

Urban Agriculture and the Threat of Climate Disaster: A New Economic Framework to Measure Resilience in Municipal Gardens

Author: Benjamin Matlick

Affiliation: Bishop Blanchet High School

Date: September, 2025

Abstract

Climate change is reshaping cities, and urban agriculture is increasingly at risk from climate disaster. Many vulnerable and low-income households depend on urban gardens as their only affordable access point to healthy produce, yet municipal governments do not have effective tools to measure the benefits they provide or calculate to what degree they are subject to climate risk.

This paper proposes a new way to measure the value of community gardens and assess in economic terms the climate risks that threaten them. The Urban Food Systems Index (UFSI) is a quantitative approach that categorizes garden value into five domains: (1) direct food production; (2) ecosystem services; (3) social benefits, (4) health & wellness; and (5) biodiversity. The index is modified by two additional variables: municipal governance backing and degree of climate hazard exposure. Together, the aforementioned are calculated into a single, unified score, the UFSI metric, which policy makers can then reference in making decisions about funding and in city planning.

The ensuing analysis tests the UAI framework across four US cities: Seattle, New York City, Detroit, and Altadena, California. Results are twofold. First, quantifying the value and potential loss of community gardens in economic terms reveals their role as a vital component of city infrastructure; their destruction creates ripple effects across socioeconomic and demographic distinctions. Second, because urban gardens face increasing levels of climate threat, they require clear and actionable policies and proper resource allocation at the city level to ensure their survival.

Acknowledgements:

I'm grateful to Professor Philip Bond at the University of Washington School of Economics, whose mentorship shaped this project, and for the ongoing support of Mark Huston, Volunteer Leader of the Magnuson Park Community Garden P-Patch.