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The Uptake of Heavy Metals in Chinese Cabbage Using Zambian Soil Irrigated With Contaminated and 'Fresh' Water

Benson H. Chishala (1), **Bruce D. Malamud** (2), Mendai Imasiku (3)

(1) Department of Soil Sciences, University of Zambia, Lusaka, Zambia (bhchishala@yahoo.com), (2) Department of Geography, King's College London, UK (bruce.malamud@kcl.ac.uk), (3) Zambia AIDS Law Research & Advocacy Network (ZARAN), Lusaka, Zambia

We present preliminary results of a plot experiment at the University of Zambia to examine heavy-metal uptake in Chinese Cabbage by using four separate Zambian soil plots irrigated with 'local' heavy-metal contaminated wastewater and 'fresh' tap water. The wastewater was from a smelter in the Copperbelt, with the wastewater used for urban agriculture. The application of treatments (2-30 October 2006) were at the same time in the four different plots: [I] freshwater (4 wks), [II] wastewater (4 wks), [III] freshwater (2 wks) then wastewater (2 wks), [IV] limed soil, wastewater (4 wks). After four weeks of treatment we found (i) the pH of the soil was lowered upon application of wastewater, but increased its pH (after 2 wks) when limed and wastewater; (ii) the Cu, Co and Ni uptake in the soil directly reflected watering by wastewater (higher values) vs. freshwater (lower values); (iii) the Cu and Co uptake in the Chinese Cabbage directly reflected wastewater (higher values) vs. freshwater (lower values). Of importance, is that switching from wastewater (2 wks) then to freshwater (2 wks), still resulted in significantly low values of Cu and Co in the Chinese Cabbage at harvesting. The use of freshwater for irrigation in the last stage of plant growth may thus help reduce amounts of heavy metals in the irrigated crop.