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Irrigated Urban Vegetable Farming in Africa: Options for Health Risk Management

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Abstract

In and around three out of four cities in the developing world, crops are irrigated with raw or diluted wastewater without any noteworthy treatment. In this situation, the 2006 wastewater use guidelines of the WHO offer a variety of options for risk reduction which could complement wastewater treatment but also provide a reasonable protection where wastewater treatment is unavailable and irrigation already taking place. By providing this high degree of flexibility for various situations, the guidelines became rather academic with so far limited acceptance. Our research targeted pathogenic risks from domestic wastewater used raw or diluted for irrigation. Based on participatory action research between ‘farm and fork’ intervention measures were identified, tested and assessed for their effectiveness, costs and adoption potential. The studies covered farm, market and kitchen based interventions, applying the multi-barrier approach. At farm level, changing crops was not supported, while modifications to common water fetching and irrigation practices appeared promising. The studies showed that sedimentation ponds and filtration techniques could reduce the number of helminth eggs to acceptable levels but not fecal coliforms. Among various irrigation methods, drip kits achieved as expected high removal levels. Cessation of irrigation did not fit every type of crop and cannot last long without crop damage, at least in the hot climate of West Africa. Overall, farm based interventions were able to reduce bacterial contamination levels by 1–4 log units. Market-based interventions had generally less impact on the contamination carried over from the farm, like through the support of microbial die-off but they remain important to prevent new or additional contamination. At the consumer level, the removal of outer cabbage leaves and vegetable washing proved most successful. Washing lettuce, especially with recommended sanitisers and longer contact time, reduced bacterial contamination by 1 to 3 log units.

To protect the consumer according to the health-based targets suggested by WHO, combining interventions from farm to fork appears most promising, but also a significant challenge as it requires a high adoption rate of the recommended practices. While the current WHO guidelines fall short in explaining how to facilitate and sustain their adoption, for example at the farm level, the presented research showed that it will require well targeted studies to understand the incentives needed for a lasting behaviour change.

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