

## **Assessment of Legacy Contaminants in Urban Agricultural Soils of Newark, New Jersey**

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Urban farms have not only improved access to fresh, edible produce in low-income neighbourhoods, but are the focal point of recreational and community building opportunities. In Newark, New Jersey, approximately 2,471 out of 277,000 residents live in food deserts, with limited access to fresh food and vegetables. Newark has over 80 community gardens established in its five wards; many operating out of reclaimed abandoned lots. The challenges of urban farming are unique due to proximity to large human settlements and industrialized areas. Newark's industrial legacy and the occurrence of brownfield and superfund sites enhances the potential risk of legacy pollutants in the soil. High concentrations of heavy metals prevalent in urban soils can provide pathways for human exposure through ingestion or inhalation of dust. Lead (Pb) legacy in particular continues to be a major challenge of farming in urban soils. This study investigates the extent and speciation of Pb and other heavy metals in Newark community garden soils. Soil samples were collected from four urban community gardens, located in four different wards to understand the extent of contamination spatially. Samples were collected from raised beds, cultivated native soil, and the periphery of the gardens (adjacent to other buildings/property). Compost, used as a soil amendment, was also collected from two gardens with an on-site composting facility. Samples were air and oven dried, sieved to 2 mm, and two types of soil extractions performed: (1) 1M nitric acid to determine the total metal concentration; and (2) a Tessier sequential extraction to analyze Pb speciation in exchangeable, acid soluble, reducible and oxidizable soil fractions. Detected heavy metals include Pb, zinc (Zn), copper (Cu), and nickel (Ni). Greater than 90% of samples were found to have Pb concentrations within a 20-830 mg/kg range, and 20% exceeded the EPA-NJDEP Pb limit of 400 mg/kg. Sequential extractions indicate that Pb concentrations range from 1-948 mg/kg in exchangeable and acid soluble fractions, and 1-2240 mg/kg in reducible and oxidizable fractions. Overall, results indicate the prevalence of Pb in the urban soils of Newark. The primary risk for human exposure in community gardens is likely through inhalation and ingestion of dust particles when tilling contaminated soils. Garden managers were therefore advised to implement soil management and preventive practices to minimize exposure to soil Pb.