

Residential household yard care practices along urban-exurban gradients in six climatically-diverse U.S. metropolitan areas

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Abstract

Residential land is expanding in the United States, and lawn now covers more area than the country's leading irrigated crop by area. Given that lawns are widespread across diverse climatic regions and there is rising concern about the environmental impacts associated with their management, there is a clear need to understand the geographic variation, drivers, and outcomes of common yard care practices. We hypothesized that 1) income, age, and the number of neighbors known by name will be positively associated with the odds of having irrigated, fertilized, or applied pesticides in the last year, 2) irrigation, fertilization, and pesticide application will vary quadratically with population density, with the highest odds in suburban areas, and 3) the odds of irrigating will vary by climate, but fertilization and pesticide application will not. We used multi-level models to systematically address nested spatial scales within and across six U.S. metropolitan areas—Boston, Baltimore, Miami, Minneapolis-St. Paul, Phoenix, and Los Angeles. We found significant variation in yard care practices at the household (the relationship with income was positive), urban-exurban gradient (the relationship with population density was an inverted U), and regional scales (city-to-city variation). A multi-level modeling framework was useful for discerning these scale-dependent outcomes because this approach controls for autocorrelation at multiple spatial scales. Our findings may guide policies or programs seeking to mitigate the potentially deleterious outcomes associated with water use and chemical application, by identifying the subpopulations most likely to irrigate, fertilize, and/or apply pesticides.

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