

## Urban Agriculture: Growing Potential in Milwaukee's 15th Aldermanic District

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### Abstract

The City of Milwaukee has several targeted efforts to address vacant lots and foreclosed properties. One potential strategy is to create landscaped green space and/or Urban Agriculture (UA) using the \$1 Vacant Side Lot - 15th District Pilot Program (\$1 Lot Program) policy adopted for residents in Milwaukee's 15<sup>th</sup> Aldermanic District. Repurposing unused dirt lots into well-kept landscaped areas could have the benefit of discouraging crime. If the vacant lots are converted to food gardens there may be a positive impact on neighborhood property values, community health and well-being, neighborhood development, and increased neighborhood pride. It could also increase access to healthy food and improve food security for families. In addition to improving food security, five servings of fruits and vegetables a day is adequate for chronic disease prevention. *Purpose: The question this paper addresses is this:* if a proportion \$1 Lot Program properties were converted to UA for fruit and vegetable production, how many people would be provided with adequate fruits and vegetables from one year's production yield? *Results:* As of the October 2014 City of Milwaukee Master Property Record, the 15<sup>th</sup> Aldermanic District registered a total of 11,232 residential and commercial properties (6.9% of city total), and 2,070 vacant lots (31.1% of city total). After eliminating ineligible lots based on \$1 Lot Program criteria and a conservative estimate of properties used for food gardens, 340,137 square feet (sq. ft.) (roughly 7.8 Acres) were calculated to be UA land. Production yield ranged from 170,086.4 – 469,388.9 pounds of fruits and vegetables, which provides somewhere between 541.8 and 1,495.3 people with adequate fruits and vegetables per year. That production yield feeds from 1.6 to 4% of the 15<sup>th</sup> District's population. *Discussion:* Despite this somewhat disheartening percentage, it is important to note that this is roughly \$300,000 worth of fruits and vegetables grown on the estimated 116 lots. And, up to 13 individuals per lot could receive a year's worth of sufficient fruit and vegetable servings for chronic disease prevention. Policy initiatives to maximize Milwaukee's UA potential are discussed.

## Introduction

The City of Milwaukee has several targeted efforts to address vacant lots and foreclosed properties. According to the City of Milwaukee's 2013 assessment, *Revitalizing Milwaukee Neighborhoods*, there were "500 raze orders pending in the City with a fiscal impact of over \$7.5 million" and vacant and foreclosed properties were being "aggressively monitored." Several of these raze orders have been completed over the last few years, adding to a growing number of vacant lots. Milwaukee's Department of City Development (DCD) reports owning over 3,000 vacant lots (DCD, 2014a) and this number could continue to rise. A concentrated number of these vacant lots are in Milwaukee's 15th Aldermanic district, leading the city to create the \$1 Vacant Side Lot - 15th District Pilot Program (subsequently referred to as the *\$1 Lot Program*), a pilot program in this district to sell city owned vacant lots to adjacent property owners for one dollar (DCD, 2014b).

Vacant lots are more prevalent in low-income neighborhoods and are often associated with higher rates of crime. One potential strategy for addressing the issue of vacant lots is to create landscaped green space and/or Urban Agriculture (UA). The Food and Agriculture Organization of the United Nations (2014) defines UA "as the growing of plants and the raising of animals within and around cities." Utilizing UA was clearly one of the goals targeted by the \$1 Lot Program as the adjacent vacant property can only be used for a garden, side yard, or landscaped space. Wolfe & Mennis (2012) note that well-kept vegetation was associated with lower crime rates for assault, burglary, and robbery. Nassauer, Iverson, & Raskin (2014) assert that tending to vacant property, such as landscaping and improving its appearance, may discourage crime and increase social capital and cohesion. Voicu & Been (2008) assessed that community gardens have a positive impact on neighborhood property values, which was

particularly significant in the poorest neighborhoods. UA has also been associated with improved community health and well-being, neighborhood development, and increased neighborhood pride (Armstrong (2000), Hynes & Howe (2004), Okvat & Zautra (2011), & Wakefield et al (2007)).

UA could have an additional benefit beyond promoting neighborhood upkeep and care it can also provide access to healthy food and improved food security for families (Armstrong (2000), Duchemin (2008), Hynes & Howe (2004), & Wakefield et al (2007), Wegmuller, & Legault (2008)). The World Health Organization (WHO) defines food security as “all people at all times hav[ing] access to sufficient, safe, nutritious food to maintain a healthy and active life” (WHO, 2014a). Metcalf and Widener (2011) suggest that the UA movement in Buffalo, NY aided city planners and poverty activists in “redesigning their food production and distribution systems to meet the needs of food-insecure residents.” Addressing food security and improving access to healthy food is especially prudent in racially segregated and lower income neighborhoods. Morland & Filomena (2007) highlight the national trend of decreased access to fresh fruits and vegetables in racially segregated neighborhoods based on produce availability.

## **Background**

### **Adequate Intake of Fruits and Vegetables for Disease Prevention**

Increased fruit and vegetable intake has been associated with lower mortality rates (Wang et al 2014), as well as the reverse: decreased fruit intake is associated with increased mortality rate (Lim et al 2012). In fact, Bellavia et al (2013) determined that individuals who did not eat any fruits and vegetables died three years earlier than those who ate five servings a day. This study uses the conventional recommendation of five fruits and vegetables per day, which He, Nowson, & MacGregor, 2006 calculated to be the equivalent to 391 grams of fruits and

vegetables. This convention for analysis is consistent with research on mortality rates and food consumption patterns, and is also the basis for the WHO's (2014b) recommendation of 400 grams of fruit and vegetables per person per day.

### **Access to Healthy Food**

Stewart et al (2011) assess that individuals can procure adequate fruits and vegetables at a cost of roughly \$0.40 to \$0.50 per serving by following a very thrifty spending plan and not purchasing expensive items. This equates to approximately \$60 to \$75 per month based on the recommended five servings a day for 30 days. To put this amount in perspective, note that the United States Department of Agriculture calculated the 2013 average monthly Supplemental Nutrition Assistance Program benefits (formerly known as food stamps) to be \$116 per individual in Wisconsin (USDA, 2013). Even in Stewart's (2011) thriftiest scenario, more than half of these benefits would be used to purchase fruits and vegetables to meet an individual's health needs. Utilizing UA could allocate these funds to other food items and potentially increase fruit and vegetable consumption.

Carney et al (2012) surveyed, observed, and interviewed community gardeners regarding fruit and vegetable intake and food security. The gardeners reported increased intake of vegetables for both adults and children in the gardener's household, as well as a small decrease in concern regarding having enough money to purchase food each month. Alaimo et al (2008) show that for households with a participating community gardener, there was an increased likelihood of individuals in that house eating five servings of fruits and vegetables each day. Kortright & Wakefield (2011) studied home gardening as a potential mediator for food security issues. Although the gardeners did not become completely self-sufficient in growing enough produce for sustenance, several were able to produce a significant amount of fruits and

vegetables. The authors also note that these backyard gardens provided access to culturally appropriate vegetables that may have been more difficult to find in a grocery store (Kortright & Wakefield, 2011). van den Berg et al (2010) showed higher rates of health and well-being in allotment gardeners over the age of 62 compared with their non-gardening neighbors.

### **Economic Impact**

Cost savings on produce is often suggested as a benefit to UA. Algert, Baameur, & Renvall (2014) compared community garden vegetable production to the purchase cost of those same items and computed an average saving of \$435 per plot for the season. Milwaukee Urban Gardens (2011) calculated a produce value of \$39,400 for the 2011 growing season in 18 different community gardens. The National Gardening Association (NGA, 2009) estimated that, on average, a garden of 600 square feet (sq. ft.) requires \$70 of investment, but can produce \$600 worth of market value produce. Higher intensity gardening produces even more cost benefit. The Urban Homestead's (2009) detailed records showed that their one-tenth of an acre (4356 sq. ft.) garden produced 6,000 edible pounds and over \$20,000 in gross sales.

### **Milwaukee's 15<sup>th</sup> Aldermanic District**

Several neighborhoods are targeted within Milwaukee for neighborhood revitalization projects, including many within the 15<sup>th</sup> Aldermanic District. As of the 2010 census, 34,313 people lived in District 15 and 4.2% were white, non-Hispanic compared to 37% on average in Milwaukee. The average assessed residential property value was \$51,230 compared to \$120,076 city average. The District's property was 18.4% vacant land area and 30.85% owner occupied (4.2% and 58.3% are city averages, respectively) and contained 93 of the 259 rape orders in the city. When assessed for ten specific police offenses (assault, arson, burglary, criminal damage, locked vehicle, robbery, sex offense, theft, vehicle theft, and homicide) the 15<sup>th</sup> District had

110.28 crimes per 1000 residents, 1.6 times the city average. (City of Milwaukee Information and Technology Management (CMITM), 2014)

The characteristics of the 15<sup>th</sup> district make it an ideal candidate for targeted UA interventions that have the potential to impact multiple areas of neighborhood stress. The Center for Urban Population Health (CUPH, 2012) mapped socioeconomic status (SES) and health in Milwaukee. The 15th district falls within the map of lowest SES group tercile, and 70% of this tercile had inadequate fruit and vegetable intake based on the recommended five fruits and vegetables a day (CUPH, 2012). The \$1 Lot Program is an example of a targeted initiative to improve Milwaukee neighborhoods that could also dramatically impact health.

### **Purpose**

UA has a potential double impact on improving neighborhood well-being not only through community cohesion and pride, but also by providing access to healthy fruits and vegetables. The question this paper addresses is this: if a proportion of city-owned lots in the 15th Aldermanic district were bought through the \$1 Lot Program and converted to UA for fruit and vegetable production, how many people would be provided with adequate fruits and vegetables from one year's production yield?

### **Methodology**

#### **Potential Properties**

The City of Milwaukee Master Property File (MPROP) is an excel file database of all properties located within the city of Milwaukee. The properties in MPROP were sorted to target potential \$1 pilot program properties. The MPROP categories used for sorting included: "GEO-ALDER," "LAND-USE," and "OWNER-NAME" (City of Milwaukee, 2014). Properties were retained for further review and analysis based on the following codes.

**Location**

“GEO-ALDER” codes were used to determine aldermanic area based on the most recent City of Milwaukee Common Council delineations (City of Milwaukee, 2012). Potential property codes included: no code listed, zero, and 15. The properties without a valid district code (zero, none listed) were further reviewed; none were vacant lots owned by the city and were eliminated. All district 15 properties were retained for further analysis.

**Land Use**

“LAND-USE” is designated by a four-digit code for common land uses based on Standard Industrial Classification code (City of Milwaukee, 2012). All 15<sup>th</sup> district properties had a land use code, “8880” is the code for a vacant lot and was used to identify potential properties.

**Property Owner**

“OWNER-NAME” contains the legal property owner name (City of Milwaukee, 2012). Properties not owned by the City or County of Milwaukee or a subsidiary were eliminated. The following City department’s properties were also excluded: the Redevelopment Authority as they are primarily used for commercial projects (Y. LaPierre, personal communication, December 5, 2014), the Housing Authority as they were purchased for potential scattered site housing plots (Walker, 2013), and the Transit Authority as the property is used for transit. Milwaukee County properties were also reviewed but eventually excluded as they included an entire vacant block and alley, a county park, and a pedestrian mall. The final property owners included the remaining City of Milwaukee properties and two subsidiaries: The Neighborhood Improvement Development Corp Inc. and the Milwaukee Neighborhood Reclamation Co LLC. The

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subsidiaries work with the city and would honor the terms of the \$1 Lot Program (S. Leichtling, personal communication, December 8, 2014).

### **Prospective Fruit and Vegetable Production**

After sorting the properties, the total property area was adjusted to further match the \$1 Lot Program criteria requiring adjacent property ownership and landscaped or garden use (DCD, 2014b). Adjustments to the property area included: credible lot size, owner-occupancy, and feasible land use for food production. The adjusted area was multiplied by production yield to determine the potential weight of fruits and vegetables grown. Finally, this amount was converted to the recommended number of servings needed for disease prevention.

### **Credible Lot Size Summation**

The MPROP column “LOT-AREA” was used to determine the size of the properties in sq. ft. Numerical values in MPROP are spelled out such as 157 is entered as one hundred fifty-seven (City of Milwaukee, 2014) which decreased the likelihood of large errors of magnitude. Area was converted from text to number and sorted lowest to highest. Lots larger than 10,000 sq. ft. were eliminated from the sample, deemed outliers and unlikely to fit the ownership criteria for the \$1 Lot Program. The remaining properties were summed for a total area of potential vacant lots.

### **Owner Occupancy**

\$1 Lot Program properties must be purchased by the adjacent property owner. The 15<sup>th</sup> district has a 30.85% owner occupancy rate (CMITM, 2014), so the summed total area was multiplied by (0.3085) to account for this.

### **Feasible Land Use for Food Production**



\$1 Lot Program properties can be used for several purposes, not only food production. The NGA (2009) survey estimated that 31% of households in the United States had a food garden in 2008. Also, 75% of property was estimated as actual garden space as the remaining 25% would likely be used for paths through the garden, access to water, a shed, or other uses. Thus, land area was further adjusted by factors of (0.31) and (0.75) resulting in a final adjusted \$1 Pilot Program square foot estimate (\$1SqFt).

### **Fruit and Vegetable Production Yield**

There is a wide range of potential for production capacity of fruits and vegetables from 0.5 pounds per square foot (lb./sq. ft.), 0.75 lb./sq. ft., 1.2 lb./sq. ft., up to 1.38 lb./sq. ft. (Algert et al 2014, Columbia University Earth Institute 2012, NGA 2009, & Urban Homesteaders 2009). To determine a potential range of fruit and vegetable production, \$1SqFt was multiplied by the lowest and highest production yields (0.5 lb./sq. ft. to 1.38 lb./sq. ft.).

### **Recommended Servings for Disease Prevention**

Health Experts (Bellavia et al 2013, Lim et al 2012, Wang et al 2014, and WHO 2014b) suggest an intake of five servings per person, per day of fruits and vegetables for chronic disease prevention. Five servings equates to 391 grams or 0.86 pounds (He, Nowson, & MacGregor, 2006). The production yields were divided by 0.86 pounds per person per day and then 365 days per year to determine an estimated number of people per year the \$1 Lot Program could provide with the recommended servings of fruits and vegetables.

## **Results**

### **Potential Properties**

As of October 13, 2014, MPROP listed 162,063 properties in the City of Milwaukee, 6,646 of which were vacant lots. The 15<sup>th</sup> District contained 11,232 properties (6.9% of city

total), and 2,070 vacant lots (31.1% of city total). Of these 2,070 lots, 1,533 (74.1%) were owned by Milwaukee city, county, or a subsidiary. Three hundred and one (19.6%) of the city/county owned vacant lots were eliminated, a vast majority (N=265, or 88%) were owned by the City of Milwaukee Redevelopment Authority. The remaining 1,232 vacant lots were assessed for area size and potential fruit and vegetable production.

### **Prospective Fruit and Vegetable Production**

Of the potential 1,232 vacant lots, 17 (1.4%) were larger than 10,000 sq. ft. and eliminated from analysis. The remaining 1,215 lots contained 4,742,153 sq. ft. After adjusting for owner occupancy and feasible land use, 340,137 sq. ft., roughly 7.8 acres, were estimated to be producible land area and fit within the \$1 Lot Program criteria. Production yield ranged from 170,086.4 – 469,388.9 pounds of fruits and vegetables. This equated to providing a range of 541.8 – 1495.3 people with adequate fruits and vegetables per year.

### **Discussion**

What does this estimate of potential fruit and vegetable production from the \$1 Lot Program mean to the 15<sup>th</sup> District? At first glance, not much. The *most intensive* UA production (1.38 lb./sq. ft.) would only serve about 4% of the 34,313 people living there (with the low intensity production serving 1.6%). This makes little dent in the massive task of improving access to healthy food for residents of the 15<sup>th</sup> district and beyond. This is a neighborhood with an incredibly high stock (31%) of Milwaukee's vacant urban lots. The fact that the best calculated estimate of using vacant lots for food production met the needs of only 4% of the 15<sup>th</sup> district provides insight to the limited capacity UA has to address inadequate access to healthy food solely through giving away vacant lots for one dollar to willing property-owning gardeners.

It is important to note that the calculations are fairly conservative estimates. The 31% estimate for using the lots as a food garden was based on a national average, and that percentage was also trending higher (NGA, 2009). The \$1 Lot Program properties can only be used for gardening or other green space improvements, which may result in more than a third of the lots being used for food production. However, the calculations do not take into account the proportion of lots that have adequate access to sunlight, require soil amending due to contamination, or require other debris clean up that may render them unappealing property. This research suggests that garden education on intensive UA practices would likely need to accompany any policy initiative to use vacant lots for mass food production. It should also be accompanied by additional policy to promote composting, access to mulch or other soil amendments, and soil testing at a minimum.

There are interesting observations to glean from the research. Using NGA (2009) estimates for economic impact, the lot area included in the final analysis has the potential to produce over \$300,000 worth of fruits and vegetables. A *post hoc* calculation using the same owner occupancy (30.85%) and percent land used for food gardening (31%) to adjust total number of lots estimated that only 116 of the 1215 lots would be producing food. Thus, 116 lots could potentially feed 541 to 1495 people, the highest production yield resulting in almost 13 people per lot receiving the recommended fruit and vegetable servings. Creating a garden through the \$1 Lot Program could provide permanent access to low cost fruits and vegetables for families. This suggests policy initiatives to improve access to and interest in gardening. Should owner occupancy be a requirement for the program? How can the percentage of gardens that are used for food be maximized?

It is important to note that the \$1 Lot Program is a pilot program attempting an innovative way to reduce vacant lots owned by the city. However, the program does clearly target gardening by limiting development to green space options. It could have the additional benefit of improving access to healthy food in the 15<sup>th</sup> District through UA if it is coupled with other city initiatives. Milwaukee appears to be positioning itself as a pioneering UA city with places like Walnut Way, Alice's Garden, and Growing Power taking the lead. The City's Office of Environmental Sustainability addresses UA with the novel program HOME GR/OWN (2014) and its objective to target specific neighborhoods and "make it easier to access local food and re-purpose vacant lots." For UA to truly have an impact on access to healthy food, efforts need to combine policy initiatives like the \$1 Lot Program with larger scale projects. HOME GR/OWN could target the \$1 Lot Program and support new and potential vacant lot owners in building sustainable and safe food production gardens where they are needed most. The \$1 Lot Program is a nice idea, but the City of Milwaukee would likely need a more concerted effort in order to make it not just a symbolic policy initiative, but one with a significant impact on food security and health in the community.

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