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Access, Equity, and Urban Agriculture: Trends in Selected NJ Cities

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ABSTRACT

Urban Agriculture is the cultivation and distribution of agricultural products in an urban setting. New Jersey municipalities are utilizing urban agriculture as a holistic strategy to address food insecurity and equity to varying degrees of success. This study looks to identify factors that influence the success of urban agriculture as a food equity intervention in selected New Jersey municipalities. The Rutgers' 2022 NJ Urban Agriculture Web Map was utilized as a basemap to identify urban agricultural instances (UAIs) active in 2022 in 15 select NJ municipalities. Municipalities were selected based on equal geographic representation and UAI count distribution. Satellite imagery of NJ during 2018, 2021, and 2024, provided by NASA, was utilized to confirm active cultivation of agricultural products via visual inspection. Trends regarding growth and shrinkage of instances' agricultural production and overall UAI count were identified and analyzed utilizing visual and Python analysis. Furthermore, GIS analysis was utilized to identify socioeconomic and demographic trends within the broader city context and a defined buffer area of active UAIs. Through this, weighted area population analysis was conducted to identify outreach effectiveness.

Further research into municipal codes of law and relevant food system plans may provide a broader context and reveal further trends/determinants of success for urban agricultural intervention strategies. This study highlights the use of geospatial technologies to analyze trends and patterns in urban agriculture practices in selected cities. The methodology should be applicable to other urban areas.

DATA & METHODS

The Original Data

This NASA-funded study was done in two phases. In Phase 1, the research team identified six municipalities in New Jersey based on Rutgers' 2022 NJ Urban Agriculture Web Map: Camden, Trenton, Newark, Glassboro, Hamilton, and Union Township.

In Phase 2, researchers recorded all UAIs and associated information within the aforementioned cities from the Rutgers basemap. UAIs were confirmed through visual inspection of the provided NASA satellite imagery in the years 2018, 2021, and 2024. It should be noted that some UAIs recorded in this initial data were not originally included in the Rutgers Web Map. These additional instances were manually added by the original researchers after visual inspection of the selected municipalities using satellite imagery.

Creating Our Dataset

Building On The Data

The current iteration of this project tightened its focus and broadened its scope. Building off of the original six municipalities, an additional nine municipalities were selected from the original basemap to represent a wide range of total UAI counts and provide a balanced statewide geographic representation.

Final Cities

- Atlantic City
- Bridgeton
- Camden City
- Clifton
- Elizabeth
- Ewing Township
- Glassboro
- Hamilton Township
- Jersey City
- Newark
- Paterson
- Pleasantville
- Rahway City
- Trenton
- Union Township

Redefining Categories

Additional Category	Definition
Site_Type	Classification of the site in question into three categories—Urban Farm, Institution, or Community Garden
Active_2018	Viewing if locations are present during 2018, confirmed through satellite imagery
Active_2021	Viewing if locations are present during 2021, confirmed through satellite imagery
Active_2022	Viewing if locations are present during 2022, confirmed through satellite imagery
Active_2024	Viewing if locations are present during 2024, confirmed through satellite imagery

NASA & Satellite Imagery

Utilizing the provided NASA satellite imagery, the team conducted a visual analysis of all identified basemap UAIs. Agricultural activity was defined by the instance's visual presence in satellite imagery.

During visual inspection, researchers noted instances of growth or shrinkage of identified UAIs. This encompasses...

# of Defined Cultivated Areas | **Size of Defined Cultivated Areas** | **Total Land Used**

GIS & Python Methods

GIS

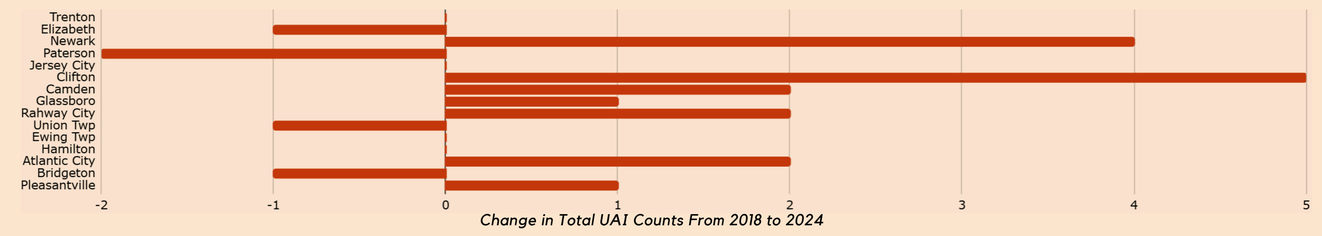
GIS models were developed to identify trends in UAI activity and accessibility. A customized Dataset Network was created and utilized to complete network analysis regarding populations with and without ease of access to UAIs. Having ease of access to UAIs was defined as being within a 0.25 mile walk, represented within GIS analysis by a 0.25 mile walking service area. Weighted area population analysis at the census tract level was utilized to determine individual counts and total city population percentages of those with ease of access to UAIs. Further analysis of demographics within the service area may reveal overarching trends across selected cities.

Python

Python analysis was utilized to complete statistical operations and data visualization. This includes determining overall UAI count trends by city over the selected years, visualizing growth and shrinkage trends, defining demographic data, and identifying individual and overall site type trends.

RESULTS

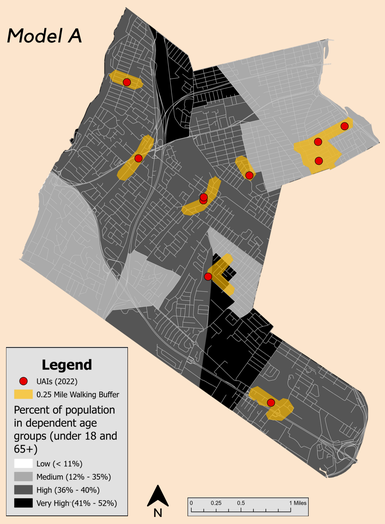
UAI Count Totals & Trends By City



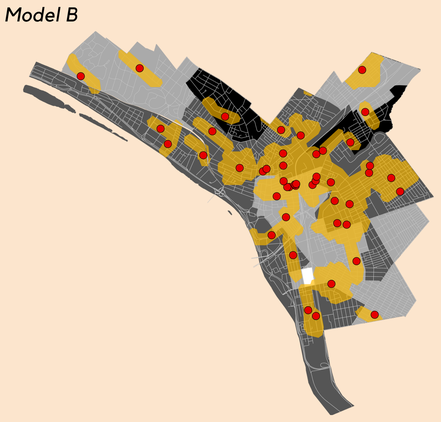
Change in Total UAI Counts From 2018 to 2024

City	Total UAIs 2018	Total UAIs 2021	Total UAIs 2022	Total UAIs 2024	UAI Change '18 -'21	UAI Change 21 - '22	UAI Change '22 - '24	UAI Change '18 - '24	% Population With Ease of Access to UAIs
Trenton	40	43	45	40	3	2	-5	0	37.99
Elizabeth	29	29	29	28	0	0	-1	-1	28.06
Newark	21	26	27	25	5	1	-2	4	12.46
Paterson	25	25	27	23	0	2	-4	-2	22.16
Jersey City	15	15	15	15	0	0	0	0	12.91
Clifton	5	8	10	10	3	2	0	5	3.97
Camden	7	8	9	9	1	1	0	2	7.92
Glassboro	6	7	7	7	1	0	0	1	1.99
Rahway City	4	5	6	6	1	1	0	2	11.98
Union Twp	4	4	4	3	0	0	-1	-1	3.28
Ewing Twp	3	3	3	3	0	0	0	0	1.57
Hamilton	2	3	3	2	1	0	-1	0	1.4
Atlantic City	0	2	2	2	2	0	0	2	2.75
Bridgeton	1	1	1	0	0	0	-1	-1	0.45
Pleasantville	0	1	1	1	1	0	0	1	0.65

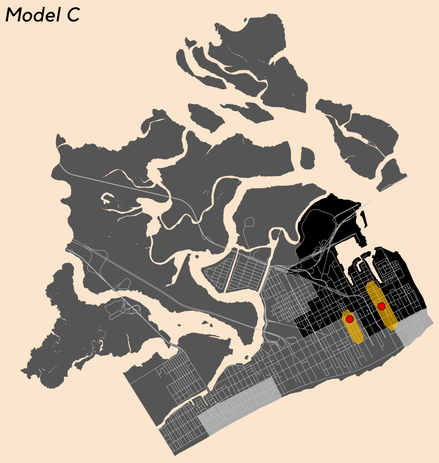
Model A



Model B



Model C



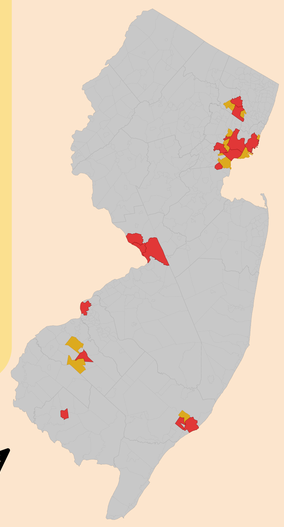
Effected Populations

Models A, B, and C show the cities of Clifton, Trenton, and Atlantic City, respectively. These cities represent Northern, Central, and Southern Jersey as well as the lowest, median, and highest municipal UAI concentrations. 2022 UAI data was utilized in these models. These models take into consideration demographic characteristics when calculating populations with ease of access.

Extended Access

Through GIS network analysis, trends regarding extended ease of access to UAIs from the initial 15 selected cities into surrounding municipalities.

13 Additional Cities are within a 0.25-mile walking buffer of the **15 Selected Cities'** identified UAIs.



DISCUSSION

Extended Access

Over 71% of the growth and shrinkage instances were categorized as Institutions. While not all Institution sites were shrinkage, all shrinkage instances were Institutions; therefore it can be concluded that institutional urban agricultural instances are most susceptible to size fluctuations.

Ease of Access

Municipalities with higher percentages of their population within the ease of access buffer are more likely to have higher counts of urban agricultural instances. However, municipal population density has little to no effect on the percentage of municipal population with ease of access.

Interestingly, it was found that one municipality's dedication to UAIs can positively impact more than just their own population. UAIs from the selected NJ cities provided ease of access to fresh produce to populations in an additional 13 cities; this is an 86% increase in municipal reach from initial expectations.

Demographic Trends

Based upon the models, municipalities with lower total UAI counts and higher overall dependent population percentages are more likely to have UAIs in locations with very high or high dependent population densities.

Model C represents the lower range of UAI counts, and over 39% of its population is defined as dependent. Model A represents the median UAI count, and over 36% of its population is defined as dependent. Finally, Model B represents the higher range of UAI counts, and approximately 35% of its population is defined as dependent. Likewise, the percentage of UAIs within very high or high concentrations of dependent populations correspond with these factors—100% (Model C), 70% (Model A), and 63% (Model B).

Future Research

Further research into local partnerships may reveal more patterns regarding such demographics as municipalities with higher external support may have different needs regarding residential volunteering, potenially influencing UAI spatial distribution. Additionally, future research into policy & local governance, instutional capacity, and environmental conditions may illuminate different trends regarding UAIs and their sustainability in different environments.

HIGHLIGHTED REFERENCES

Horst, M., McClintock, N., & Hoey, L. (2024). The intersection of planning, urban agriculture, and food justice: A review of the literature. Planning for equitable urban agriculture in the United States: future directions for a new ethic in city building, 89-120.

Meenar, M., Morales, A., & Bonarek, L. (2017). Regulatory practices of urban agriculture: A connection to planning and policy. Journal of the American Planning Association, 83(4), 389-403.

Meenar, M., & Spencer, L. (2025). Community perceptions of small-town food environments, food equity, and home-based food cultivation: Insights from a community-engaged research study. Journal of Agriculture, Food Systems, and Community Development, (3), 1-19.

Rogus, S., & Dimitri, C. (2015). Agriculture in urban and peri-urban areas in the United States: Highlights from the Census of Agriculture. Renewable Agriculture and Food Systems, 30(1), 64-78.

U.S. Census Bureau. (2021, August 12). Age and Sex: 2020 [Table]. U.S. Department of Commerce. https://www.census.gov/data/tables/2020/dec/2020-tabular-age-sex.html