

DEEP-ROOTED CONCERNS FOR URBAN COMMUNITY GARDENING: IS MORE REGULATION THE ANSWER?

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Abstract

Urban agriculture, while not new to the U.S., is a significantly expanding phenomenon that includes a broad range of agricultural activities. Within the umbrella concept of “urban agriculture” are community gardens. The growth of urban agriculture and community gardens can be traced to a variety of factors including those related to current economic conditions (high rates of joblessness and downward movement of people from the middle-class to low-income and poor), health (increasing rates of obesity and obesity-related diseases such as diabetes), and communities to seeking to reclaim blighted areas from urban decline. Community gardens are an important tool to combat issues related to these factors and have been encouraged by nonprofit organizations to fight hunger; by the Obama Administration to encourage increased consumption of fruits and vegetables in favor of processed foods; and by community organizations to convert unused land to productive, beautiful, food-producing land that provides a place for organizing and fellowship.

However, significant industrial/manufacturing-related soil contamination is often prevalent in low-income, minority, urban communities due to historical patterns of siting such uses in these neighborhoods. There are real dangers associated with working in and consuming produce grown in contaminated soil. Government responses to this problem have been piecemeal. Coordination between all levels of government is necessary for a comprehensive approach to this problem.

The challenge is to educate these communities about the dangers without discouraging them from this endeavor. This Note explores these issues and makes recommendations for implementation of regulatory measures in order to keep community

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gardeners safe so they can reap the benefits of growing and eating fresh healthy food and reclaiming their communities.

"En un jardín crecen más cosas que las que siembra el jardinero" (More grows in the garden than the gardener sows).
 – Spanish Proverb

Introduction

“Urban agriculture” is a catch-all term for the various methods of cultivating and distributing food occurring in urban areas.¹ The term has traditionally been used to refer to backyard/windowsill/rooftop gardens,² school gardens,³ and entrepreneurial gardens where food crops and/or livestock are cultivated for retail or wholesale distribution.⁴ This Note focuses on community gardens, a significant and expanding variant of urban agriculture defined as gardens “where typically a lot is divided among households who tend small plots of land for their own use.”⁵

The community garden has been touted as a cost-effective and relatively easy fix for a variety of society’s ills, including the prevalence of “food deserts”⁶ in low-income, predominantly minority,

¹ Stephanie A. Maloney, Note, *Putting Paradise in the Parking Lot: Using Zoning to Promote Urban Agriculture*, 88 NOTRE DAME L. REV. 2551, 2555 (2013).

² Kate H. Brown & Andrew L. Jameton, *Public Health Implications of Urban Agriculture*, 20, 21 J. PUB. HEALTH POL’Y, 21 (2000).

³ *Id.* School gardens generally occur where gardening is incorporated into the school’s curriculum.

⁴ *Id.* Some entrepreneurial gardens are quite extensive and cover large tracts of urbanized land. See generally John E. Mogk et al., *Promoting Urban Agriculture as an Alternative Land Use for Vacant Properties in the City of Detroit: Benefits, Problems and Proposals for a Regulatory Framework for Successful Land Use Integration*, 56 WAYNE L. REV. 21 (2010) (encouraging the promotion of urban agriculture on a grand scale in order to combat the City of Detroit’s ongoing struggle to police and maintain vacant lots, reduce unemployment, address plummeting property values and provide healthy food for its residents).

⁵ Brown & Jameton, *supra* note 2, at 21.

⁶ *Food Deserts*, U.S. DEP’T OF AGRIC.,

<http://apps.ams.usda.gov/fooddeserts/foodDeserts.aspx> (last visited Feb. 21, 2015). “Food deserts” are defined by the U.S. Departments of Agriculture, Treasury and Health and Human Services as “census tract[s] with a substantial share of residents who live in low-income areas that have low levels of access to a grocery store or healthy, affordable food retail outlet.” The definition qualifies “low-income areas” as those areas meeting the threshold of having a 20% or higher poverty rate or a median family income at 80% (or below) of the median family income of the area and “low-

urban communities which has contributed to the disproportionate impact of nutrition-related diseases among the low-income, minority, urban population.⁷ These communities commonly have vacant lots and other spaces that can be transformed from unsightly reinforcements of the area's low-income status, into productive, beautiful green space that can serve to feed the neighborhood. This nourishment is both literal, through the provision of fresh food, and figurative, through the satisfaction of the aesthetic and other needs of these communities. The gardens also act as safe places for congregation and community organization.

The concept of community gardening as a means to accomplish what has been termed "food justice" is largely positive.⁸ The goals of the movement are worthy – who can really argue against encouraging an often disenfranchised and overlooked segment of the urban population to empower themselves to take control of their health and communities by growing their own food?

However, despite the overwhelming good that community gardens accomplish in terms of both health and social benefits, there

access communities" as those with "at least 500 persons and/or at least 33% of the census tract's population liv[ing] more than one mile from a supermarket or large grocery store (10 miles, in the case of non-metropolitan census tracts)."

⁷ Compare Gina Kolata, *Studies Question the Pairing of Food Deserts and Obesity*, N.Y. TIMES (Apr. 18, 2012), http://www.nytimes.com/2012/04/18/health/research/pairing-of-food-deserts-and-obesity-challenged-in-studies.html?_r=0 (discussing the controversy resulting from recent studies of food deserts in low-income, urban neighborhoods hinting that food deserts and obesity may not be directly linked), with CTR. FOR THE STUDY OF THE PRESIDENCY & CONG., SNAP TO HEALTH: A FRESH APPROACH TO IMPROVING NUTRITION IN THE SUPPLEMENTAL NUTRITION ASSISTANCE PROGRAM 5 (July 2012) [hereinafter *SNAP to Health*] (arguing that "poverty, hunger and food insecurity" are linked to "obesity and chronic disease", which are in turn linked to "changes in food consumption patterns . . . [f]oods high in energy, sugar, refined starches, and sodium have become widely available and affordable," and thus concluding that there is a well established correlation between being low-income and obese).

⁸ "Food justice" has been defined as "seek[ing] to ensure that the benefits and risks of where, what, and how food is grown, produced, transported, distributed, accessed and eaten are shared fairly." Elizabeth Harrington, *New Let's Move Executive Director is a 'Food Justice' Activist*, THE WASHINGTON FREE BEACON (Jan. 8, 2015 3:00 PM), <http://freebeacon.com/issues/new-lets-move-executive-director-is-a-food-justice-activist/>. See also *What is Food Justice*, JUST FOOD, <http://www.justfood.org/advocacy/what-is-food-justice> (last visited Feb. 21, 2015) (defining the term as "communities exercising their right to grow, sell, and eat healthy food. Healthy food is fresh, nutritious, affordable, culturally-appropriate, and grown locally with care for the well-being of the land, workers, and animals").

are potential dangers inherent in utilizing urban lands for food cultivation. The very real dangers of air and soil contamination resulting from past and ongoing urban and industrial use pose significant risks - the gardening process and the food product have the potential to poison the very population that they are supposed to help.

In short, the space between the positive impacts of eating fresh food and the potential adverse health effects of eating food grown in contaminated soil needs to be explored. The benefits of eating fresh, healthy food are numerous. Studies have shown that eating fruits and vegetables can help combat, among other conditions, “malnutrition, obesity, fatigue, and depression.”⁹ However, contaminated soils have the potential to negate the health benefits of eating produce through exposure during the gardening process and consumption.¹⁰ Because of widespread soil contamination, particularly in urban areas, it is necessary to ask whether the benefits outweigh the potential risks. Can we make the growing process safe enough? And if so, how?

Part I of this Note will provide background on the urban agriculture movement in the U.S. over the last century. Part II will explore the dangers of existing air and soil contamination and how exposure to contaminants such as heavy metals affect human beings through interaction with the soil during cultivation and/or consumption of the end product. Part III will look at how various municipalities have addressed these issues and evaluate whether such measures have been effective in protecting communities from the potential effects of environmental pollution. Part IV will discuss various regulatory options to identify and mitigate soil contamination through remediation and/or best management practices (“BMPs”). This Part will also explore whether community gardens can be regulated in such a way as to minimize potential adverse effects without destroying the many benefits they provide. Part V will conclude with recommendations for cost, effectively and

⁹ Steven A. Platt, Note, *Death by Arugula: How Soil Contamination Stunts Urban Agriculture, and What the Law Should Do About It*, 97 MINN. L. REV. 1507, 1511 (Apr. 2013); see also *Obesity Prevention Source*, HARV. SCH. OF PUB. HEALTH, <http://www.hsph.harvard.edu/obesity-prevention-source/obesity-causes/diet-and-weight/> (last visited Feb. 21, 2015) [hereinafter, *Harvard*] (discussing how a healthy diet rich in fruits, vegetables, whole grains and healthy protein sources can combat disease as well as weight gain).

¹⁰ Platt, *supra* note 9, at 1512-13.

comprehensively addressing the problem of using contaminated lands to produce food.

I. Urban Agriculture in the U.S.

A. *Historical Urban Agricultural Movements*

There is a strong tradition of urban agriculture in the U.S. Perhaps the most famous wave of urban agriculture began during World War II. It has been argued that the most successful home front effort during the war was “the growing of victory gardens by residents of every city and town in the country.”¹¹ According to the U.S. Department of Agriculture (“USDA”), the nearly twenty million backyard victory gardens planted by an estimated fifteen million families in 1942 produced approximately forty percent of the nation’s fruits and vegetables, or up to ten million tons, in 1943.¹² The USDA contributed to the success of the program by distributing seed, fertilizer, and gardening tools to gardeners through extension agents.¹³

A later wave of urban agriculture occurred as a response to the significant economic inflation of the 1970s.¹⁴ In addition to increasing food prices, the social activism of the 1960s and 1970s used urban gardening as a response to social and economic issues, such as the energy crisis, general urban decline, and degradation of the environment.¹⁵ It was during this era of urban gardening that activist garden programs were established, including the Green Guerillas in New York City¹⁶ and the Boston Urban Gardeners.¹⁷ The USDA

¹¹ Mogk, et al., *supra* note 4, at 1527.

¹² *Extension*, USDA, <http://www.csrees.usda.gov/qlinks/extension.html> (last updated Mar. 28, 2014); Kimberly Hodgson, *Investing in Healthy Sustainable Places through Agriculture*, FUNDER’S NETWORK FOR SMART GROWTH AND LIVABLE COMMUNITIES 3 (2011), available at http://www.fundersnetwork.org/files/learn/Investing_in_Urban_Agriculture_Final_110713.pdf.

¹³ See USDA, *supra* note 12. The USDA, in coordination with the 100 federally-funded land grant colleges and universities, operates 2,900 extension offices across the U.S. that offer assistance on agricultural matters, including soil testing.

¹⁴ Brown & Jameton, *supra* note 2, at 22.

¹⁵ Maloney, *supra* note 1, at 2559.

¹⁶ Christopher M. Smith & Hilda E. Kurtz, *Community Gardens and Politics of Scale in New York City*, in 93 GEOGRAPHICAL REV. 193, 195-97 (2003) (Operation GreenThumb was established by the City of New York in 1978 in response to such “guerilla” gardening operations).

began sponsoring the Urban Gardening Program in 1976 with an initial congressional allocation of \$1.5 million to encourage and assist vegetable gardening and community gardens through offices in six cities.¹⁸ By 1993, the Urban Gardening Program's allocation was \$3.6 million, which allowed expansion to twenty-three cities.¹⁹

More recently, the growth of the "locavore" movement, which espouses the reduction of the individual "carbon footprint"²⁰ through a combination of avoiding conventional agriculture, genetically modified foods, pesticides and fertilizers, reducing cost, and fostering an awareness of where food comes from, has fueled growth of urban agriculture.²¹ This movement, in combination with a renewed interest in sustainability has revived the tradition of urban agriculture.

A more practical reason for a return to urban gardening may be related to the recent economic downturn.²² There has been an increase in the planting of "recession gardens" as more families have had to trim their budgets in response to current economic conditions.²³ Many Americans have experienced food shortages,²⁴ and some have turned to planting subsistence gardens in order to supplement their food supply.²⁵

¹⁷ LAURA LAWSON, DEPARTMENT OF LANDSCAPE ARCHITECTURE, RUTGERS, THE STATE UNIVERSITY OF NEW JERSEY, A BRIEF HISTORY OF URBAN GARDEN PROGRAMS IN THE UNITED STATES 13 (Oct. 2009).

¹⁸ Brown & Jameton, *supra* note 2, at 23.

¹⁹ *Id.* Funding was eventually discontinued due to lack of support in both Congress and the USDA.

²⁰ Sarah B. Schindler, *Of Backyard Chickens and Front Yard Gardens: The Conflict Between Local Governments and Locavores*, 87 TUL. L. REV. 231, 235 (2012).

²¹ *Id.*; see, e.g. *Guidelines for Eating Well*, THE LOCAVORES, www.locavores.com/how/ (last visited Feb. 21, 2015).

²² The "Great Recession" sparked by the sub-prime mortgage crisis is generally thought to have begun impacting middle-class America in 2008.

²³ John D. Sutter, *Recession gardens' trim grocery bills, teach lessons*, CNN.COM (Apr. 2, 2009), <http://www.cnn.com/2009/LIVING/04/01/recession.garden/> (noting a significant uptick in 2009 vegetable plant and seed sales over the prior year).

²⁴ *SNAP to Health*, *supra* note 7, at 9.

²⁵ See generally *Recession Garden Plan for \$20*, THE GARDENER'S RAKE BLOG (Apr. 14, 2009), <http://thegardenersrake.com/recession-garden-plan-for-20> (offering advice on how to start a recession garden cheaply and efficiently).

B. Community Gardens

Community gardens serve many important functions. They are a way to fight hunger in urban America—community gardens provide a means for urban, low-income, minority families to supplement their sometimes meager food supplies and stretch their limited resources, thereby addressing hunger in a direct and meaningful way.²⁶ There has also been a push on the national level to use community gardens as a tool to fight the growing prevalence of obesity-related diseases by emphasizing nutrition and provision of affordable and easy access to fresh healthy food (discussed further in Part I(B)(2)). Community gardens have long been encouraged as a means to facilitate community building and empowerment (discussed further in Part I(C)).

According to the American Community Gardening Association (“ACGA”), there are over 18,000 community gardens in the U.S. and Canada.²⁷ In addition, the USDA has funded over 1,500 community gardens in all fifty states through its People’s Garden Grant Program (“PGGP”).²⁸ These figures may overlap somewhat and do not provide the total number of community gardens in America; however, they are indicative of a significant and ongoing interest in community gardening and localized food production. In a recent survey of 443 community gardening associations, representing 8,550 community gardens (primarily in the U.S. with a small subset in Canada) conducted by the Rutgers School of Environmental and Biological Sciences in collaboration with ACGA, it was found that

²⁶ See generally *Community Gardens Mitigate Hunger and Malnutrition*, GARDENING MATTERS (Oct. 2006), <http://www.gardeningmatters.org/sites/default/files/cgs-mitigate-hunger.pdf> (detailing the many ways in which community gardens combat hunger, including by feeding many more people than just those who work in the garden); *15 Community Gardens. 3,506 Pounds of nutritious, delicious vegetables for the Target Hunger community. Thank you volunteers!*, TARGET HUNGER, <http://www.targethunger.org/gardens/> (last visited Feb. 21, 2015); *Community Gardens and Hunger*, DENVER URBAN GARDENS (2012), <http://dug.org/storage/public-documents/Community%20Gardens%20and%20Hunger.pdf> (last visited Feb. 21, 2015) (10% of all produce grown in DUG gardens is donated to local food banks or hungry families and certain DUG gardens provide free vegetables to low-income women with children).

²⁷ *FAQ*, AMERICAN COMMUNITY GARDENING ASSOCIATION, <https://communitygarden.org/resources/faq/> (last visited on Feb. 21, 2015).

²⁸ *Common Questions*, USDA (Feb. 2012), http://www.usda.gov/documents/Common_Questions_feb2012.pdf

seventy-three percent of survey respondents were located in urban areas.²⁹

i. Hunger

Legislative responses to the economic crisis and the related ongoing political battles over how to balance the budget³⁰ have had devastating effects on a significant number of Americans including children, the elderly, and the disabled who receive Supplemental Nutrition Assistance Program (“SNAP”) benefits.³¹ These cuts have also affected many Americans who have fallen out of the middle class due to job loss, pay cuts, and reductions in hours.³² Decreased federal

²⁹ Laura Lawson & Luke Drake, *Community Gardening Organization Survey 2011-2012* 1, 5-6 (2012), <http://communitygarden.rutgers.edu/files/Lawson%20and%20Drake%20community%20garden%20survey%20report.pdf>.

³⁰ See Stacy Dean & Dottie Rosenbaum, *SNAP Benefits Will Be Cut for Nearly All Participants In November 2013*, CTR. ON BUDGET & POL’Y PRIORITIES 1-2 (rev. Aug. 2, 2013), <http://www.cbpp.org/files/2-8-13fa.pdf>. The 2009 Recovery Act included a temporary boost to SNAP, which lapsed on November 1, 2013, resulting in a loss of approximately \$5 billion dollars for fiscal year 2014. The immediate effects to beneficiaries included a reduction of \$29 a month for a household of three, resulting in an average of “less than \$1.40 per person per meal.”

³¹ *SNAP (Food Stamps): Facts, Myths and Realities*, FEEDINGAMERICA, <http://www.feedingamerica.org/take-action/advocate/federal-hunger-relief-programs/supplemental-nutrition-assistance-program.html> (“82 percent of all SNAP benefits go to vulnerable houses that include a child, elderly person, or disabled person.”)

³² See *Census Data: Half of U.S. poor or low income*, CBS NEWS (Dec. 15, 2011), <http://www.cbsnews.com/news/census-data-half-of-us-poor-or-low-income/> (2011 U.S. census data showed that approximately 48% of Americans were classified as “low income” or “poor” (97.3 million Americans were low-income and earning approximately \$45,000 per year for a family of four. An additional 49.1 million Americans were below the poverty line, an increase of 4 million Americans in the low-income and poor categories over the 2009 data.)); *but see 4 in 5 Americans Live in Danger of Falling into Poverty, Joblessness*, NBC NEWS (July 28, 2013), http://usnews.nbcnews.com/_news/2013/07/28/19738595-ap-4-in-5-americans-live-in-danger-of-falling-into-poverty-joblessness?lite (reporting that 46.2 million Americans (15%) are poor); *80 Percent of U.S. Adults Face Near-Poverty, Unemployment, Survey Finds*, CBS NEWS (July 28, 2013), <http://www.cbsnews.com/news/80-percent-of-us-adults-face-near-poverty-unemployment-survey-finds/> (reporting that the number of U.S. poor remains at 46.2 million people partially due to ongoing post-recession unemployment rates); Lynn Stuart Parramore, *Dear Middle Class: Welcome to Poverty*, SALON (Jan. 8, 2014),

funding for SNAP has greatly increased hunger among America's poor and has undoubtedly increased the need for community gardens in low-income neighborhoods.³³ On February 7, 2014, President Obama signed into law the 2014 Farm Bill (formally, the Food Conservation and Energy Act), which cuts an additional \$800 million a year from SNAP for the next five years.³⁴

ii. Health

In March of 2009, First Lady Michelle Obama prepared to plant an organic garden at the White House, the first such garden since Eleanor Roosevelt planted her victory garden during World War II.³⁵ While the garden would provide food for the Obamas' meals and formal functions, Mrs. Obama's primary purpose was to "educate children about healthful, locally grown fruit and vegetables at a time when obesity and diabetes have become a national concern."³⁶ And for urban dwellers with no backyards, the nation's one million plus community gardens could "play an important role" in providing fresh and healthy food.³⁷

In addition to the White House garden, nutrition has played a significant part in Mrs. Obama's overall agenda as First Lady. Her "Let's Move" campaign, officially launched in February of 2010,³⁸ has shaped the national dialogue about nutrition as a way to address obesity and diabetes, both of which are on the rise in children and

http://www.salon.com/2014/01/08/dear_middle_class_welcome_to_poverty_partner/ (discussing census data showing that although minorities are still more likely to be poor than whites, racial disparities are narrowing).

³³ Eleanor Goldberg, *Nearly Half Of NYC Food Banks Ran Out Of Supplies After SNAP Benefits Were Cut: Report*, THE HUFFINGTON POST (Jan. 24, 2014), http://www.huffingtonpost.com/2014/01/24/food-banks-run-out-supplies_n_4660792.html (reporting that 85% of the 522 emergency food pantries and 138 soup kitchens surveyed by the Food Bank for New York City after the November 2013 SNAP cuts reported increases over the same period in the prior year and 26% reported turning people away due to inadequate supplies).

³⁴ Michael D. Shear, *In Signing Farm Bill, Obama Extols Rural Growth*, N.Y. TIMES (Feb. 8, 2014), http://www.nytimes.com/2014/02/08/us/politics/farm-bill.html?_r=0.

³⁵ Marian Burros, *Obamas to Plant Vegetable Garden at White House*, N.Y. TIMES (Mar. 20, 2009), http://www.nytimes.com/2009/03/20/dining/20garden.html?_r=0.

³⁶ *Id.*

³⁷ *Id.*

³⁸ See generally LET'S MOVE!, <http://www.letsmove.gov/> (last visited on Feb. 21, 2015).

adults.³⁹ One of the ways that community leaders are encouraged to support the initiatives is to plant community gardens.⁴⁰ Diets rich in fruits, vegetables and whole grains are powerful ways to combat heart disease, diabetes and weight gain, while diets comprised of highly processed, refined foods and sugary drinks lead to weight gain and chronic disease.⁴¹

In 2009, in conjunction with “Let’s Move,” President Obama established a Task Force on Childhood Obesity in order “to develop and implement an inter-agency plan that details a coordinated strategy, identifies key benchmarks, and outlines an action plan to end the problem of childhood obesity within a generation.”⁴² The action plan’s goal is the reduction of childhood obesity to five percent by the year 2030.⁴³ In May of 2010, the Task Force submitted its report to the President.⁴⁴ In February of 2011, the Domestic Policy Council submitted the Task Force’s recommendations and an implementation progress report to the President.⁴⁵

iii. Community Building, Open Space & Empowerment

Apart from the perceived health benefits, community gardens have value as a means to make productive use of vacant (and thus

³⁹ *Id.*

⁴⁰ E.g., *Ideas for Action*, LETS MOVE!, <http://www.letsmove.gov/ideas-action> (last visited Feb. 21, 2015); *Community Garden Checklist*, LETS MOVE!, <http://www.letsmove.gov/community-garden-checklist> (last visited Feb. 21, 2015).

⁴¹ *Harvard*, *supra* note 9.

⁴² *White House Task Force on Childhood Obesity Report to the President*, LETS MOVE!, <http://www.letsmove.gov/white-house-task-force-childhood-obesity-report-president> (last visited Feb. 21, 2015) [hereinafter *Task Force*]; see also Barack Obama, Presidential Memorandum - Establishing a Task Force on Childhood Obesity (Feb. 9, 2010), *available at* <http://www.whitehouse.gov/the-press-office/presidential-memorandum-establishing-a-task-force-childhood-obesity>.

⁴³ *Task Force*, *supra* note 42.

⁴⁴ WHITE HOUSE TASK FORCE ON CHILDHOOD OBESITY, SOLVING THE PROBLEM OF CHILDHOOD OBESITY WITHIN A GENERATION (May 2010), *available at* http://www.letsmove.gov/sites/letsmove.gov/files/TaskForce_on_Childhood_Obesity_May2010_FullReport.pdf.

⁴⁵ WHITE HOUSE TASK FORCE ON CHILDHOOD OBESITY, ONE YEAR PROGRESS REPORT (Feb. 2011), *available at* http://www.letsmove.gov/sites/letsmove.gov/files/Obesity_update_report.pdf.

unproductive) land.⁴⁶ Community gardens have been used to minimize blight, reduce crime, bring communities together, and preserve open space.⁴⁷ “The community gardening movement promotes interaction between the diverse residents of an urban neighborhood along common interests such as beautification, local food production, personal safety, health, and group projects.”⁴⁸ The garden is a gathering place.

In order to facilitate the establishment of community gardens, some states have taken affirmative steps to legislatively assist them. For example, New York State recognizes the use of state and parklands for community gardens as a public use and makes community gardens eligible as municipal park projects for state assistance.⁴⁹ New York also includes specific mention of community gardens in state laws relating to agriculture and food production.⁵⁰ California establishes gardening as an instructional school program.⁵¹ California also authorizes its Secretary of Business, Consumer Services, and Housing to “develop programs for technical and fiscal assistance to facilitate” community gardens.⁵²

II. Air and Soil Contamination

Soil contamination is a very real issue in urban areas, and a fact of life in many low-income, minority, and urban communities.⁵³

⁴⁶ Jane Schukoske, *Community Development through Gardening: State and Local Policies Transforming Urban Open Space*, 3 N.Y.U. LEGIS. & PUB. POL’Y 351, 351-52 (2000).

⁴⁷ *Id.* at 356.

⁴⁸ *Id.* at 357.

⁴⁹ See, e.g., *Use of state or municipally owned land for community gardens*, N.Y. CLS Agric. & M § 31-i(1).

⁵⁰ See, e.g., *Community Gardens Definition*, N.Y. CLS AGR. & M § 31-g(1)(1986).

⁵¹ See, e.g., *Recreation Center Definition*, CAL. ED. CODE § 10901(f)(1976).

⁵² See, e.g., *Vegetable garden programs*, Cal. Gov. Code § 12804.5.

⁵³ See Jon C. Dubin, *From Junkyards to Gentrification: Explicating a Right to Protective Zoning in Low-Income Communities of Color*, 77 MINN. L. REV. 739, 742 (1993) (demonstrating that “intrusive, disruptive, even hazardous uses . . . which degrade the residential environment” have moved into communities of color through the use of incompatible zoning as a tool for segregation). See also *id.* at 765-66 (quoting the Environmental Protection Agency’s (“EPA”) Environmental Equity workgroup finding that “minorities are more likely to live near a commercial waste treatment facility or an uncontrolled hazardous waste site than the general population” and referring to a 1987 study conducted by the United Church of Christ that found that “the proportion of minorities residing in communities with either the largest

Some of the most common contaminants are “lead and other toxic metals, solvents, pesticides and total petroleum hydrocarbons.”⁵⁴ Soil contamination can result from previous or ongoing manufacturing and industrial use; landfills; lead paint and fixtures; leaded gasoline and other vehicle emissions; and previous agricultural use.⁵⁵ Not every urban parcel is a brownfield,⁵⁶ and while previous industrial use or proximity to such use should trigger caution, proximity to roadways or older residential areas developed prior to 1978 when lead paint was still legal should trigger the same caution.⁵⁷

A. Lead

One of the most prevalent contaminants in urban soil is lead.⁵⁸ The Center for Disease Control (“CDC”) estimates that over four million households contain children exposed to high levels of lead.⁵⁹ Further, the CDC estimates that there are 500,000 children between the ages of one and five with blood lead levels over five micrograms per deciliter, the level at which action should be taken to

commercial landfills or the most commercial waste facilities was triple that of other communities.”).

⁵⁴ CARL R. CROZIER, ET AL., SOILFACTS: MINIMIZING RISKS OF SOIL CONTAMINANTS IN URBAN GARDENS 1 (North Carolina Cooperative Extension Service), available at <http://content.ces.ncsu.edu/20684.pdf>.

⁵⁵ *Id.* at 2.

⁵⁶ *Brownfields and Land Revitalization*, EPA,

<http://www.epa.gov/brownfields/overview/glossary.htm> (last updated Oct. 4, 2011) (“The term ‘brownfield site’ means real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.”).

⁵⁷ See Linda Block, *Where Lead Hides*, HOPE PARTNERSHIP 1-2 (Sep. 2006), available at <http://hydra.usc.edu/scehsc/pdfs/D-1-3-2%20Where%20Lead%20Hides.pdf> (the use of lead in residential paint was banned in 1978; however, it is still allowed for marine, industrial and infrastructural purposes).

⁵⁸ THE ASSOCIATED PRESS, *As Urban Farming Takes Root, Experts Seek Better Understanding of Soil Contamination*, MLIVE (Mar. 23, 2011, 11:03 AM) http://www.mlive.com/news/detroit/index.ssf/2011/03/as_urban_farming_takes_root_ex.html [hereinafter *Urban Farming*]; ALLISON HOULIHAN TURNER, CTR. FOR ENVTL. POL’Y & MGMT., ENVTL. FIN. CTR., URBAN AGRICULTURE AND SOIL CONTAMINATION: AN INTRODUCTION TO URBAN GARDENING, PRACTICE GUIDE #25 2 (2009) [hereinafter *PG #25*]; Platt, *supra* note 9, at 5.

⁵⁹ *E.g.*, *Lead*, CDC, <http://www.cdc.gov/nceh/lead/> (last visited Feb. 21, 2015).

eliminate exposure to lead.⁶⁰ Since exposure to lead often does not cause any symptoms, it frequently goes unnoticed.⁶¹

Lead-based paint and the dust generated by the use of leaded gasoline have contributed significant quantities of lead to the environment.⁶² Leaded gasoline has been banned for many years; however the dust generated by its previous use remains in the air and soil.⁶³ Although significant research on the pathways of human lead exposure has been conducted, the importance of soil as a critical pathway remains controversial, often resulting in an emphasis on the dangers of lead paint rather than soil contaminated through atmospheric accumulation of lead dust.⁶⁴

i. Source – Lead Paint

Lead-based paint use reached its peak in the U.S. in 1920,⁶⁵ and it was not banned for residential purposes until 1978.⁶⁶ The CDC estimates that in 2007, there were approximately 24 million housing units that still contained lead paint.⁶⁷ Any activity that scrapes, burns or pulverizes lead paint releases fine particles of lead and larger paint chips into the air that can be ingested or inhaled by humans.⁶⁸ These lead particles and paint chips often settle into the soil and contribute to contamination of the soil.

ii. Source – Leaded Gasoline

A second source of lead in soil comes from leaded gasoline. It has been estimated that approximately “75% of the gasoline lead was emitted from automobile exhaust pipes in the form of a fine lead

⁶⁰ *Id.* The CDC’s policy focuses on prevention of lead exposure. Medical intervention is not recommended unless a child’s blood lead level reaches 45 micrograms per deciliter or higher.

⁶¹ *Id.*

⁶² See Howard Mielke & Patrick L. Reagan, *Soil is an Important Pathway of Human Lead Exposure*, 106 ENVTL. HEALTH PERSP. (SUPP. 1) 217, 217 (Feb. 1998).

⁶³ *Id.* at 223. Some estimates of atmospheric lead dust resulting from the use of leaded gasoline at 4-5 million metric tons.

⁶⁴ *Id.* at 217.

⁶⁵ *Id.*

⁶⁶ See generally Angela Haupt, *It’s banned but not gone: Lead paint is still a danger*, USA TODAY (Aug. 29, 2007, 8:51 AM), http://usatoday30.usatoday.com/news/health/2007-08-28-lead-paint_N.htm.

⁶⁷ *Id.*

⁶⁸ *Id.*; Mielke & Reagan, *supra* note 62, at 221.

dust” that settled on all surfaces in the immediate vicinity of roadways.⁶⁹ Because the lead mist traveled through the air until it hit a wall or a building and then settled, there are generally higher lead concentrations around a building’s foundation.⁷⁰ Due to the airborne nature of lead emitted by vehicles, highly trafficked urban areas tend to contain high concentrations of lead contamination in “densely populated areas surrounding the city center.”⁷¹ Larger cities tend to have median lead concentrations “1 to 2 orders of magnitude higher than those of small cities” and higher lead concentrations than in the soil of adjacent suburban areas with high numbers of older housing units where lead-based paint was present.⁷²

iii. Previous Industrial Use

Community gardens located in low-income, minority, urban communities are often situated in areas that were previously utilized for, or proximate to, industrial or manufacturing purposes.⁷³ The previous use of the land where the garden is located, as well as previous or ongoing industrial and/or manufacturing activity in the vicinity of the garden can also be sources of lead or other contamination.⁷⁴

iv. Risks

Regardless of the source, the risk of lead soil contamination is extremely high in many urban cities. Lead is heavy and does not

⁶⁹ See Mielke & Reagan, *supra* note 62, at 218; see also *supra* text accompanying note 63; Wendy Wendland-Bowyer, *Hazards Lurking in Soil as Children Play*, DETROIT FREE PRESS (Jan. 23, 2003), <http://www.earlychildhoodmichigan.org/articles/1-03/FREEP1-23-03c.htm>.

⁷⁰ Wendland-Bowyer, *supra* note 69.

⁷¹ Mielke & Reagan, *supra* note 62, at 218.

⁷² *Id.*

⁷³ Dubin, *supra* note 53, at 762-66, 778-79.

⁷⁴ See *Learn about Lead*, EPA, <http://www2.epa.gov/lead/learn-about-lead> (areas formerly used for mining, smelting and refining activities, as well as areas proximate to such past or ongoing uses are often contaminated by lead); see generally Francis Douay, et al., *Assessment of potential health risk for inhabitants living near a former lead smelter. Part 1: metal concentrations in soils, agricultural crops, and homegrown vegetables*, 185 ENVTL. MONITORING & ASSESSMENT 3665, 3665 (May 2013) (studying long-term effects of a closed lead smelter on soil, crops grown within the contaminated soil, and effects on local population).

evaporate, which means it remains where it was deposited for a long period of time.⁷⁵ Recent studies have shown that a significant number of urban gardens have tested positive for high lead concentrations in the soil, including a study showing that nine out of ten urban gardens tested in Indianapolis, Indiana had lead levels that were problematic.⁷⁶ An informal study commissioned in 2003, by the Detroit Free Press of the Metro Detroit area, found that lead-contaminated soil is widespread throughout the area, but most significantly in the urban core.⁷⁷ High lead concentrations have also been documented in soils in New York, Boston, Baltimore, Chicago, Los Angeles, Minneapolis and Philadelphia.⁷⁸

Although it has been established that lead-contaminated soil is prevalent in urban areas, the effects of such contamination on produce grown in such contaminated soil is less clear. There is much disagreement about the uptake of lead by certain kinds of edible crops,⁷⁹ with the concern focusing on leafy greens and root crops.⁸⁰ Predicting lead concentrations in plants grown in lead-contaminated soils is difficult because according to some experts, “the most significant source of lead contamination in vegetables is atmospheric deposition.”⁸¹ The focus has thus been the potential for lead contamination on the surface of the crop and not lead contamination within the crop. It has also been suggested that the primary ingestion of lead relating to fruit and vegetable consumption occurs when produce is not sufficiently washed.⁸²

⁷⁵ Wendland-Bowyer, *supra* note 69.

⁷⁶ See *Urban Farming*, *supra* note 58 (testing on sixty gardens throughout Detroit showed the highest lead concentrations in gardens close to roadways and the “drip lines” of buildings where lead particles settle on structures and are then washed down by rainwater).

⁷⁷ Wendland-Bowyer, *supra* note 69.

⁷⁸ Mogk et al., *supra* note 4, at 1537; but see *Urban Farming*, *supra* note 58 (regarding testing of New York City gardens).

⁷⁹ See Carrie Sturrock, *The dirt on testing soil for lead*, OREGONLIVE BLOG (Jun. 12, 2009, 7:43 AM), http://blog.oregonlive.com/pdxgreen//print.html?entry=/2009/06/the_dirt_on_testing_soil_for_l.html (stating that leafy green vegetables are thought to absorb more lead than other kinds of plants).

⁸⁰ URBAN DESIGN LAB, COLUMBIA UNIV., *THE POTENTIAL FOR URBAN AGRICULTURE IN NEW YORK CITY, GROWING CAPACITY, FOOD SECURITY, AND GREEN INFRASTRUCTURE* 47 (ed. II 2012).

⁸¹ Hough et al., *Assessing Potential Risk of Heavy Metal Exposure from Consumption of Home Produced Vegetables by Urban Populations*, 112 ENVTL. HEALTH PERSP. 215, 219-20 (Feb. 2004).

⁸² Mogk et al., *supra* note 4, at 1536.

There is little agreement as to the plant uptake of lead or the bioavailability⁸³ of lead ingested through the consumption of food crops grown in lead contaminated soil. Because most of the research relating to absorption of lead by the intestines has been conducted on animals, the mechanisms of absorption by humans are not fully understood.⁸⁴ Based on a very small number of human studies, it is generally accepted that lead absorption in younger children occurs at a higher rate than older children and at a much higher rate than adults.⁸⁵

While it has been widely documented that elevated lead levels are harmful to humans, particularly children, there is a remarkable lack of clarity regarding the pathways of exposure and how each one contributes to the accumulation of lead in the body. There is widespread disagreement over whether lead paint chips are more harmful than lead-contaminated soil; whether inhalation or ingestion of lead-contaminated soils is more dangerous than ingestion of lead paint chips; whether lead uptake in edible plants can be predicted and to what extent ingestion of food crops cultivated in contaminated soil affects the human body; and finally, whether there is any exposure to lead that can be considered safe.⁸⁶ It is clear that exposure through inhalation of lead contaminated soil does occur and can significantly contribute to elevated lead levels in humans.⁸⁷

Symptoms of lead poisoning are nonspecific in that many individuals that have been exposed to lead look and act healthy.⁸⁸ A few of the symptoms include fatigue or loss of energy, irritability or crankiness, reduced attention span and poor appetite.⁸⁹ Effects from

⁸³ EPA, REUSING POTENTIALLY CONTAMINATED LANDSCAPES: GROWING GARDENS IN URBAN SOILS 7 (Spring 2011), available at http://www.epa.gov/region04/foiapg/readingroom/rcra_community/urban_gardening_fina_fact_sheet.pdf [hereinafter, *Reusing*] (“Bioavailability” is the “the amount of contaminant that can be taken up by your body” and is dependent on various factors relating to the contaminant, the site and the soil itself).

⁸⁴ Kathryn R. Mahaffey, Ph.D. et al., *Lead and Compounds*, in ENVIRONMENTAL TOXICANTS: HUMAN EXPOSURES AND THEIR HEALTH EFFECTS 481, 487 (Morton Lippman ed., 2d ed. 2000).

⁸⁵ *Id.*

⁸⁶ Wendland-Bowyer, *supra* note 69; Mielke & Reagan, *supra* note 62, at 217.

⁸⁷ See *Lead Poisoning*, KIDSHEALTH, http://kidshealth.org/parent/medical/brain/lead_poisoning.html# (last visited Feb. 21, 2015).

⁸⁸ *Lead Poisoning Signs & Symptoms*, OREGON.GOV, <https://public.health.oregon.gov/HealthyEnvironments/HealthyNeighborhoods/LeadPoisoning/ParentsFamilies/Pages/signs.aspx> (last visited Feb. 21, 2015).

⁸⁹ *Id.*

lead poisoning are permanent and can include brain damage, behavioral problems, impaired growth and speech problems.⁹⁰ Exposure to high levels of lead can lead to “coma, seizures and death.”⁹¹

As far as consumption of produce grown in lead contaminated soil, the information available is surprisingly scant. Chinese studies indicate that while the Chinese Department of Preventative Medicine (“CDPM”) has set the maximum lead limit for human health for vegetable crops, it has not set soil lead thresholds for safely producing vegetables.⁹² CDPM has, however, used a subjective standard whereby “the potential dietary toxic threshold of heavy metal is the highest permissible content in the soil . . . that does not cause any phytotoxicity . . . or heavy metal in edible parts of the crops that does not exceed food safety standard.”⁹³

There is some evidence to suggest that plants such as kale, mustard greens, collard greens and broccoli absorb significant amounts of lead from the soil and these plants have been used in some cases to remediate lead contaminated soil.⁹⁴ Because of the lead absorption properties of these plants, it is not recommended that they be eaten if grown in lead contaminated soil.⁹⁵ The Connecticut Departments of Health and Environmental Protection have determined that the health risks associated with eating unwashed/unpeeled produce, including leafy and root vegetables, grown in contaminated soil are very low unless there has been long-term exposure to high levels of lead and other contaminants.⁹⁶

⁹⁰ *Id.*

⁹¹ *Id.*

⁹² C.L. Hong et al., *Assessing Lead Thresholds for Phytotoxicity and Potential Dietary Toxicity in Selected Vegetable Crops*, 80 BULL. ENVIRON. CONTAM. TOXICOL. 356, 356 (2008).

⁹³ *Id.* at 359.

⁹⁴ Janice Price & Stephen Dare, *Sunflowers for Lead; Spider Plants for Arsenic*, METRO JACKSONVILLE (Jul. 8, 2012), www.metrojacksonville.com/article/2010-jun-sunflowers-for-lead-spider-plants-for-arsenic.

⁹⁵ *Id.*; see generally Douay et al., *supra* note 74 (calling for additional studies to assess the potential health risks to humans posed by consuming vegetables with high lead content).

⁹⁶ CONN. DEP’T OF PUB. HEALTH, GROWING AND EATING FRUITS AND VEGETABLES IN THE NEWHALL NEIGHBORHOOD OF HAMDEN 4 (Jan. 2004), available at http://www.newhallinfo.org/pdfs4download/general_documents/hamden_vegetable_uptake_fact_sheet.pdf.

B. Other Contaminants

Although lead is by far the most common urban soil contaminant, other contaminants can also be present depending on the previous land use and/or lands in the immediate vicinity. If the contaminants are airborne, such as those released from the burning of fossil fuels, various environmental factors such as wind and drainage patterns contribute to the spread of contaminants into urban soils.⁹⁷

Other common urban soil contaminants include arsenic, cadmium, chromium, manganese, mercury and zinc, among others.⁹⁸

i. Arsenic

Arsenic is both a poison and a carcinogen.⁹⁹ The presence of arsenic in the soil can be naturally occurring, the result of industrial activity, or the previous application of various agricultural chemicals, pesticides and/or herbicides.¹⁰⁰ In general, plants grown in arsenic contaminated soil do not contain high concentrations of arsenic; however, the notable exceptions are leafy vegetables such as celery and chard,¹⁰¹ as well as rice.¹⁰²

The absorption of arsenic depends greatly on the form of the arsenic at exposure, and the distribution of ingested arsenic through

⁹⁷ Wendland-Bowyer, *supra* note 69.

⁹⁸ M.A. Oliver, *Soil and Human Health: A Review*, 48 EUR. J. OF SOIL SCI. 573, 573 (Dec. 1997).

⁹⁹ *Id.* at 579.

¹⁰⁰ *Id.*

¹⁰¹ Paul Nathanail et al., *Uptake of Arsenic by Vegetables for*

Human Consumption: A Study of Wellingborough Allotment Plots, 12 LAND CONTAMINATION AND RECLAMATION 219, 226 (2004).

¹⁰² Oliver, *supra* note 98, at 579; *FDA Statement on Testing and Analysis of Arsenic in Rice and Rice Products*, FDA U.S. FOOD AND DRUG ADMINISTRATION (Sep. 6, 2013), <http://www.fda.gov/Food/FoodborneIllnessContaminants/Metals/ucm367263.htm> (FDA has assured consumers that the levels of arsenic detected in the 1,300 samples of rice it tested contained arsenic levels that were too low to produce and short- or long-term health effects; however, FDA has also recommended that people vary their grains). *See also FDA Explores Impact of Arsenic in Rice*, FDA U.S. FOOD AND DRUG ADMINISTRATION (Sep. 6, 2013), <http://www.fda.gov/ForConsumers/ConsumerUpdates/ucm352569.htm> (additional research is being conducted in relation to the EPA's risk assessment of the arsenic present in rice and rice products).

the body depends on the oxidation state of the arsenic.¹⁰³ However, symptoms of acute arsenic exposure include inflammation of the gastrointestinal tract, “cardiac dysfunction, coma, and even death, as a result of cardiac failure.”¹⁰⁴

ii. Cadmium

The presence of cadmium is primarily the result of mine runoff, metal smelteries and industrial uses relating to the manufacture of “alkaline batteries, paints and plastics.”¹⁰⁵ It is also commonly present in sludge, discussed below.¹⁰⁶

The main exposure pathways of cadmium are inhalation and ingestion.¹⁰⁷ Absorption by inhalation depends on the size of the particles.¹⁰⁸ Because high cadmium concentrations in soil or water can lead to significant accumulation in food, absorption by ingestion can occur by eating meat, fruit and fish, and can be enhanced or inhibited by dietary considerations.¹⁰⁹

Acute inhalation can produce lung symptoms within hours, with the potential for later development of pulmonary edema; whereas chronic inhalation can result in emphysema, liver damage, anemia and kidney damage.¹¹⁰ Symptoms from acute ingestion manifest almost immediately and can include vomiting, choking, abdominal pain, diarrhea, and headaches, while chronic ingestion can result in a painful degenerative bone disease called itai-itai disease.¹¹¹

iii. Chromium

Chromium is actually beneficial to humans when taken in small doses and certain forms, such as chromium picolinate.¹¹²

¹⁰³ Max Costa, Ph.D., *Trace Elements: Aluminum, Arsenic, Cadmium, and Nickel, in ENVIRONMENTAL TOXICANTS: HUMAN EXPOSURES AND THEIR HEALTH EFFECTS* 811, 819 (Morton Lippman ed., 2d ed. 2000).

¹⁰⁴ *Id.* at 824.

¹⁰⁵ *Id.*

¹⁰⁶ *Id.*

¹⁰⁷ *Id.* at 825-26.

¹⁰⁸ *Id.*

¹⁰⁹ *Id.*

¹¹⁰ Costa, *supra* note 103, at 826.

¹¹¹ *Id.* at 826-27.

¹¹² Mitchell D. Cohen, Ph.D. & Max Costa, Ph.D., *Chromium, in ENVIRONMENTAL TOXICANTS: HUMAN EXPOSURES AND THEIR HEALTH EFFECTS* 173, 173-74 (Morton Lippman ed., 2d ed. 2000).

Previous industrial use can result in levels that are substantially higher than those occurring naturally.¹¹³ Most of the sites with the highest chromium soil levels are located in urban areas.¹¹⁴

Because chromium will be toxic to plants in higher levels and result in retarded plant growth, the risk of adverse effects from ingestion by consumption of food grown in contaminated soils is low.¹¹⁵ The more likely pathway to human exposure would be through direct ingestion of soil particles¹¹⁶ or through inhalation. Inhalation has been shown to be a significant hazard and can result in a variety of respiratory symptoms including chronic inflammation of the lungs, emphysema, chronic bronchitis and bronchopneumonia.¹¹⁷ There has been little documentation of dermal effects even in areas known to have high levels of chromium soil contamination.¹¹⁸

iv. Zinc

Zinc is beneficial and even necessary for human health; however, in excessive amounts, it is toxic.¹¹⁹ Although zinc can occur naturally in soils, excessive amounts are generally tied to pollution, including mining operations as well as the application of fertilizers, pesticides and sludge.¹²⁰ Although there are dangers related to zinc accumulation, it is phytotoxic to plants, meaning that excessive levels of zinc will cause significant adverse effects to crops.¹²¹ Zinc toxicity results in adverse effects to reproductive systems and embryos.¹²²

v. Sewage Sludge

Sludge, a by-product of the treatment of wastewater containing human excreta, household chemicals, industrial wastes and pesticides, has been purposely applied as a fertilizer and is of

¹¹³ *Id.* at 174.

¹¹⁴ *Id.* at 176.

¹¹⁵ *Id.*

¹¹⁶ *See id.*

¹¹⁷ *Id.* at 180.

¹¹⁸ Cohen & Costa, *supra* note 111, at 180.

¹¹⁹ Oliver, *supra* note 98, at 586.

¹²⁰ *See id.*

¹²¹ *Id.*

¹²² *Id.*

particular concern because it contains many contaminants.¹²³ The sludge is promoted as fertilizer because it is derived from wastewater, which inevitably contains urine, which is high in nitrogen.¹²⁴ However, because of the strong chemical bond between nitrogen and water, much of the nitrogen present in the wastewater remains in the treated wastewater with very little of it present in the sludge.¹²⁵ What remains are high concentrations of toxic materials and heavy metals from industrial wastes and harmful residues from household chemicals, pesticides, synthetic compounds and even pharmaceuticals.¹²⁶

In 1992, the ban on ocean dumping of both solid waste and sludge went into effect,¹²⁷ which created an issue for municipalities utilizing wastewater treatment plants that created sludge, which they had previously been dumping into the ocean.¹²⁸ With the dumping ban, a new solution for sludge disposal was necessary.¹²⁹ In response, the Environmental Protection Agency (“EPA”) rebranded the toxic sludge as “beneficial biosolids”¹³⁰ and began analogizing its benefits to those of organic compost.¹³¹ With the blessing of various

¹²³ Abby A. Rockefeller, *Civilization and Sludge: Notes on the History of the Management of Human Excreta*, 9 CAPITALISM, NATURE, SOCIALISM 3, 10 (Sep. 1998) (referencing 55 Fed. Reg. 47,210 (Nov. 9, 1990)).

¹²⁴ *Id.* at 15.

¹²⁵ *Id.* at 15-16.

¹²⁶ *Id.*

¹²⁷ Ocean Dumping Ban Act, 33 U.S.C. §§ 1401-1445 (1988); *Ocean Dumping Ban Act of 1988*, EPA (Nov. 21, 1988), <http://www2.epa.gov/aboutepa/ocean-dumping-ban-act-1988> (the Act amended the Marine Protection, Research, and Sanctuaries Act of 1972 to prohibit all dumping of sewage sludge and industrial waste into the ocean after 1991); *See* Rockefeller, *supra* note 122, at 14.

¹²⁸ *See* Rockefeller, *supra* note 122, at 13 (other municipalities disposed of the sludge either by dumping it into sanitary landfills causing contamination of groundwater or by incineration causing air contamination).

¹²⁹ *Id.* at 13-14.

¹³⁰ *Id.* at 14; Andrew Kimbrall, *The Obama Organic Family Garden: Swimming in Sludge?*, THE HUFFINGTON POST, (Aug. 1, 2009), huffingtonpost.com/andrew-kimbrall/the-obama-organic-family_b_224398.html.

¹³¹ *Compost for Facility Basics*, EPA (Jun. 27, 2014), <http://www.epa.gov/compost/basic.htm> (“Compost is organic material that can be used as a soil amendment or as a medium to grow plants.”). Creating compost involves “combining organic wastes (e.g., yard trimmings, food wastes, manures) in proper ratios into piles, rows, or vessels; adding bulking agents (e.g., wood chips) as necessary to accelerate the breakdown of organic materials; and allowing the finished material to fully stabilize and mature through a curing process.”

environmental groups and the EPA,¹³² the rebranded sludge was then offered by municipalities to farms for use as fertilizer at little to no cost to the farmer.¹³³

The contamination of soil through the land application of sludge in community gardens is different than contamination by other means because it is often the result of misguided attempts to revitalize the soil “naturally.”¹³⁴ However, the use of sludge as fertilizer contaminates the soil and presents potential harmful effects.¹³⁵ Because it is not always known what is in the sludge and in what concentrations, health effects are difficult to gauge. Sludge is an unknown factor—it contains whatever the pre-treated household, industrial and/or commercial wastewater contains.

vi. Contaminant Risk Summary

Accurate predictions of how ingestion of food crops will affect human health are nearly impossible to make because of the many different variables that must be taken into account. Such variables include the type of crop being grown, the location of the garden, the geography of the site, soil pH, type and amount of fertilizer used, weather and wind patterns, the types and specific forms of contaminants present, among many others.¹³⁶ Despite various studies being undertaken in countries where industrial pollution is a significant problem, such as China, India and

¹³² See Rockefeller, *supra* note 122, at 13. Groups that supported the rebranding included the Environmental Defense Fund and Natural Resource Defense Council.

¹³³ *Id.* at 15.

¹³⁴ See *id.* (noting that an intensive public relations campaign characterizing sludge as “natural,” “organic,” and “compost” in combination with the endorsement of land application by environmental groups successfully altered the public’s perception of sludge).

¹³⁵ See generally Josh Harkinson, *A Backlash After San Francisco Labels Sewage Sludge “Organic”*, MOTHER JONES (Mar. 4, 2010), <http://www.motherjones.com/blue-marble/2010/03/backlash-after-san-francisco-labels-sewage-sludge-organic>; See generally Josh Harkinson, *Did Sewage Sludge Lace the White House Veggie Garden with Lead?*, MOTHER JONES (Jun. 17, 2009), www.motherjones.com/blue-marble/2009/06/did-sludge-lace-obamas-veggie-garden-lead.

¹³⁶ EPA, BROWNFIELDS AND URBAN AGRICULTURE: INTERIM GUIDELINES FOR SAFE GARDENING PRACTICES 4-5 (Summer 2011), available at http://www.epa.gov/brownfields/urbanag/pdf/bf_urban_ag.pdf [hereinafter *Brownfields*]; see also Ganesh Chandra Kisku, et al., *Uptake and accumulation of potentially toxic metals (Zn, Cu and Pb) in soils and plants of Durgapur industrial belt*, 32 J. OF ENVTL. BIOLOGY 831, 837 (Nov. 2011) (studying the effects of irrigating food crops with textile-industry waste water containing heavy metals).

Bangladesh,¹³⁷ there is very little information on how ingestion of food grown in soil contaminated with heavy metals affects human health. Contaminant levels in studied crops are well documented and information is available on plant uptake of contaminants; however, when it comes to evaluation of whether and to what extent those contaminants affect humans who consume those crops, there is very little information available.¹³⁸ As such, the best answer to the question of “how will consuming foods grown in contaminated soil affect humans?” appears in most cases to be “it depends.”

USDA research has shown that different kinds of contaminants have different effects on humans and their crops because “most metals are so insoluble or so strongly attached . . . to the actual soil particles or plant roots that they do not reach the edible portions of most plants in levels which would compromise human health when eating grown crops.”¹³⁹ Further, neutral soil pH can inhibit plant uptake of most heavy metals, with the exception of cadmium and cobalt.¹⁴⁰ Some metals, such as copper, will kill the plants before they can produce edible food, further reducing the risk of harmful effects through consumption of food grown in contaminated soil.¹⁴¹

Although the level of risk from ingestion of food grown in contaminated soils is far from conclusive, the risk from coming into contact with and working in contaminated soils is clear; “[t]he greatest risk of exposure to contaminants is from contaminated soil getting into your mouth or by breathing in contaminated dust.”¹⁴² As

¹³⁷ See D.K. Gupta et al., *Arsenic accumulation in root and shoot vis-à-vis its effects on growth and level of phytochelatins in seedlings of Cicer Arietinum L.*, 29 J. OF ENVTL. BIOLOGY 281, 281 (2008).

¹³⁸ See generally *id.*; Hong et al., *supra* note 92 (discussing lead thresholds in soil used for cultivation); Mather Ali Khan et al., *Screening and Detection of Biomarkers in Chickpea Plants Exposed to Chromium and Cadmium*, 32 J. ENVTL. BIOLOGY 51 (2011)(discussing effects of irrigating chickpea plants with water containing cadmium and chromium); Kisku et al., *supra* note 135; Richa Marwari & T.I. Khan, *Effect of Textile Waste on Tomato Plant*, *Lycopersicon esculentum*, 33 J. ENVTL. BIOLOGY 849, 849 (2012)(discussing the effects of textile/dye industry wastewater irrigation on tomato plants); Shadma Naaz & S.N. Pandey, *Effects of Industrial Wastewater on Heavy Metal Accumulation, Growth and Biochemical Responses of Lettuce (Lactuca sativa L.)*, 31 J. OF ENVTL. BIOLOGY 273, 273 (2010) (discussing the uptake of heavy metals by lettuce irrigated with textile industry wastewater).

¹³⁹ *Brownfields*, *supra* note 136, at 11.

¹⁴⁰ *Id.*

¹⁴¹ *Id.*

¹⁴² *Reusing*, *supra* note 83, at 5; See also *Brownfields*, *supra* note 136, at 13.

such, there is a need to manage the risks associated with and in contaminated soil.

C. Solutions

Presently, there are three commonly accepted options for the urban agriculturalist faced with significant soil contamination: choose a different site (or abandon the idea altogether), remediate the site, or construct the garden in such a way that the plants do not come into contact with the contaminated soil. In conjunction with the above options, urban gardeners should also put some care into selecting appropriate crops.

i. Different Site

Given that most urban soil is contaminated to some extent (arguably to a significant extent), choosing a different site is unlikely to address the problem. To that end, the two most relevant factors in their decision are whether another site is available, and whether that site is any less contaminated than the previous one. The would-be gardener could also choose to abandon the idea altogether, which is a common occurrence.

ii. Remediation

Remediation can take either of two forms: physical remediation (where the contaminated soil is removed and replaced)¹⁴³ or biological remediation (where certain types of plants and/or microorganisms are introduced to the site that will extract the contaminants over time).¹⁴⁴ Physical remediation is costly as it involves excavation and disposal of contaminated soil and replacement with clean soil. Biological remediation can be a lengthy process, depending on the method used. There is also some level of uncertainty in terms of overall effectiveness of biological remediation if multiple contaminants are present. A third type of remediation for lower levels of contamination is maintenance of soil pH levels and

¹⁴³ See *PG #25, supra* note 58, at 7-8. Note that there are several variants on the physical remediation method, but removal and replacement is the most efficient manner.

¹⁴⁴ *Id.* at 8. There are several variants on this method, but each is based on the same general premise.

addition of compost to the soil to minimize plant uptake of contaminants.

iii. Avoiding Contact with Contaminated Soil

The third option, ensuring that the plants do not come into contact with the contaminated soil, is a relatively easy and inexpensive way to allow community gardens to operate without exposing gardeners or consumers to the potential adverse health effects of exposure to contaminants.¹⁴⁵ By constructing the garden in such a way that the roots on the plants do not come into contact with the soil, by using raised beds or gardening in containers, contact with the contaminated soil can be minimized and even eliminated. Avoiding human and plant contact with contaminated soil greatly reduces the risk from both the soil-to-human exposure pathway (relating to exposure resulting from contact with contaminated soil during the gardening process) and soil-to-plant-to-human exposure pathway (relating to exposure resulting from ingestion of food grown in contaminated soil).

The materials for constructing raised beds or establishing container gardens are relatively inexpensive. Purchasing clean soil may drive up costs; however, in comparison with remediation, this option is significantly less costly. Unlike biological remediation, which may take significant time after the plants and/or microorganisms are introduced, the space is usable immediately upon installation of raised beds or containers and clean soil. This method also works well for retrofitting existing gardens and can be implemented in between planting cycles without significant interruption in the overall garden operations. A retrofit could be implemented in one stage for the entire garden, or in multiple stages plot by plot because raised beds and containers do not require mass excavation (as in physical remediation).

iv. Crop Selection

In general, for cultivation in potentially contaminated soils, “fruiting bodies” such as squash, tomatoes, corn, melons, eggplants and apple trees are recommended.¹⁴⁶ Green leafy vegetables such as lettuce, spinach and Swiss chard, root vegetables and tuber crops such

¹⁴⁵ See *id.* at 9.

¹⁴⁶ Reusing, *supra* note 83, at 9; See also PG #25, *supra* note 58, at 12.

as potatoes, carrots and onions should be avoided because they come into direct contact with the soil.¹⁴⁷ Vegetables such as broccoli, cauliflower and green beans are known to absorb significant amount of lead and should also be avoided.¹⁴⁸ Vegetables with large leaves should be washed thoroughly to reduce exposure from atmospheric deposition.¹⁴⁹

III. Effectiveness of Existing Regulations

A. Existing Regulatory Schemes

i. Federal Regulation

At this time, there is no federal regulatory scheme in place to address the issue of soil contamination and the potential adverse effects to human health that such contamination poses. In the summer of 2011, the EPA issued interim guidelines for safe gardening practices (“Interim Guidelines”).¹⁵⁰ The Interim Guidelines are the result of “the input of sixty experts from academia, state and local government, and the nonprofit sector”¹⁵¹ which identified three major issues through which to frame the discussion. These issues are previous use of the property, testing/cleanup/gardening practices that can be employed to limit exposure, and clean up standards for parcels where food will be grown for human consumption.¹⁵² The working group found that in many areas of the U.S. there was a lack of “advisory standards and practices for agricultural redevelopment.”¹⁵³ The thrust of the Interim Guidelines is informational, with the goal of advising communities of “safe gardening practices,” especially in areas with a history of potentially contaminated land use.¹⁵⁴

To be clear, the Interim Guidelines are informational in nature—they are guidelines, not rules or regulations. They are also “interim” guidelines, as opposed to “final” guidelines because the clean up standards currently in existence are focused on protection from potential inhalation or ingestion of contaminants and not

¹⁴⁷ PG #25, *supra* note 58, at 12.

¹⁴⁸ *Id.* at 12; *See also* Price & Dare, *supra* note 94.

¹⁴⁹ *See* PG #25, *supra* note 58, at 12.

¹⁵⁰ *See* *Brownfields*, *supra* note 136.

¹⁵¹ *Id.* at 1.

¹⁵² *Id.*

¹⁵³ *Id.* at 2.

¹⁵⁴ *Id.*

protection against contaminants that may be ingested through the consumption of food grown in contaminated soil.¹⁵⁵ The guidelines are expected to remain “interim” until such standards are developed to deal with this aspect of exposure.¹⁵⁶ The development of those standards will be dependent on the development of threshold soil screening levels for contaminants that take into account the plant uptake and bioavailability of the contaminants by plants grown in contaminated soils.¹⁵⁷ To date, neither the Food and Drug Administration (“FDA”), nor the USDA, the federal regulatory agencies whose responsibilities include different aspects of food safety, have regulatory standards relating to soil quality as a “growing medium.”¹⁵⁸

In addition to policy gaps in and between agencies, the EPA working group also identified practice gaps relating to testing. Because the extent of contamination of land being used for urban agriculture is not always clear, testing is not always complete.¹⁵⁹ While many community garden sites have been tested for nutrients and pH levels, fewer have been tested for lead, and even fewer have been tested for other soil contaminants.¹⁶⁰ Lead testing can be relatively inexpensive, especially if the testing is done in cooperation with a community garden’s local agricultural extension.¹⁶¹ Full metal testing can be cost prohibitive.¹⁶² It is notable that the American Planning Association identified “few local requirements for soil testing and very few examples of locally driven testing on behalf of community organizations.”¹⁶³

The EPA working group identified underlying reasons for the policy gaps, mainly due to certain complicating factors. Because each site is unique¹⁶⁴ and will be used for different purposes (i.e., food production or green space/beautification), it is very difficult to issue

¹⁵⁵ *Id.* at 1.

¹⁵⁶ See *Brownfields*, *supra* note 136, at 1.

¹⁵⁷ *Id.* at 2.

¹⁵⁸ *Id.*

¹⁵⁹ *Id.*

¹⁶⁰ *Id.*

¹⁶¹ See *PG #25*, *supra* note 58, at 4-6 (providing factors that affect the cost of soil testing for various labs).

¹⁶² See *Brownfields*, *supra* note 136, at 2.

¹⁶³ *Id.*

¹⁶⁴ See *id.* at 4 (complicating factors include “soil type, likely contaminants, crop type, garden size, climate, who enters the garden, individual gardener/farmer practice, how long they spend in the garden, growing for individual or family use, donation or market, state regulations, etc.”).

blanket guidelines for the redevelopment of previously contaminated properties for gardening in general, and food production specifically.¹⁶⁵ The Interim Guidelines acknowledge the monumental nature of the task of creating guidelines to address each specific situation and would require “state-by-state assessments of risk criteria, soil cleanup standards, voluntary brownfields programs, and health agency standards, as well as coordination on a level that is easily translatable to [the] neighborhood gardener.”¹⁶⁶ These questions have not been answered yet and may never be answered in a satisfactory way. A discussion of regulatory options is located in Part VI. Recommendations are located in Part V.

In the end, community gardeners have access to the step-by-step advice contained in the Interim Guidelines, which is essentially an unimpressive collection of BMPs. The guidelines for establishing a community garden are grouped into four steps:¹⁶⁷

1. Identify previous use of the property in order to determine the likelihood and extent of soil contamination. Certain prior land uses will provide an indication of the kind of contaminants that might be present in the soil. In general, previous residential or recreational uses of a property present a low risk while previous commercial or industrial uses present a higher risk.¹⁶⁸
2. Gather soil samples and test for contaminants based on the level of risk determined in Step 1. Lower risk sites should be tested for heavy metals and other contaminants based on the specific previous use. Higher risk sites should be tested more rigorously, including testing of groundwater or deeper soil sampling if a spill is suspected.¹⁶⁹
3. Interpret the test results to determine whether they fall within or above the industrial and commercial clean up standards and therefore necessitate additional assessment. Such assessment can be obtained through contact with state/local health departments and environmental agencies and USDA cooperative extension offices.¹⁷⁰ Due to the lack of federal standards for “safe” levels of contaminants in soil to be used

¹⁶⁵ *See id.*

¹⁶⁶ *Id.*

¹⁶⁷ *See Brownfields, supra* note 136, at 7.

¹⁶⁸ *Id.* at 7-9.

¹⁶⁹ *Id.* at 9-10.

¹⁷⁰ *Id.* at 11.

for cultivation, interpretation of the results may be difficult. Because residential clean up standards are the strictest, if the results fall below the threshold that triggers residential cleanup, “it is safe to assume your site is good for gardening and will be protective of public health.”¹⁷¹

4. Mitigate risks by remediating the property (through physical or biological means) or implementation of non-remedial mitigation measures such as planting above ground in raised beds or in containers to ensure that the plant roots do not come into contact with the contaminated soil. Develop and implement BMPs to protect the gardeners from contact with contaminated soils that might result in accidental inhalation or ingestion, including garden siting away from roads or railways; covering of existing soil and walkways and mulching to prevent dust and splashback after heavy rains; maintenance of neutral soil pH; and use of certified sources for any imported topsoil. Gardeners should be encouraged to wear gloves, wash hands, wash produce prior to consumption, peel root crops and remove outer leaves of leafy vegetables.¹⁷²

The Interim Guidelines are based on available knowledge, and are not reflective of any federal baseline for safe levels of contaminants in soil used for the cultivation of food crops for human consumption. Given that the Interim Guidelines are based on cleanup standards formulated without consideration of intensive interaction with contaminated soils, are they sufficient to manage the risks associated with growing and consuming food grown in contaminated soil? Is there comfort in knowing that if test results fall within the reuse standards for residential soils, it is *probably* okay to grow and eat food grown in that soil? Without any agreement on what “safe” levels of certain contaminants are, there can be no answer to these questions. Because of the controversy surrounding “safe” levels of environmental pollutants, there may never be sufficient answers to these questions. Perhaps the question that should be asked then is whether the EPA should simply recommend remediation or implementation of non-remediation mitigation measures to ensure that the roots of plants being grown in urban soils for human consumption do not come into contact with existing soil.

¹⁷¹ *Id.*

¹⁷² *Id.* at 12-14.

ii. Existing State/Local Regulations

Some municipalities such as New York City, New York,¹⁷³ Portland, Oregon,¹⁷⁴ Seattle, Washington,¹⁷⁵ and Chicago, Illinois¹⁷⁶ have developed programs to facilitate and in some cases regulate community gardens.

In New York City, the establishment of the first community gardens were without the help of the municipal government— gardeners often simply took control of vacant lots and gardened them, only petitioning for recognition after investing significant time and effort.¹⁷⁷ In response, the City created Operation GreenThumb in 1978, to facilitate the establishment of community gardens by offering leases, advice, and expertise.¹⁷⁸

In Seattle, Washington, community gardens are a permitted use in all zones.¹⁷⁹ The “P-Patch Program,” as it is called in Seattle, is administered through the Seattle Department of Neighborhoods (“DN”), a subset of the City Department of Parks and Recreation. Seattle DN establishes community gardens on land that it has purchased.¹⁸⁰ All City-funded gardens are required to have some raised beds to accommodate wheelchair access for disabled

¹⁷³ *About GreenThumb Community Gardens*, NYC PARKS GREENTHUMB, <http://www.greenthumbnyc.org/about.html> (last visited Jan. 24, 2015).

¹⁷⁴ *Community Garden Facts*, THE CITY OF PORTLAND PARKS & RECREATION, <http://www.portlandoregon.gov/parks/39846?> (last visited Jan. 24, 2015) (explaining the Portland Community Gardens program was established in 1974 and oversees fifty gardens).

¹⁷⁵ *P-Patch Community Gardens*, SEATTLE DEP’T OF NEIGHBORHOODS, <https://www.seattle.gov/neighborhoods/ppatch/aboutPpatch.htm#about> (last visited Jan. 24, 2015) (the Seattle P-Patch program was officially established in 1973 and oversees eighty-one community gardens throughout the City).

¹⁷⁶ *Community Gardens*, CHICAGO PARK DIST., <http://www.chicagoparkdistrict.com/facilities/community-gardens/> (last visited Jan. 1, 2015) (the Chicago Park District traces its community garden history back to 1940 and today works with over seventy community garden groups through its Community Gardens in the Parks program).

¹⁷⁷ See Smith & Kurtz, *supra* note 16, at 197.

¹⁷⁸ *Id.*

¹⁷⁹ CITY OF SEATTLE DEP’T OF PLANNING & DEV., URBAN AGRICULTURE 2 (2010), available at https://www.seattle.gov_DPD_Publications_CAM_cam244.pdf.

¹⁸⁰ Pamela R. Kirshbaum, *Making Policy in a Crowded World: Steps Beyond the Physical Garden*, 10 COMMUNITY GREENING REV. 2, 3 (2000).

gardeners.¹⁸¹ The Seattle Land Use Code does not require soil testing, but it is “highly encouraged.”¹⁸²

The community garden program in Portland, Oregon, is administered by the Portland Department of Parks & Recreation (“DPR”) on land acquired through grants allocated by the City of Portland for that purpose.¹⁸³ Community gardens sponsored by the Portland DPR are not required to use raised beds, but they are available for disabled gardeners.¹⁸⁴ Portland DPR requires organic gardening techniques.¹⁸⁵ In Chicago, Illinois, city parkland is available to the public for planting edible gardens, ornamental gardens or a combination of the two through the Chicago Park District’s Community Gardens in the Parks program.¹⁸⁶ All edible and combination gardens planted in the parks must use raised beds.¹⁸⁷

In Newark, New Jersey, the city has partnered with the non-profit Greater Newark Conservancy (“GNC”) to form the Adopt-a-Lot Program whereby interested residents, businesses or nonprofits can adopt a vacant city-owned lot for \$1 per year to establish gardens.¹⁸⁸ There is no requirement for soil testing or for the use of raised beds; however, GNC recommends that all Newark-area community gardens utilize raised beds or container gardening techniques to avoid contact with the soil.¹⁸⁹ As of June 2013, over

¹⁸¹ *P-Patch Community Design Expectations*, SEATTLE DEP’T OF NEIGHBORHOODS, <https://www.seattle.gov/neighborhoods/ppatch/documents/GardenDesignExpectations.pdf> (last visited Jan. 24, 2015).

¹⁸² CITY OF SEATTLE DEP’T OF PLANNING & DEV., *supra* note 179, at 4.

¹⁸³ See generally *Community Garden Facts*, THE CITY OF PORTLAND PARKS & RECREATION, <http://www.portlandoregon.gov/parks/39846?> (last visited Jan. 24, 2015).

¹⁸⁴ *Id.*

¹⁸⁵ *Community Gardens Best Practices*, THE CITY OF PORTLAND PARKS & RECREATION, <http://www.portlandoregon.gov/parks/65819> (last visited Jan. 24, 2015).

¹⁸⁶ *Community Gardens in the Parks Reference Manual*, CHICAGO PARK DISTRICT, http://www.chicagoparkdistrict.com/assets/1/23/CG_ReferenceManual_2013.pdf [hereinafter *Reference Manual*] (last visited Jan. 24, 2015).

¹⁸⁷ *Id.*

¹⁸⁸ *Adopt-A-Lot*, THE CITY OF NEWARK, http://www.ci.newark.nj.us/government/city_departments/economic_housing_development/adoptalot.php (last visited Jan. 24, 2015); *Community Gardening Program*, GREATER NEWARK CONSERVANCY, <http://citybloom.org/community-gardens.htm> (last visited Jan. 24, 2015); THE CITY OF NEWARK, SUSTAINABILITY ACTION PLAN 97 (2013).

¹⁸⁹ Telephone interview with Robin Dougherty, Exec. Dir., Greater Newark Conservancy (Jan. 17, 2014).

eighty lots have been adopted throughout the city for community garden use.¹⁹⁰

B. Effectiveness of Existing Regulatory Schemes

The general assumption is that the goal of a community garden is to benefit the community it is situated in—after all, it is unlikely that the goal is to harm anyone.¹⁹¹ Most organizations that go through the process of establishing a community garden should want to comply with all recommendations relating to the health and safety of the people who work in the garden, and the people who will consume the food grown in it. That being said, it is difficult to adequately assess a danger when no baseline measurement for safety is available. Do the Interim Guidelines and other available information adequately advise these organizations on how to accomplish this goal?

A study conducted in a collaborative effort between Johns Hopkins University in Baltimore, Maryland, and the Community Greening Resource Network (“CGRN”) surveyed thirty of CGRN’s seventy registered food producing gardens in Baltimore to assess community gardener’s knowledge and perception of risks associated with soil contamination.¹⁹² The study found that the concern about soil contamination was generally low despite the prevalence of extensive soil contamination in and around the City of Baltimore resulting from its industrial past.¹⁹³ While there was a general awareness of the possibility of soil contamination, it was centered on lead.¹⁹⁴

Specifically, the Baltimore study made several findings relating to site history, soil testing, reduction of exposure to

¹⁹⁰ *Newark’s Adopt-a-Lot Program Lets Community Members Beautify the City and Grow Food*, NJTV NEWS (June 18, 2013), <http://www.njtvonline.org/news/video/newarks-adopt-a-lot-program-lets-community-members-beautify-the-city-and-grow-food/>.

¹⁹¹ For all cities studied, the community garden programs were framed in terms of community building as well as access to healthy food.

¹⁹² See Brent F. Kim et al., *Urban Community Gardeners’ Knowledge and Perceptions of Soil Contaminant Risks*, 9 PLOS ONE 1, 1-2 (2014), available at <http://www.plosone.org/article/fetchObject.action?uri=info%3A%2F10.1371%2Fjournal.pone.0087913&representation=PDF> (noting that the surveys included in-person and/or telephone interviews of gardeners as well as a small number of “key informants” including City officials, federal agency employees, community garden organization representatives and master gardeners, among others).

¹⁹³ *Id.* at 8.

¹⁹⁴ *Id.*

contaminants, and information and training needs. As to site history, although many of those interviewed stated that they had investigated the history of the site, only seven percent had consulted government records.¹⁹⁵ Key informants expressed concern that many gardeners might not have the expertise to conduct an adequate assessment of prior use and use the information to make a determination concerning the level of risk.¹⁹⁶

With regard to soil testing, the study identified several barriers to testing, including perceptions of cost prohibition, lack of knowledge with respect to what the soil should be tested for, difficulty interpreting results and fear of discovering additional contaminants once investment had been made in the site.¹⁹⁷ One informant recommended a comprehensive approach to both site histories and soil testing on a city-wide level that would facilitate a fuller understanding of the risks of the specific site as well as other factors that would indirectly affect the site (i.e., other uses that might affect the property).¹⁹⁸

When asked about reducing exposure to contaminants, many participants expressed the belief that using raised beds was sufficient to manage soil contamination and the majority of those surveyed (seventy-four percent) reported growing some crops in raised beds (fifty percent reported using raised beds exclusively).¹⁹⁹ Key informants expressed concern about the limitations of raised beds, such as the potential for contamination of the beds by using soil from a questionable source, the lack of cover of contaminated soil under and around the beds that could be disturbed and inhaled, and the underestimation of risk culminating in a failure to test soil.²⁰⁰ The use of raised beds might also lead gardeners to believe that they do not have to periodically test the soil for ongoing atmospheric deposition of contaminants, and as the study notes, “[w]hile raised beds provide some protection against contaminant exposure, they are not a panacea, and recommendations for their use should be tempered with information about their limitations.”²⁰¹

In terms of information resources, one central theme present in the survey relates to the need for a centralized repository where

¹⁹⁵ *Id.* at 5.

¹⁹⁶ *Id.*

¹⁹⁷ *Id.* at 5-6.

¹⁹⁸ Kim et al., *supra* note 192, at 5.

¹⁹⁹ *Id.*

²⁰⁰ *Id.*

²⁰¹ *Id.* at 8.

information about soil contamination could be accessed.²⁰² Most participants recommended that a community gardening association manage such information, while others suggested that the local cooperative extension handle it.²⁰³ However, one recommendation was obvious: the message of caution must be clear, concise and easy to understand, and it must be tempered with information about the positive effects of gardening and eating healthy foods so as not to discourage community gardening.²⁰⁴

IV. Options for Regulation

A. Federal Regulation – National Standards

One option for regulation is the development of national soil cleanup standards for agricultural reuse of urban soil, which could be done by a federal agency such as the EPA or by some combination of the EPA, FDA or USDA. Because each agency already has some responsibilities relating to food safety, it is possible to amend an existing federal statute to authorize one or more of these agencies to play a more active role in ensuring that people are not harmed by working in an urban community garden or consuming produce grown in one. Any one of these agencies could be authorized by statute to allocate resources to facilitate research into developing federal standards for the cleanup of contaminated soils to be used for agricultural purposes.

As discussed above in Part II, establishing such standards will be a Herculean effort due to the many factors that need to be considered for each contaminant that might be present in urban soil. In addition to contaminant-specific considerations, and as discussed in Part III, site-specific considerations also play an important role in attempting to predict whether food grown in contaminated soil will have harmful effects. Even if soil cleanup standards were developed that could be applied broadly, the next question is whether they retained enough specificity to remain useful.

²⁰² *Id.* at 5-6.

²⁰³ *Id.* (one informant expressed concern that although community organizations had the most direct line of communication with the gardeners, a fair amount of misinformation was circulated between members).

²⁰⁴ Kim et al., *supra* note 192, at 6.

B. Joint Federal/State Regulation

Most, if not all, federal environmental statutes encourage varying degrees of state participation.²⁰⁵ However, because of the structure of the U.S. Government, the federal government cannot force states to take action if it interferes with the states' sovereign powers.²⁰⁶ However, it can encourage states to take action through conditional grants.

Variations on the block grant approach are used for many joint federal/state programs. SNAP benefits are one hundred percent federally funded, but the administrative costs are split between the federal government and the states (with the federal government picking up close to half of those costs).²⁰⁷ The Temporary Assistance to Needy Families (“TANF”) program is funded by federal block grants to the states, which are then required to contribute state funds and administer the program and distribute benefits to needy families.²⁰⁸ The states have significant discretion to spend the funds as they see fit so long as they use the funds in furtherance of general goals.²⁰⁹

Another option for a federal/state or federal/local government partnership is through the use of conditional grants,²¹⁰

²⁰⁵ See ENVTL. LAW INST., A CITIZEN’S GUIDE TO USING FEDERAL ENVIRONMENTAL LAWS TO SECURE ENVIRONMENTAL JUSTICE 10 (2002) (each state has an environmental agency that administers federal environmental statutes on the state level, while EPA administers them on the federal level).

²⁰⁶ See *United States v. Butler*, 297 U.S. 1, 69 (1936).

"Congress cannot, under the pretext of executing delegated power, pass laws for the accomplishment of objects not entrusted to the Federal Government." (*quoting* *Linder v. United States*, 268 U.S. 5, 17 (1925)).

²⁰⁷ See *SNAP/Food Stamps*, FOOD RESEARCH & ACTION CTR., <http://frac.org/federal-foodnutrition-programs/snapfood-stamps/> (last visited Jan. 24, 2015); see also *SNAP Basics*, CTR. ON BUDGET & POL’Y PRIORITIES, <http://www.cbpp.org/research/?fa=topic&id=69> (last visited Jan. 24, 2015).

²⁰⁸ LIZ SCHOTT, CTR. ON BUDGET & POL’Y PRIORITIES, *Policy Basics: An Introduction to TANF 1* (2012), <http://www.cbpp.org/cms/?fa=view&id=936> (under the Personal Responsibility and Work Act of 1996, states are provided block grants by the Department of Health and Human Services, which states must then use to fund the administration of “welfare” benefits to needy families).

²⁰⁹ *Id.* If states fail to meet their contribution obligations, they risk facing severe financial penalties.

²¹⁰ See *S.D. v. Dole*, 483 U.S. 203, 207-08 (1987) (ruling that in order for a conditional grant to fall within the congressional spending power, as defined in Art. I, §8, c. 1 of the U.S. Constitution, it must be “in pursuit of ‘the general welfare[.]’” the conditions imposed must be unambiguous so as to allow the

such as through the Department of Housing and Urban Development's ("HUD") Community Development Block Grant ("CDBG") program.²¹¹ HUD has administered the CDBG Program since 1974 by providing funds directly to the local governments of large cities or urban counties, or to state governments for dispersion to smaller cities based on an annual prioritization of projects for the development of viable communities and other purposes.²¹²

Another funding opportunity for community gardens is the PGGP, which is managed by the USDA National Institute of Food and Agriculture.²¹³ The PGGP was "designed to invest in urban and rural areas identified as food deserts and/or food insecure areas, particularly those with persistent poverty" with the goal of providing the initial investment only and has helped to establish People's Gardens nationwide, in all fifty states.²¹⁴ PGGP gardens must demonstrate three characteristics: they must be for the community's benefit, they must be collaborative, and they should incorporate sustainable practices to some degree.²¹⁵

state to "exercise [its] choice knowingly," the subject condition must relate "to the federal interest in particular national projects or programs[.]" and finally, the condition may be barred by conflicting constitutional provisions. (internal citations omitted)).

²¹¹ See U.S. Dep't of Hous. & Urban Dev., *Community Development Block Grant Program – CDBG*,

http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/communitydevelopment/programs (last visited Jan. 24, 2015) (CDBGs are used to fund initiatives "to ensure decent affordable housing, to provide services to the most vulnerable in our communities, and to create jobs through the expansion and retention of businesses.").

²¹² *Id.* (HUD's annual appropriation for the CDBG program is divided between States ("non-entitlement communities") and local jurisdictions ("entitlement communities"). Entitlement communities are larger cities of 50,000 residents or more as well as qualified urban counties of 200,000 residents or more. Non-entitlement communities have access to CDBG funds that are provided directly to the states for distribution to specific projects).

²¹³ See U.S. Dep't of Agric., *The People's Garden: People's Garden Grant Program* (Feb. 2012),

http://www.usda.gov/wps/portal/usda/usdahome?navid=GARDEN_RT5&parentnav=PEOPLES_GARDEN&navtype=RT.

²¹⁴ See *id.*

²¹⁵ See USDA, *People's Garden Common Questions* (February 2012), http://www.usda.gov/wps/portal/usda/usdahome?navid=GARDEN_RT1&parentnav=PEOPLES_GARDEN&navtype=RT.

Grants to be used for community gardens, whether the grant is through the CDBG program, the PGGP, or a different program, could be conditioned on the use of raised beds or any alternative that was sufficient to ensure that the food plants being grown do not have contact with contaminated soil. Alternatively, the grants could be provided to community gardens for the specific purpose of implementing raised bed community gardens. Although the difference between the two conditioning mechanisms is small, the message behind each is very different.

Some thought should be given to the way the condition is framed. Conditioning the grant on using raised beds (or alternative means) sends a command and control message that is unpalatable in its paternalism because it implies that people don't know what is good for them. Low-income, minority, urban communities have often borne the social and health costs of urban development to a greater degree than other urban communities, potentially resulting in a lack of trust in regulatory mechanisms.²¹⁶

The other option, providing grants exclusively for the purpose of establishing raised bed/container-based community gardens or retrofitting existing community gardens, sends a different message to the community. It allows them to *choose* the safer option and comports with the idea that community gardens provide more than just healthy food to residents that might not have access to it otherwise – the gardens provide substantial social benefit through empowerment.

Grants could also be awarded to state or local governments to facilitate soil testing and interpretation. Most, if not all, cooperative extension offices will perform soil testing for soil nutrients and lead at a reasonable cost.²¹⁷ However, testing for other contaminants could be costly. Perhaps an even greater problem with soil testing is interpretation of test results. Grants could be used to provide soil test kits, testing and interpretation guidance for lead and other likely contaminants.

As part of an application for the subsidized test kits and services, community gardeners could be required to perform and

²¹⁶ See generally Dubin, *supra* note 53 (discussing the prevalence of hazardous land uses sited within minority communities as a result of protective zoning implemented by non-minority communities).

²¹⁷ See STEPHANIE HAMEL, PH.D. ET AL., RUTGERS COOP. EXTENSION, LEAD CONTAMINATED SOIL: MINIMIZING HEALTH RISKS 2 (2010) (\$20 for lead testing of soil sample).

submit a land use history assessment, which would assist in the determination of what types of contaminants to test for. Guidance on interpreting the results could be provided by issuing a standardized information sheet to the applicant along with the results based on the national standards recommended in Part IV(A). The standardized information sheet would be similar to the informational brochures that are required to be issued along with prescription drugs, and could clearly explain the risks in layman's terms. If nothing else, the information sheets could clearly inform the gardener that if the results are above a certain threshold, the existing soil should not be used as a growing medium. If additional clarification is required beyond the results and the information sheet, grants could be used to fund a hotline for gardeners to call for more detailed explanations on the results.

Community gardens are a means to allow residents to take control of not only their health, but also their community by allowing them to choose to make the community productive. They provide a venue for community organization and the very existence of the gardens is a way for residents to combat crime, beautify the landscape and uplift the spirit of those who work in it as well as those who live near it.²¹⁸ The provision of grants to allow the community the opportunity to share awareness and mitigate potential adverse health effects from soil contamination is another tool to assist in community empowerment.²¹⁹

C. State/Local Regulation

State regulation of community gardens is present on some level in many states through the mechanism of zoning and land use.²²⁰ New York expressly permits use of state and local lands for community garden purposes; however, it is notable that even in states that do not have such express statutes that general provisions relating to parks or agricultural activity may provide a basis for regulation of community gardening.²²¹ Massachusetts and New York mention community gardens in laws relating to agriculture and food production; and California authorizes allocation of grant funds to

²¹⁸ Schukoske, *supra* note 46, at 356-57.

²¹⁹ *Id.*

²²⁰ *Id.* at 372.

²²¹ *Id.*

schools for implementation of instructional school gardens.²²² In several states' public housing laws, 'housing project' has been defined to encompass lands for gardening within the project.²²³

In the cities discussed above in Part III, the municipality takes an active role in facilitating community gardens through an agency such as the Department of Parks, which then implements local controls with regard to the types of agricultural inputs allowed. In Chicago, all parkland community gardens are required to use raised beds.²²⁴ The local government's authority to legislate community gardens is derived from various sources, including the state constitution and state statutes, among other sources.²²⁵

Regulation of community gardens by state and/or local authority has many benefits, including regulation by the government entity closest to the activity to determine what is appropriate. For example, in cities where vacant land is a problem, community gardens may be encouraged by the local government as a means to revitalize communities by making productive use of land that has become blighted, thereby contributing to crime and dissolution of community ties.²²⁶ In cities where vacant land is less of an issue, community gardens can be encouraged to serve other purposes, such as educational or vocational tools.

In both cases, the state and/or local government, as the repository of land use and permitting records as well as records relating to violations and compliance enforcement actions with respect to environmental matters, is in the best position to identify potential issues relating to soil contamination. As the state and/or local government is best suited to identifying and implementing land use and planning matters for the local community, so it is in the best position to advise community gardeners on how to garden safely.

State and local governments also have separate but equally important roles to play in safeguarding public health and managing exposure to contaminants and contamination-related effects. While both state and local governments have access to block grant funding, the states are uniquely positioned to provide assistance to community gardeners in obtaining soil tests and interpreting the results through their cooperative extension offices.

²²² *Id.* at 372-373.

²²³ *Id.* at 373.

²²⁴ *See Reference Manual, supra* note 186, at 1.

²²⁵ Schukoske, *supra* note 46, at 380.

²²⁶ *Id.* at 391.

As discussed in Part IV(B), states could devise an application process whereby, using grant funding, community gardeners could apply for soil testing and interpretation of results. The application process could include land use history assessment to be done by the applicant, which would inform the state as what contaminants to test for. When providing results, the state could include an information sheet providing easy to understand guidance on interpretation of the results. Mainly, the state could ensure that the applicant is sufficiently advised of whether the existing soil is appropriate to use as a growing medium and, based on the test results, which crops would be best suited to the tested area. Alternatively, if the soil were too contaminated, the information sheet would advise the applicant not to grow food in the existing soil and to instead utilize raised beds or containers.

In conjunction with state efforts, local governments could require urban community gardens to be licensed. The licensing process could require land use history, soil testing based on the use history, and a commitment to utilizing containers or raised beds if the existing soil contains contaminant levels in excess of the national standards. A condition of the license should also be annual soil retesting to ensure that the soil has not become contaminated through atmospheric deposition since the initial license was issued. All soil testing should be funded by grants in order to encourage compliance and remove identified barriers to testing. Although the testing, interpretation of results, and further consultation should be conducted by the state, the local government should be the point of contact with the public. The local government should accept and process the license applications, send the soil samples to the state cooperative extension office, and return the results to the applicant. Licenses should be issued by the local government and agreements to utilize raised beds or containers should be between the applicant and the local government. For continuity purposes, annual re-testing should be processed by the local government as well.

D. Publication/Right to Know/Voluntary Compliance with BMPs

In effect, the EPA has taken an informational approach to the problem by issuing the Interim Guidelines, which include BMPs that, if followed, should properly mitigate any potential adverse health effects that could occur from working in a garden and/or consuming produce grown in contaminated soil. However, EPA could also create

an informational system similar to the one it has in place for companies that have released toxic chemicals, either advertently or inadvertently. The EPA maintains a Toxic Release Inventory (“TRI”) system that is accessible through the EPA website.²²⁷ The TRI system allows the user to input a zip code and search within a specified radius for companies that have the capacity to release significant amounts of toxic chemicals into the air. The website also provides information on the companies’ compliance with safety requirements and its record of release.

Several states have also implemented systems similar to the EPA’s TRI website that allow individuals to identify whether a certain property has been the subject of an enforcement action initiated by the state environmental protection agency. New Jersey’s system is accessible through the New Jersey Department of Environmental Protection and provides information on violations.²²⁸ Because many states already have information systems in place, they could be used as a centralized portal providing access to the other information that is critical in projecting the existing level of risk for specific properties.

In addition to what is already provided, the state portals could include results from environmental testing done for development or other purposes where Environmental Site Assessments have taken place, or where the state has had to conduct testing for other reasons. Historical land use information should be included as well. It could also provide links to the EPA’s Interim Guidelines and other informational publications containing BMPs, basic information on the types of contaminants typically resulting from certain prior uses, and information on soil testing opportunities and interpretation of results.

Providing a web-based, centralized repository of information would make it very simple for a community to extrapolate the potential contamination level of its proposed garden site, decide early on whether in ground cultivation is appropriate, and then plan accordingly using the guidelines provided. Such an approach was recommended by both community gardeners and key informants in the Baltimore study discussed in Part III(B). It would also empower the community to take the steps it feels necessary to safeguard the

²²⁷ See *Toxic Release Inventory (TRI) Program*, EPA, <http://www2.epa.gov/toxics-release-inventory-tri-program> (the TRI website also includes guidance documents to provide information for companies that handle and store toxic chemicals).

²²⁸ *Dep Data Miner*, N.J. DEP’T OF ENV. PROTECTION, http://datamine2.state.nj.us/dep/DEP_OPRA/.

gardeners and the consumers without mandating specific actions. The portals could then provide links to different types of grants for retrofitting an existing garden or establishing a raised bed or container garden.

Since the web portal would be the centralized repository of related information, it could also be the vehicle through which the gardener initiates the soil testing and licensing processes. The application form could be a fillable PDF and land use history could be entered directly onto the application form. The combination of land use history data for the specific site and the existence of prior or ongoing uses within a specified radius with the potential to affect the site would determine the range of likely contaminants. Once all this information is compiled and uploaded into the application, it could be printed, signed and mailed to the state along with the necessary soil samples, test area plot plan, photos and any other information that would be helpful. Licensing fees, if charged, could be processed through the portal. Since the web portal would capture the information uploaded into the application, it could be incorporated into the underlying database to ensure that the system is always up to date.

V. Conclusions & Recommendations

There is a significant and widespread soil contamination problem in the U.S., which is especially acute in low-income, minority, urban communities. At the same time, there has been a renewed interest in urban gardening. Given the importance of community gardens to both the physical, mental and social health of low-income, minority, urban communities, the problem of contamination needs to be addressed in a comprehensive way to safeguard the health of the residents of these communities while ensuring that community gardens are not regulated to death. The benefits of access to fresh healthy foods are so significant that the effects of regulations should not outweigh those benefits or in any discourage community gardening.

A coordinated effort by all levels of government would result in a comprehensive approach that would mitigate the problem to an extent that removes the potential for significant adverse effects on communities that already bear so much of the cost of progress. On the federal level, agency informational guidelines, national standards for safe levels of contaminants, and grant funding are needed. On the state level, centralization of information into a single web portal,

assistance with soil testing and interpretation, and public awareness campaigns are needed. On the local level, a conditional licensing system that includes agreements to use raised beds or containers when soil contamination levels exceed the national standards and annual retesting of the soil is needed.

The mobilization of thousands of highly motivated community gardeners dedicated to improving their lives and their communities are working for positive change. What is lacking is proper guidance to ensure that the processes of growing and consuming the products of this endeavor are as safe as they can be. The proposed comprehensive approach is focused on providing the proper guidance to ensure that the gardeners and the food they are growing are rooted in clean soil.

