harmful to children because their brains and nervous systems are still developing. Lead poisoning can be treated but any damage caused cannot be reversed.

In Bangladesh, approximately 6.9 million