



Preliminary evaluation of heavy-metal contamination of water, soil, and foodcrops in three Zambian localities

Benson H. Chishala (1), Evaristo Kapungwe (1), John Volk (1), Jennifer A. Holden (2), Tanya Bowyer-Bower (3), **Bruce D. Malamud** (2)

(1) Soil Science, University of Zambia (bhchishala@yahoo.com, ekapungwe2004@yahoo.com, jvolk2004@yahoo.com); (2) Geography, King's College London (jennifer.holden@kcl.ac.uk, bruce.malamud@kcl.ac.uk); (3) Geography, Glenalmond College (TanyaBowyerBower@GlenalmondCollege.co.uk)

Urban agriculture in the developing world is often an informal practice and therefore uses any available water source. In many developing world locations, the water-source used is industrial wastewater and is potentially contaminated with heavy metals. In this paper, we investigate some of the issues associated with potentially heavy metal contaminated water use in urban agriculture in Zambia. We present preliminary field research results from three urban agriculture areas of Zambia: (a) Lusaka, the capital, (b) Kafue, an industrial satellite town of Lusaka and (c) Mufulira, at the centre of Zambia's vital mining industry and in the Copperbelt Region. We have done monthly monitoring of water, soil and plant (foodcrops) samples from each area, for the 12-month period August 2004 to July 2005. The level of six heavy-metals (Cu, Co, Cr, Ni, Pb, Zn) were examined in each field sample using atomic absorption spectroscopy. Some levels were found above Zambian and International legislated limits, and in particular, levels in some plants used as food crops were found that may cause a potential hazard to human health. Heavy metal concentrations in water samples and soil are somewhat variable throughout the year, potentially indicating they are dependent on varying levels of production at the source industries. In contrast, some of the highest heavy-metal levels in plants (foodcrops) are found early in the wet season (October to February) vs. the dry season (March to September), potentially related to slightly acidic rain which might cause greater mobility of heavy-metals already in the soils.