

Use of Irrigation Water to Wash Vegetables Grown on Urban Farms in Kumasi, Ghana

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Owing to the importance of irrigated urban vegetable farming in Ghana, a number of research and development activities have been recently initiated to improve the safety of vegetables. The positive and negative impacts of these initiatives have already been widely documented (UA Magazine no 8, and the article in no. 19 on this issue). This paper describes a number of low-cost risk-reduction interventions developed together with key stakeholders in the “farm to fork” continuum. These initiatives were based on the WHO multiple-barrier approach that calls for the implementation of risk-reduction strategies at various points along the food chain in order to achieve a cumulative risk reduction (see the figure and the article on page 21).



The Multiple-barrier concept (Adapted from WHO, 2006)

These interventions include farm-based measures such as sedimentation ponds, simple filtration techniques and improved irrigation practices as well as post-harvest measures such as improved vegetable washing methods (Keraita, 2008; Amoah, 2008). A number of best practices have been developed from these interventions, and implementation is ongoing, particularly of farm-based practices with which the Urban Agriculture Directorates of the Ministry of Food and Agriculture (MoFA) are actively involved. Follow-up studies are also being carried out, such as by the SWITCH programme, which is implementing improved pond systems at the Dzorwulu in Accra (see article on page 14), and the boreholes implemented by MoFA in some vegetable farming sites in Accra. Although these interventions have the potential of reducing health risks, other practices of vegetable traders (market women) like the washing of vegetables in irrigation water jeopardize efforts to ensure the safety of vegetables.

Quality of irrigation water and vegetables

Farm-based intervention measures tested so far have been able to reduce levels of helminth eggs to less than 1 egg, and faecal coliforms by 1-3 log units, per 100g of lettuce. The presence of these contaminants on lettuce not washed in irrigation water has thus been reduced to acceptable levels of about less than 4 log units per 100g. Washing of lettuce in contaminated irrigation



Women harvesting vegetables in Kumasi
Photo: IWMI-Ghana

water deposits microorganisms on the vegetable's surfaces, thereby increasing contamination levels, especially bacterial by 1-2 log units, and thus significantly reversing the contamination reduction gained from intervention measures (data are available with the corresponding author).

Why wash vegetables in irrigation water?

A number of different kinds of vegetables are grown on urban farms. The most commonly grown are lettuce, cabbage, spring onions, green pepper, cauliflower, carrots and cucumber. In Ghana, harvesting of vegetables is done by traders who are often women. Observations revealed that lettuce is the only crop commonly washed in irrigation water. It is uprooted from plots, heaped on vegetable beds (bare soil) and carried to nearby irrigation water sources, usually ponds and dugouts, where it is washed. Washing is a delicate task and care is taken that lettuce retains its physical quality and attractiveness.

Vegetable sellers (market women) and farmers explained in interviews that washing lettuce in irrigation water is an old practice which has existed as long as lettuce has been grown at the farming sites. The main reasons given by vegetable sellers for washing vegetables in irrigation water was to remove soil particles and earthworms that are attached to leaves and roots. This makes the lettuce more attractive and reduces its weight, which is important when the lettuce has to be carried to markets. Washing also helps keep vegetables fresh, especially when kept overnight before selling. Lettuce to be transported out of Kumasi city is not washed because washing makes it “soft” (flaccid) and rot faster during the long hours of transportation in intense heat, as it is not refrigerated.



It is recommended that market women be better informed
Photo: IWMI-Ghana

Farmers often walk into the water sources when collecting irrigation water and wash their boots, feet and hands in the same sources in which market women wash vegetables. In most cases, these water sources are visibly dirty. The main reasons given by market women for using this water are convenience and unavailability of water in the markets and at home. Salamatu, one of the market women interviewed noted: "There is no water in the market. I do not even have enough space to display my vegetables in the market. I always have to pick up my vegetables whenever a truck is approaching to prevent vegetables from being run over. How do you expect me to even have space to wash them? You understand the market problems now!" Memuna, also a market woman, who once tried washing vegetables at home, said "my children were fetching water at distant places for me to wash vegetables at home but it was too tiresome for them so I decided to wash on the farm to finish up all the activities associated with marketing of vegetables, especially lettuce, before I go home".

Perceptions on health risks

The market women interviewed knew that irrigation water has some harmful organisms that could cause diseases. Efuwa, one of the market women, noted that "once the water has no cover, there will definitely be certain germs in the water". This was perhaps based on experience from households where drinking water in storage containers is covered to minimise contamination. They also said that vegetables were "dirty" (with mud and germs), hence needed to be washed. However, only one of them could associate health risks (diarrhoea and stomach ache) with wash-



Main reasons for washing vegetables is to remove soil particles and earthworms. Photo: IWMI-Ghana

ing vegetables in irrigation water. Others saw no increased risk with this practice. Armah said, "this is the same water that the farmers use for watering these crops, so what is wrong with using it to wash vegetables? It is just like watering uprooted lettuce!"

Even if the lettuce was contaminated, market women strongly believed that the pathogens will die before the lettuce reaches the consumer. They noted that everyone who buys lettuce washes it with salt or vinegar before use, so the consumer is never at risk". Even without washing, they said that the heat alone that builds in lettuce between harvesting and selling, i.e. during storage and transportation, will kill all the pathogens. Microbiological studies disprove this idea as they show that pathogen levels do not decrease from farms to markets and washing of lettuce with vinegar and salt can only reduce pathogen levels but not eliminate them totally as initial levels are usually very high (Amoah et al., 2007).

The market women themselves may be at higher risk of exposure, as they spend long periods washing vegetables in irrigation water without any protection. But very few market women recognised this occupational risk. Ataa indicated "if anyone is at risk it is the traders and farmers who have direct contact with irrigation water." Skin rashes on hands and palms were the main health effects reported by the market women. In response (to these effects, some women now wear gloves during harvesting and washing of vegetables while others have totally stopped washing vegetables in irrigation water and now sell them unwashed.

Conclusion

Washing of lettuce poses a health risk, and therefore it is recommended that market women be better informed, with the aim of stopping the practice. There is a clear knowledge gap among market women on pathogen transfer and health implications, which needs to be addressed. If the practice is to be considered as one of the multiple uses of irrigation water, then efforts should be directed at improving the water quality.

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