

FOOD INSECURITY AND URBAN AGRICULTURE: A GIS-BASED APPROACH

JOHN A. SORRENTINO*; MAHBUBUR R. MEENAR

TEMPLE UNIVERSITY.

Along with many of the world's other economies, the US is experiencing a deep recession. A greater number of individuals in the US are unemployed, and a greater number live below the US poverty line. Closely associated with these phenomena are food insecurity and hunger. According to Cook & Jeng (2009, p. 1), food insecurity means "Limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways." Holben (2010, p. 7) examined a host of definitions of hunger, and gave one variation as "...hunger is an involuntary lack of access to food preceded by food insecurity."

From the Holistic Approach Principle of The Hunger Project (THP, 2011), we learn that, "Hunger is inextricably linked to a nexus of issues including decent work, health, education, environmental sustainability and social justice. Only in solving these together will any of them be solved on a sustainable basis."

Like many other economies throughout the world, the US is experiencing an urbanization of its population. Whereas the rural poor often have access to land upon which to grow food, the poor in densely-populated metro areas are generally surrounded by infrastructure and other forms of impervious surface. Herein lies the major challenge – whether and how to provide food for a large and growing food-insecure segment of the metro population. The relief efforts themselves are largely undertaken by national, state and local governments and non-governmental organizations (NGOs). Most, if not all, of these organizations are experiencing contractions of available funds. This, of course, makes the hunger-relief effort ever more acute.

The work for the present paper is part of an on-going research effort by the Center for Sustainable Communities at Temple University on food insecurity and hunger-relief in the Philadelphia metro region (Meenar 2010). It is felt by the authors that the generic part of the analysis is applicable to metro regions around the world.

The current research involves using Geographic Information Systems (GIS) to map the areas of relative poverty and food insecurity in the metro region, including "food deserts." Food deserts are areas not served by supermarkets, small grocery stores, corner/convenience stores, farmers' markets, community supported agriculture, food cooperatives or community provision points. This data will be combined with transportation routes and the locations of current alternative food availability points (e.g., urban farms, community gardens, and NGO provision points such as food cupboards). A suitability analysis employing urban sustainability criteria (Wheeler 2000; Sorrentino et al. 2008) will determine where hunger-relief efforts should be targeted in the future. After suitable locations are found, computational tools within ArcGIS 10.0 will be used to create distance and cost parameters to be used in an optimization problem. The optimization model will resemble the "transshipment" model in Kaiser & Messer (2011) with elements from Sobal & Biscogni (1998).

The solution to the optimization problem will be mapped in GIS, and recommendations for action will be made based on a display of the results. As the authors maintain associations with the Delaware Valley Planning Commission, the City of Philadelphia, suburban municipal officials, and various hunger-related NGOs, the results and

recommendations will be presented to them. The applicability of the model and the suggestions for action to other urban areas in the Global North and the Global South will be discussed.

Selected References

Cook, John & Karen Jeng. (2009). Child Food Insecurity: The Economic Impact on our Nation. Feeding America. Available at <http://feedingamerica.org/SiteFiles/child-economy-study.pdf>. Accessed 11/25/11.

Holben, David H. (2010). The Concept and Definition of Hunger and Its Relationship to Food Insecurity. Available at www7.nationalacademies.org/.../Concept_and_Definition_of_Hunger_Paper.pdf

Accessed 6/11/10.

Meenar, Md Mahbubur (2010). Community Food Insecurity and The Role of Urban Agriculture. Unpublished manuscript. Center for Sustainable Communities, Temple University Ambler.

The Hunger Project (THP, 2011). Principles. Available at http://www.thp.org/what_we_do/mission/principles. Accessed 11/25/11.

Sobal, J., Khan, L., and Bisogni, C. (1998). A conceptual model of the food and nutrition system. *Social Science and Medicine*, 47(7):853-863.

Sorrentino, John A., Md M. R. Meenar & Bradley J. Flamm. (2008). Suitable Housing Placement: A GIS-Based Approach. *Environmental Management*, 42(5). pp. 803-20.

The Philadelphia Grow Project web site. (2010). Retrieved October 28, 2010, from <http://publichealth.drexel.edu/GROW>

Urban Agriculture: Food, Jobs, and Sustainable Cities, United Nations Development