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## **Assessment of the impact of ore processing in the Kabwe area to the environment and human health**

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The Kabwe industrial area (Zambia) was strongly affected by fallout from mining and mineral processing in the past. The main danger was caused by fallout of dust from the former lead and zinc smelter. This project was intended to assess the degree of contamination of soils in the Kabwe area and to formulate measures to mitigate the damage to the environment. It was found that contents of lead in topsoil are as high as 4%, those of zinc reach a maximum of 6.7wt. %, copper 0.7 wt.%, arsenic 0.06 wt.% and selenium 0.01 wt.%. The contents of lead, zinc and copper in topsoil from the strongly contaminated soil profile were found to decrease quite rapidly with depth. A test modeling the intake of lead and other metals through swallowing of dust particles or by ingestion of dust through consumption of unwashed vegetables or fruit was used to determine the gastric availability of metals. The amount of metals released during this test increases in the following order: Fe → As → Cu → Mn → Co → Zn → Pb → Cd. This indicates that lead and cadmium pose the greatest environmental hazard when dust particles are swallowed as a result of eating unwashed vegetables or fruits. The amounts of metals in soils available for metabolism by plants (plant-available metals) were established by extraction into chelation solution (DTPA). The tests undertaken showed that the amounts of bio-available metals increase in the following sequence: Fe → As → Co → Mn → Cu → Zn → Pb → Cd. The experiments (undertaken) showed that the addition of phosphate solutions to contaminated soils reduces the availability of lead and cadmium for plants metabolism. However, their addition does not reduce the gastric availability of metals. This study was carried out within the framework of the Czech Science Foundation grant 16-13142S, Mining and Processing of Ores in Sub-Saharan Africa.