

# BORROWED GROUND: Evaluating the potential role of usufruct in neighborhood-scale foodsheds

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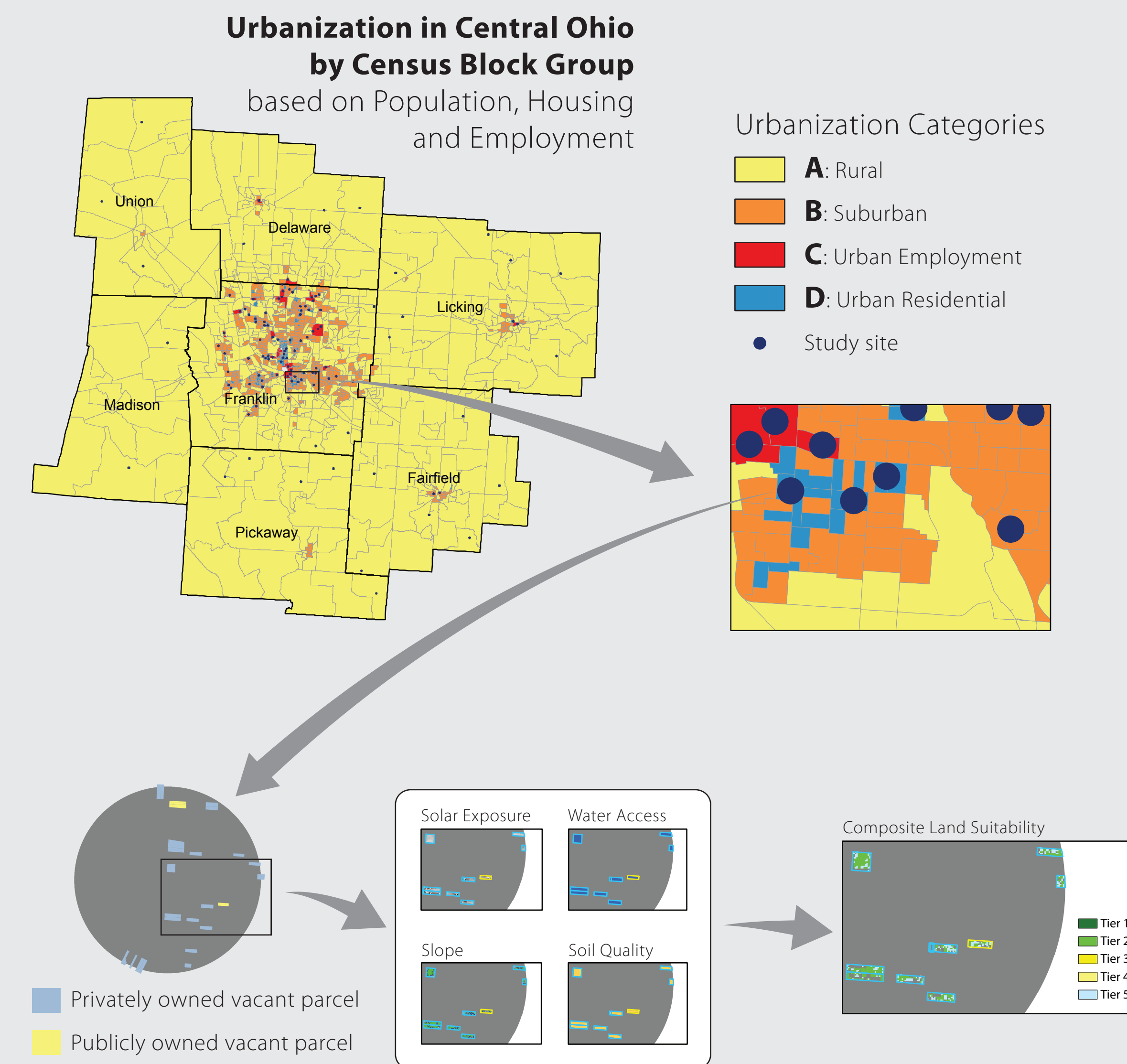
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## [ INTRODUCTION ]

As the world's population becomes more urbanized, the ability of cities to produce food within and around their boundaries has been increasingly extolled as a potential avenue for improving food security, as well as providing a number of other benefits. While increasing the availability of local food, urban agriculture can also increase engagement of urban dwellers in food production, with potential health and social benefits such as nutrition education and community network building. Furthermore, urban food production presents an opportunity for beneficial use of unused urban lots: idle or vacant land, both publicly and privately owned, represents a major resource for rural agriculture, and potentially for rural agriculture as well. Applying the concept of **usufruct**, or **productively using another's unused land**, could increase agricultural use for both privately and publicly owned land resources. However, little is understood about how these land resources vary according to degree of urbanization, or how these land resources might provide land access for food production. As Colasanti & Hamm (2010) point out, there is "a dearth of research relating an urban land base to food consumption by urban residents."

This research evaluated usufruct's potential provision of land and vegetable servings for the local population. For the purposes of this research, usufruct is defined as: "Any gardening or farming activity allowed by a landowner unaffiliated with the farmers or gardeners, permitted through formal or informal agreement, for no or nominal cost." We focus on potential yield of vegetable servings with respect to the local population's needs to represent food production in general. Several "walking distance"-defined study sites (300-meter radius) were selected in seven central Ohio counties comprising and surrounding the city of Columbus, to represent a range of classified urbanization values. Within each study site, GIS-based classification was used to identify publicly and privately owned vacant land that is suitable for vegetable production, based on the criteria of soil quality, slope, water access, and solar exposure. Production scenarios were modeled, and the estimated vegetable yields compared with the dietary needs of the local population. Available land area was also averaged by the number of households in each study site. These results were compared between urban categories, and between publicly and privately owned land resources.

## [ METHODS ]



## [ OBJECTIVES + HYPOTHESES ]

### Objective 1.

Determine how vacant land resources suitable for vegetable production vary according to urbanization, in terms of quantity, quality, and spatial pattern.

*Null hypothesis: Urbanization has no effect on vacant parcel size, abundance, or quality.*

### Objective 2.

Determine how vacant land resources suitable for vegetable production differ between public and private ownership, in terms of quantity, quality, and spatial pattern.

*Null hypothesis: Ownership has no effect on vacant parcel size, abundance, or quality.*

### Objective 3.

Determine the potential contributions of these land resources to the local (study site) populations, in terms of both vegetable servings and land access, and whether these contributions vary according to urbanization.

*Null hypothesis: Urbanization has no effect on the potential vegetable serving and land access contributions of vacant land.*

## [ RESULTS: LAND INVENTORY + ASSESSMENT ]

Privately owned land was found to be more prevalent than publicly owned land ( $\chi^2=53.593$ ,  $df=1$ ,  $N=232$ ,  $p<0.001$ ; Fig. 1). Urbanization had an effect on the presence of all vacant land ( $\chi^2=34.679$ ,  $df=3$ ,  $N=116$ ,  $p<0.001$ ) and Tier 3 vacant land ( $\chi^2=32.921$ ,  $df=3$ ,  $N=79$ ,  $p<0.001$ ; Fig. 2).

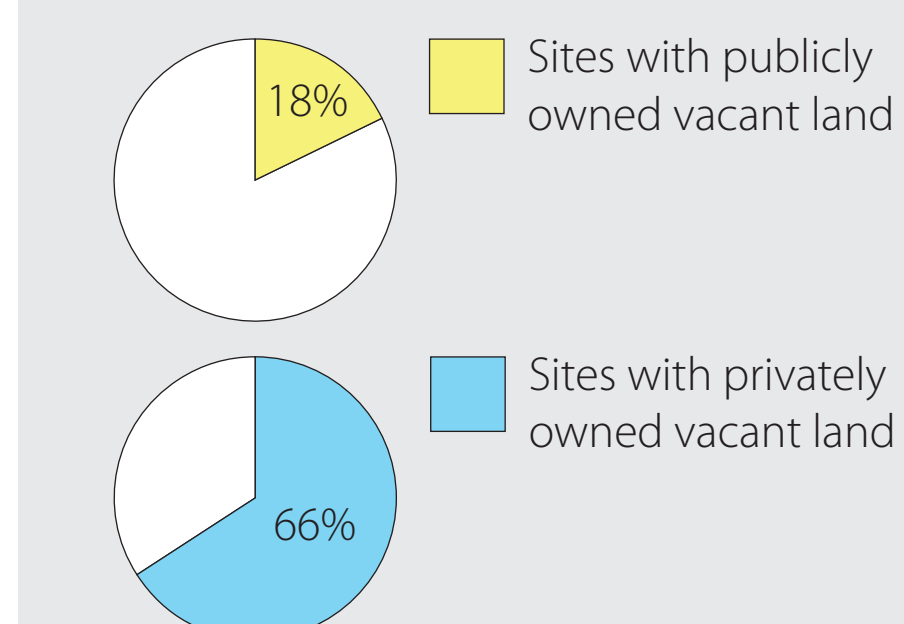


Figure 1. Prevalence of publicly owned vs. privately owned vacant land

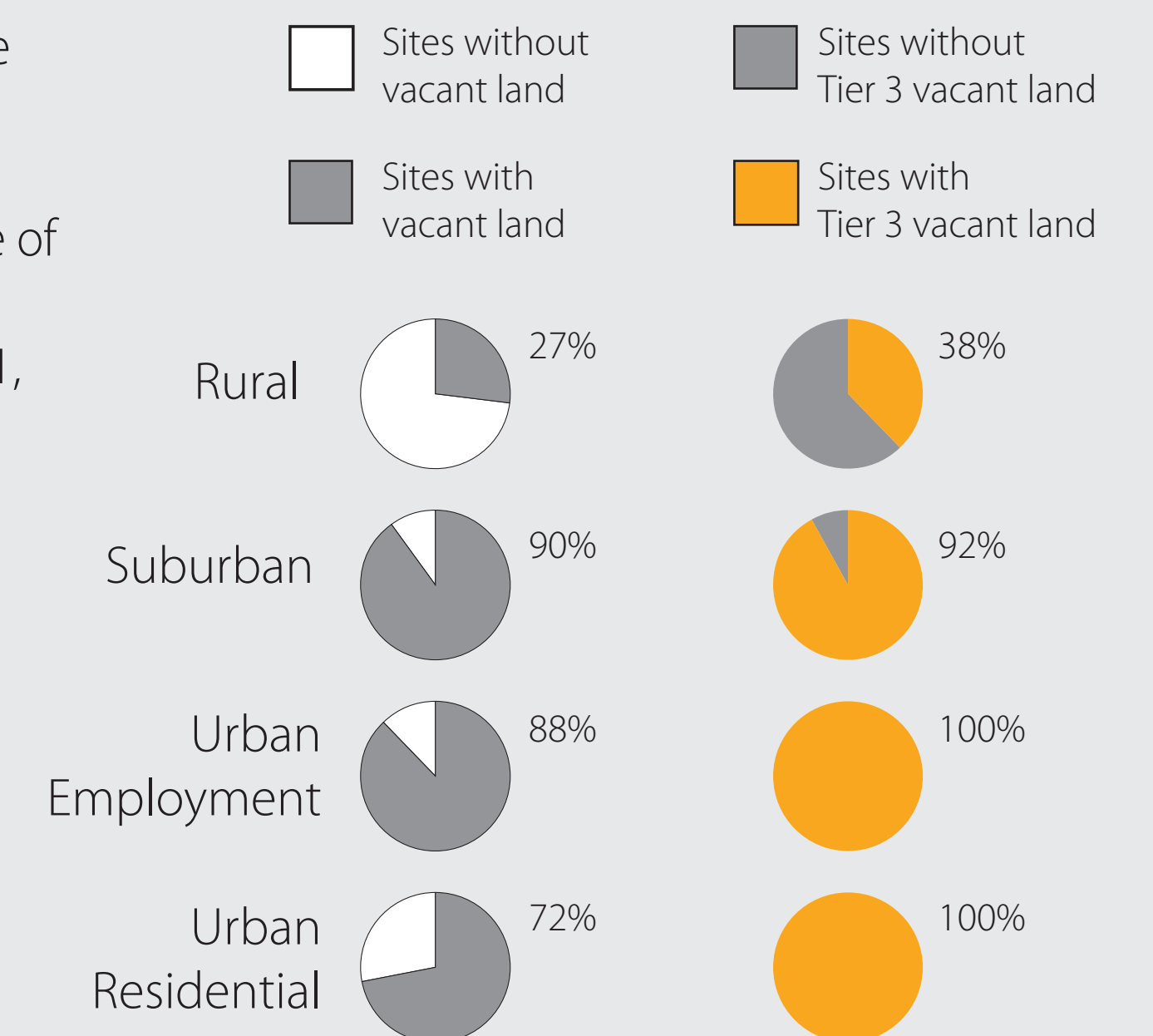


Figure 2. Prevalence of vacant land and Tier 3 vacant land by urbanization category

## [ RESULTS: FOODSHED + LAND ACCESS ANALYSIS ]

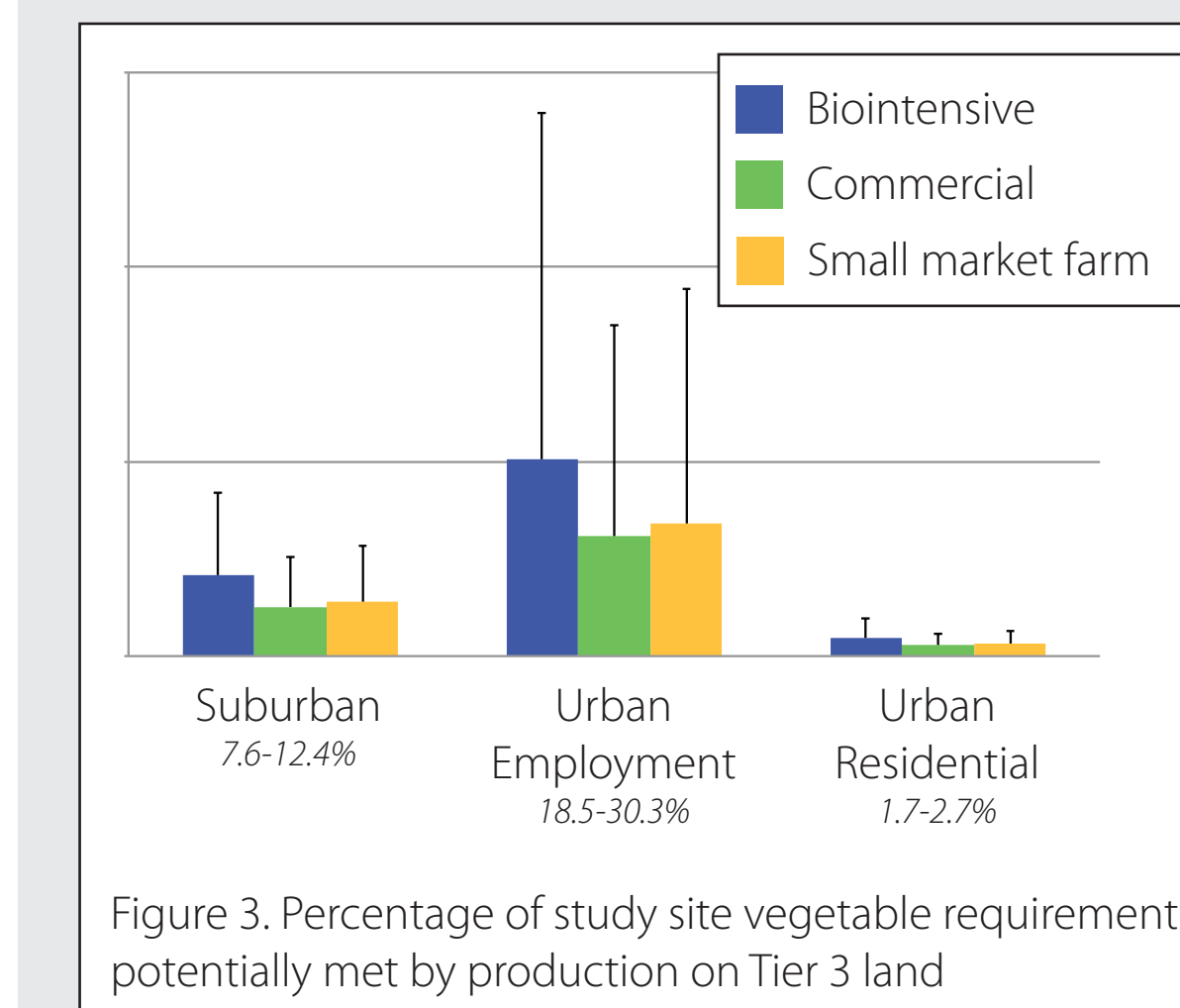


Figure 3. Percentage of study site vegetable requirements potentially met by production on Tier 3 land

Urbanization had a significant effect on the percentage of vegetable servings potentially met ( $F_{(3,66)}=10.185$ ,  $p<0.001$ ; Fig. 3) and potential land access per household ( $F_{(3,66)}=16.547$ ,  $p<0.001$ ; Fig. 4).

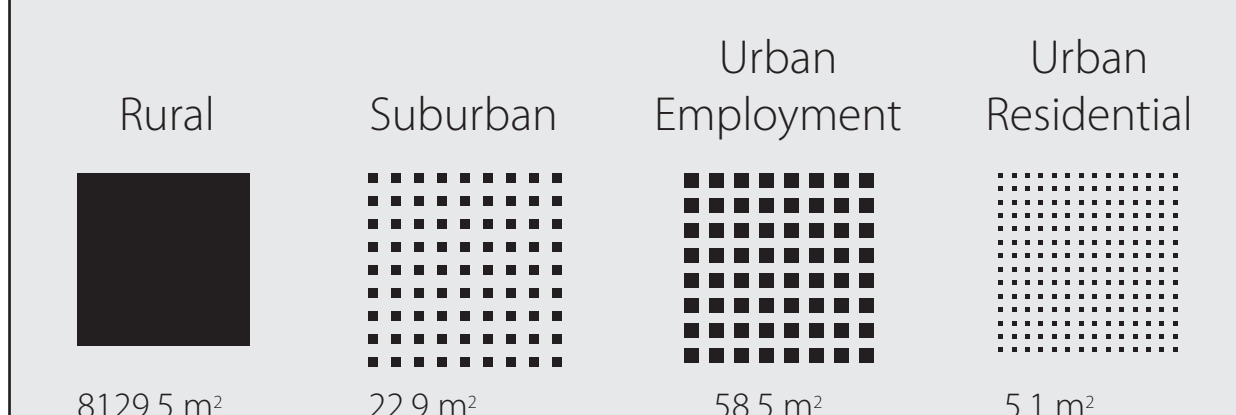


Figure 4. Household density and Tier 3 land area per household according to urbanization

## [ CONCLUSIONS ]

This research demonstrates that privately owned land is a significantly more prevalent land resource for urban food production than public land. Policy instruments that facilitate or incentivize usufruct agreements between private owners and urban gardeners and farmers would be effective in increasing urban agriculture. The land suitability index used in this research shows that soil quality is the most significant obstacle to enabling food production in more urban areas. Vacant land resources in urban employment areas could be successfully leveraged to provide food production and land access opportunities for

workers at their place of employment. Finally, this research demonstrates that land-to-household ratios vary significantly according to urbanization, and that this ratio should be considered when assessing the production potential of urban land.

Food system solutions that are tailored to their urban context and comprehensively target both public and private land resources would more effectively maximize food production and land access across the urban-rural continuum.

## [ THANK YOU ]

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## [ CITATIONS ]

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