

Introduction

The project has focused on the dispersion and effects of heavy metals and xenobiotic substances in the Ghanaian environment, primarily from rapidly expanding informal economic sectors such as artisanal mining (ASM) and waste electronic and electrical equipment (WEEE). Local-scale investigations and studies at known polluted sites demonstrate the severity of the problem, but larger-scale systematic collected data is essential for a reliable of pollution levels outside areas with severe local pollution. Although governments have attempted to regulate ASM activities since 1989, many studies have found them ineffective, and individual and community awareness needs to be raised.

The project has mapped nationwide background toxicant concentrations in soil, water, and air to model the dispersal of emissions from various sources and describe their relative contribution to environmental concentrations, current and future trends, and impacts on human health, ecosystems, and food production. The project also investigated how access to information and knowledge can raise awareness, remove barriers to better practices adaptation, and develop better risk-management strategies at the individual and community levels, using a participatory approach. The findings are important for policy development at state and district levels and for stakeholders in civil society like NGOs and producer organizations.

Results

The study found relatively low background concentrations outside severely polluted local areas for both mercury and other heavy metals and for POPs. Concentrations in soil and air in these areas are, therefore, not an immediate health threat. It is, however, deeply concerning that soil concentrations in the regions where more intense mining is taking place (1/3 of the country area) have been found to have increased by 100 – 200 % over the past decades. Also, in the River Pra, elevated levels of mercury were found, which locally can constitute a health risk through the formation of methylmercury. The elevated concentrations in the river were found to come from direct spilling or mining close to the river rather than from more diffuse sources.

Harmful concentrations of mercury and other metals were found in soil and air in and around artisanal mining areas, with critical values in compounds and inside houses where burning has taken place. It was found that small-scale miners have a number of health problems, including severe muscle pain and respiratory distress. It was, however, found that the miners could not relate the various health problems to the type of work they engaged in.

The study found that high concentrations of toxic metals are released in WEEE recycling sites, posing potential risks to human health and ecological systems and that the longer the duration of the recycling activity, the higher the concentrations of heavy metals.

The study found that although WEEE recyclers have some level of awareness of the risks they are exposed to, their perception differs from that of epidemiological studies.

Conclusions

The study concludes that because background concentrations have been low, present concentrations of heavy metals and POPs are not alarming outside local areas with intense ASGM or WEEE activity. The rate of increase in soil mercury concentrations affecting roughly 1/3 of the country area is, though, alarming because accumulation in the soils is difficult to reverse. Even in bigger rivers like the Pra, mercury concentrations have significantly increased, but this increase can, to some degree, be mitigated by banning mining close to the river.

The study confirmed earlier results showing severe and problematic pollution in areas with intense ASGM or WEEE activity, most alarming for mercury where amalgam burning occurs.

The study, however, found low awareness about the risks in both ASGM and WEEE communities. It will be important to raise awareness in these communities and accommodate a change in practices.

Recommendations

To mitigate the environmental and health hazards of WEEE recycling and ASGM activities, the Ghanaian authorities should prioritize implementing stricter regulations, especially for amalgam burning in houses and mining close to wells, lakes, rivers and streams. It will also be important to increase awareness of the associated risks in the local communities.

Alternative methods for recycling e-waste and gold mining that minimize pollution should be explored. The government should monitor heavy metal concentrations in soil, water and air, identify contaminated areas and promptly take action. Collaboration with stakeholders in the mining industry and WEEE communities should be established to develop regulations that mitigate environmental and health hazards. Through these measures, the government can protect the health of citizens and the environment while promoting economic development.