

Pollution Challenges in the Akaki Catchment, Upper Awash Basin, Ethiopia: Potential Health Implications for Vegetables

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Abstract : The upper Awash Basin faces pollution challenges due to urbanization, population growth, and expanding industries. It receives various pollutants from its catchments. The study aimed to assess the impact of wastewater irrigation on vegetables and inform stakeholders about pollution challenges and consequences. Eighty-two composite samples of matured vegetables were randomly collected from twenty-one agricultural farm sites. These samples were analyzed for potentially toxic elements, including Cd, Pb, Cr, Hg, As, Ni, Sr, B, Co, Cu, Mn, Fe, Zn, and Se. The results indicated significant variations in concentrations across different sites, with localized contributions from various contaminants. Cr, Cd, and Pb concentrations in most vegetables exceeded recommended levels. Pollution levels varied with metals and vegetable types. Different vegetables contribute differently to health risks. The relative contributions of Ethiopian kale, cabbage, red beet, lettuce, Swiss chard, Gurage cabbage, tomato, zucchini, carrot, onion, watermelon, and potato to the aggregated risk were 12.69%, 12.25%, 11.83%, 11.20%, 10.21%, 9.91%, 8.49%, 5.66%, 3.96%, 3.35%, 3.10%, and 2.72%, respectively. Comparison with permissible standards revealed inadequate environmental management by relevant regulatory bodies and industries. Despite good laws and standards at the federal and regional levels, they are ineffectively implemented or enforced to prevent environmental pollution. Mitigation measures are urgently recommended to address the potential health implications of toxic substances.

Keywords : pollution, upper Awash Basin, health risk, Ethiopia

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