Rooftop Runoff Irrigating Produce Eaten Raw (RRIPER): Evaluating the Safety of Roof-Harvested Rainwater as an Irrigation Source and Determining Urban Farmer Interest and Concerns

Rachel E. Rosenberg Goldstein[1*], Claire Hudson[2], Suhana Chattopadhyay[1], Leena Malayil[1], Kaitlin Ta[1], Nina Jeffries[1], Jordan Reed[2], Sarah Allard[1,3], Manan Sharma[4], Marcus Williams[5], Kelsey Brooks[5], Andrew Lazur[5], Jon Traunfeld[5], Neith Little[5], Drew Ferrier[2], Amy R. Sapkota[1]

[1] University of Maryland School of Public Health, Maryland Institute for Applied Environmental Health, College Park, MD 20742; [2] Hood College, Center for Coastal and Watershed Studies; [3] University of California San Diego, Scripps Institution of Oceanography; [4] U.S. Department of Agriculture, Agricultural Research Service; [5] University of Maryland Extension, College Park MD 20742
*Rachel E. Rosenberg Goldstein, rerosenb@umd.edu, 301-314-1588, https://sph.umd.edu/people/rachel-rosenberg-goldstein

Methods

1. Sampling and analysis of bacteria and heavy metals at two Frederick, MD gardens irrigating with roof harvested rainwater

Water Samples (n=37)

Soil Samples (n=146)

Produce Samples (n=68)
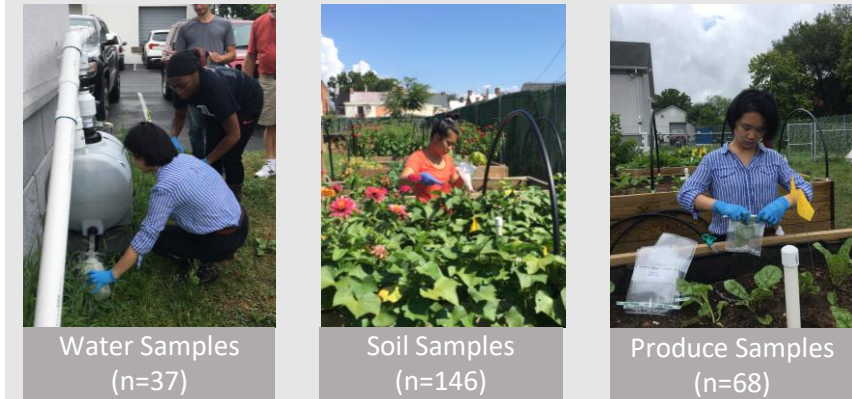
2. Needs assessment among Baltimore urban farmers and gardeners asking about:
- Current water sources
- Water concerns
- Interest in roof harvested rainwater (RHW)

Results
- No *Salmonella* or *Listeria* detected in any water samples
- *E. coli* and heavy metals below irrigation standards
- 58% (n=21) of Baltimore urban growers interested but want information on design and water quality

"We are excited to work alongside you to make BALTIMORE Urban Farmers successful"

"Have an excessive amount of birds. Worried about the bacteria from their waste"

Urban farmers want data on roof harvested rainwater quality, an alternative water source which could meet urban agriculture needs and irrigation water standards.

57% of water, 90% of soil, and 96% of produce samples did not contain *E. coli*.
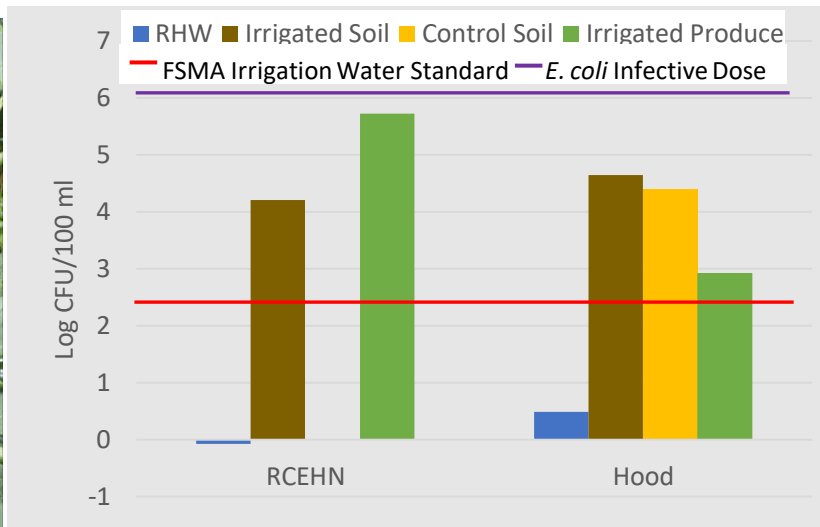

Figure 1. Average concentration of *E. coli* by sampling location and sample type.

	Average (mg/L)	USDA NRCS Recommended Maximum Concentrations of Trace Elements in Irrigation Waters (mg/L)
Lead	0.03	5
Copper	0.03	0.2
Aluminum	0.12	5
Cadmium	0	0.01
Zinc	0.07	2

Figure 2. Average heavy metal concentration in water samples.