Mercury and the environment

Africa hosts a third of the world's mineral wealth and has significant deposits of gold, Zimbabwe is no exception. The country's endowment with vast gold reserves has given rise to artisanal gold mining activities, whose use of mercury in gold processing has brought several environmental and health impacts. Emerging evidence indicate that artisanal and small scale gold mining related mercury contamination in Africa is contributing to serious health and ecological impacts and has raised concern among environmentalists.

Mercury is a persistent, highly toxic heavy metal whose continued inhalation can cause death. It is estimated that artisanal small scale miners, mostly from poor and vulnerable backgrounds active in gold and diamond sectors constitute more than half of all mineral exploitation in the world. UNEP estimates that 3, 5 million people are at risk of health impacts in artisanal and small scale gold mining sector of which 2, 5 million are in Africa. A research (Global Mercury Project) by the United Nations Industrial Development Organisation (UNIDO) which was conducted between 2007 to 2012 revealed that Zimbabwe had an estimated 500 000 artisanal gold miners, the number is expected to have increased over the years.

The fact that artisanal gold mining is largely unplanned, unregulated and unmanaged has left a legacy of severe adverse (and irreversible) environmental and health impacts.

The Minamata Convention on Mercury

Concerns on the negative impacts of mercury and gave rise to the promulgation of the Minamata Convention on Mercury of October 2013.

The Convention is an international treaty designed to protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds. The Convention was a result of international action aimed at managing mercury in an efficient, effective and coherent manner, whilst member state work on towards its total elimination. Zimbabwe is one of the 147 countries which signed the convention and is working towards ratification.

The document puts an obligation on member states to ensure there is informed consent from the receiving state in relation to the trade in mercury or mercury based products. Trade in mercury or mercury based products will be restricted to allowed purposes under the instrument and also domestic law, and only in quantities needed for those purposes.

The instrument will also put restrictive measures on the use of mercury especially in the mining sector. There is a need for the development of sustainable technologies to extract gold in preparation for the restrictions that will be imposed on trade in mercury. Once ratified, the main benefit, of the document is that it will be a reference point or provide direction on how national legislation can be developed to tackle the on-going problem of controlling the use and influx of mercury into the country and prevent the possibility of Zimbabwe being a dumping ground of such hazardous substances.

Large-scale public health crises due to mercury poisoning, such as Minamata disease and Niigata Minamata disease, drew attention to the issue. In 1972, delegates to the Stockholm Conference on the Human Environment witnessed Japanese Junior High School Student Shinobu Sakamoto, disabled as the result of methylmercury poisoning.

Why is mercury bad for the environment?

Toxic mercury vapour from the process of burning the amalgam impacts

negatively on miners, their families and nearby communities. Most gold mining activities are carried out in rivers and streams which drain into dams and lakes. Mercury contaminates water, accumulates in sediments and bio-accumulates in fish and tissues and other aquatic species. Its effects on the environment include the following:

- Mercury in the air may settle into water bodies and affect water quality;
- Methylmercury accumulates in fish at levels that may harm fish and the other animals that eat them;
- Methylmercury exposure on wildlife can cause mortality (death), reduced fertility, slower growth and development and abnormal behaviour that affects survival;
- Research indicates that the endocrine system of fish, which plays an important role in fish development and reproduction, may be altered by the levels of methylmercury found in the environment;
- Once present in aquatic ecosystems, elemental and inorganic mercury can undergo chemical transformations to methylated mercury species and enter the food web and high level predators such as birds, sea mammals and humans could be in danger of contamination.

Mercury effects on human beings

- Continued inhalation exposure to elemental mercury causes tremors, gingivitis, and excitability. At very high levels,

inhalation of elemental mercury can cause death.

- For foetuses, infants, and children, the primary health effect of mercury is impaired neurological development. Mercury exposure in the womb, which can result from a mother's consumption of fish that contain mercury, can adversely affect a baby's growing brain and nervous system. Impacts on cognitive thinking, memory, attention, language, and fine motor and visual spatial skills have been seen in children exposed to mercury in the womb.

- Impairment of the peripheral vision; disturbances in sensations ("pins and needles" feelings, usually in the hands, feet, and around the mouth); lack of coordination of movements; impairment of speech, hearing, walking; and muscle weakness.

- Mercury primarily causes health effects when it is breathed as a vapour where it can be absorbed through the lungs. Such exposure can occur when mercury is spilled or products that contain mercury break and expose mercury to the air, particularly in warm or poorly-ventilated indoor spaces. Symptoms include tremors; emotional changes (e.g., mood swings, irritability, nervousness, excessive shyness); insomnia; neuromuscular changes (such as weakness, muscle atrophy, twitching); headaches; disturbances in sensations; changes in nerve responses; performance deficits on tests of cognitive function. At higher exposures there may be kidney effects, respiratory failure and death

On animals

- Exposure of animals to methylmercury affects the immune system, alters genetic and enzyme systems, and damages the nervous system.

What is Zimbabwe doing about mercury?

With the assistance of the World Bank, Zimbabwe has undertaken a research to collect scientific data and evidence of the impacts of mercury for use by policy makers. The research will produce a Country Diagnostic Report with current knowledge about the status of mercury contamination and environmental and health risks to miners and their families in artisanal gold mining hot spots. The findings will inform the country's next plan of action, the review of policies, legislation, regulations and standards as well as review institutional responsibilities of various ministries and government agencies such as EMA, Government Metallurgy, Government Mining Engineering and Mining Commissioner's Departments as well as Zimbabwe Revenue Authority (ZIMRA) in regulating mercury importation and use in Zimbabwe.

It is of great importance that interested and affected parties make themselves aware of the implications of this Instrument so as ensure that preparations are made that insure voluntary compliance rather than forced compliance once the law comes to fruition.

What does the law say about mercury?

Environmental Management Act Cap (20:27) as read with S.I 12 of 2007 Hazardous Substances, Pesticides and Toxic Substances Regulations state that, any person who imports, transports, stores or sells any hazardous substance must have a license for each purpose.

What are the mercury alternatives?

As a country we should be working at embracing mercury alternatives such as the borax method and the gravitation methods which proved to be equally

efficient when used as demonstrations during the Global Mercury Project which ran between 2007 to 2012 in Kadoma.

Please talk to us we are always ready to listen. Email: eep@ema.co.zw or 04 305543 / Toll free 08080028, sms/whatsapp 0779 777 094, Like our Facebook Page- Environmental Management Agency or follow us on Twitter @EMAeep.