

HEAVY METAL POLLUTION IN DIFFERENT ENVIRONMENTAL MEDIA IN AFRICA: PROBLEMS AND PROSPECTS (WITH CASE STUDIES FROM NIGERIA)

By

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The presentation focusses on

- Heavy metal exposure sources in Africa
- how to prevent exposure – (solution oriented) - what has worked and what was not successful; lessons learnt
- identification of obstacles, particular needs and challenges faced
- international dimensions of challenges

1.0 PREAMBLE

- Unlike other pollutants like petroleum hydrocarbons and domestic and municipal litter which may visibly build up in the environment, trace metals in the environment may accumulate unnoticed to toxic levels.
- Generally, human health problems associated with trace metal contamination have been well-highlighted in the literature.
- In spite of the relatively low level of industrial activity in less developed regions such as Africa, there is nevertheless a high potential of toxic heavy metal pollution.

2.0 HEAVY METAL POLLUTION STATUS AND SOURCES IN AFRICA

- ❖ In Africa in the last decade, increases in both industrial activities and urbanisation have led to huge increases in the amount of various waste (solid, liquid and gaseous emissions) including heavy metals inputs into the environment in all parts of the continent leading to potential increases in the focused metals: mercury, cadmium and lead
- ❖ In most countries in Africa, *mining activities are important sources* of heavy metal input to the environment, for example, mercury in Algeria, arsenic in Namibia and South Africa, tin in Nigeria and Zaire and copper in the Zambia. These lead to undue deposition of metal-rich mine tailings, metal smelting etc,

➤ **Other *sources* in the region which contaminate the environment with large amounts of toxic metals include activities such as**

- **leather tanning**
- **electroplating**
- **emissions from vehicular traffic gas exhausts**
- **Crude Oil and Hydrocarbon exploration and exploitation**
- **energy and fuel production, downwash from power lines**
- **intensive agriculture and sludge dumping**

- For most trace metals, especially the focussed three viz : *mercury, cadmium and lead*
- anthropogenic emissions are more than or equal to natural emissions.
- the combustion of leaded petrol in automobiles is responsible for the continued widespread distribution of lead in the continent's environment.
- For mercury however, a yawning gap still exists on its status but studies show undue levels.

In many African countries, the toll on human health from heavy metal pollution is huge

3.0 CASE STUDIES FROM NIGERIA

- **Studies conducted exist on the occurrence, exposure sources and distribution of metals in Nigeria in all the environmental matrices (water, sediment, fauna and flora and air) but with more emphasis on water and sediment (Alo et.al., 2004, 2005, 2006) and suggestions on how to prevent exposure were reported.**

- From our laboratories, several studies on heavy metal pollution from each of the environmental media have been conducted. Results of lead and other metals in the atmosphere, water bodies, soils and vegetation consistently show undue levels, injurious to human health.
- Cadmium, Mercury, and chromium have been sparsely studied. Some recent data show high concentrations of Cadmium in street dust samples in high density, high traffic areas.
- Heavy metals in biological species- plants, fish etc. in aquatic environments (and consumed by humans) also show high levels.
- These results and data provide many lessons learnt which advise our recommendations.

4.0 OBSTACLES AND CHALLENGES OF HEAVY METAL POLLUTION STUDIES IN AFRICA

- a. Focus on the environmental media in urban and industrial areas only. Studies need to be extended to determine the status of heavy metal pollution in rural areas
- b. Also the focused metals: mercury, cadmium and lead have not received due attention for studies even in the face of their well-known negative effects on humans
- c. Where the studies have even been done, some of the data are non-robust and unreliable due to the low sophistication of analytical equipment and techniques.

- d. Continuous loading of heavy metals into inland and coastal waters and sediments from land - based sources.

- e. The concentrations in the sediments are much higher than values for unpolluted sediments from developing nations,
- f. Seeming indication that the pollution is anthropogenic

These challenges amongst others posed by heavy metals on human health in Africa are issues that need robust studies and appropriate policy responses.

5.0 CONCLUSIONS

- With the increases in urbanisation and socio-economic activities in Africa, the intent of this presentation is to catalyze discussions and possible global policy responses for a concerted global effort to assist Africa with an upfront Programme of Action on Heavy Metals in the Environment with a view to reduce Africa's contribution to global levels of harmful heavy metals.

- The initial focus of the assistance should be to
 - Accurately identify the sources and
 - Quantify the discharge of heavy metals into the three main environmental media and
 - Address negative human and environmental impacts from exposure to heavy metals in specific settings

- **Very few studies have been carried out in Africa on Mercury and Cadmium as confirmed by the UNEP Global Mercury Assessment document. This yawning gap still requires filling**
- **The proposed Africa heavy Metal Assessment Action programme shall include modules or strategies towards formulating workable pollution control measures in the countries which should cover legislation, standards and criteria, waste minimisation, effluent treatment, training, education and public awareness**

Thank you for your attention