



## **Risks and responsibilities concerning heavy-metal contamination.**

### **The case of potentially hazardous food in Chunga, Lusaka, Zambia.**

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This paper investigates heavy-metal levels of irrigation water and foodcrops in Zambia and their subsequent health hazard. Further, we explore issues surrounding the agencies that should be responsible for communicating risk and dealing with heavy-metal contamination. The case study is Chunga, NW Lusaka, Zambia. In this urban agriculture locality, wastewater from industries that is contaminated by heavy metals is used to cultivate food crops, with the food subsequently both eaten by the farmers and sold. We use findings from a year-long monthly sampling at this site of irrigation water and foodcrops irrigated with the wastewater. For irrigation water, of those elements that are legislated by Zambia, levels were exceeded by 4x for Al and Fe, and 10x for Cr. For foodcrops, we quantify the potential risk to humans of the heavy-metal levels found by using target hazard quotients (THQ), which in addition to the concentration of heavy metals in given food types, take into account the mass of food consumed, the average weight of the person, and an USA EPA hazard reference dose for each of the elements. A THQ value  $> 1$  indicates a potential cause for concern for human health. THQ values at the site range from 97 to 391, indicating strong potential concern for human health. Focus group discussions with urban agriculturalists and semi-structured interviews with policy stakeholders were used to investigate perceived and actual responsibilities. We investigated whether in a locality where potentially hazardous heavy metal contamination existed, people were aware of the situation and what action was

or might be taken. This information is important if scientists are to communicate findings for effective action by local agriculture and policy communities. In this Zambian case example (typical of many urban agriculture sites), despite organisations being perceived as responsible for action, actual action was found to be low, due to a variety of reasons. Issues of environmental hazards such as this one of contaminated irrigation water and foodcrops are seen as low priority for policy stakeholders.