



Heavy Metal Levels in Sugarcane Irrigated with Wastewater in Peri-Urban Areas of Zambia

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This paper examines heavy-metal levels in the above-ground edible parts of sugarcane grown by crop cultivators at two Zambian sites: New Farm (Mufulira) and Chilumba (Kafue). In both sites, informal crop cultivators use heavy-metal contaminated wastewater as irrigation to produce food crops. Sources of heavy-metal pollution at New Farm include mining, tailing dams and sewer ponds, and at Chilumba, various factories. Both sites have commercial farms, small holdings, scattered cultivation, and wastewater irrigated areas. The total estimated cultivated areas in the New Farm study site is 98 ha, and in Chilumba 142 ha. New Farm has a total of 19 types of crops grown, compared to 17 types in Chilumba. Different crops are grown in different seasons at the two study sites.

The 'edible' portion of sugarcane plants were collected randomly across a number of field plots at the two study sites. Sugarcane juice that people would normally eat was extracted from the sugarcane samples. The juice extracts were then analyzed for heavy metals (Co, Cu, Cr, Ni, Pb) at three Zambian laboratories: (i) University of Zambia, Soil Science Laboratories, Lusaka; (ii) Alfred Knight Laboratory, Kitwe; (iii) Nkana Water and Sewerage Company Laboratory, Kitwe. Heavy-metals were measured at each lab using an Atomic Absorption Spectrometer (AAS). We found that different laboratories produced results that were conflicting (in some cases by orders of magnitude) in terms of levels of heavy metal contamination. However, in a number of cases, depending on the laboratory, Cu, Pb, and Co were found to be have levels higher than legislative limits, thus indicating a potential cause for concern to people eating large

amounts of sugarcane in those areas. We urge further studies of sugarcane juice in urban and peri-urban areas that are irrigated by wastewater, using 'internationally' acceptable laboratories for heavy-metal analysis, to determine more accurately levels of heavy-metal in sugarcane juice.