

From bees to brownfields: (Un) paving the way for urban food production

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Across the nation's cities and towns, innumerable creative strategies are being implemented for growing food in more places. The reasons for this transition are many – increasing recognition that the conventional model of farming is not a healthy or sustainable one, high prices (and transportation costs) of fresh produce, a desire to connect to the land and beautify urban spaces. These efforts have proven to be highly successful, and more and more fresh food is being grown in cities – on rooftops, windowsills, and in previously vacant lots. The American Community Gardening Association estimates that there are now more than 18,000 community gardens in the US and Canada. Urban land is also increasingly being used to market locally produced food – according to the USDA, the number of farmer's markets increased by 6.8% from 2006-2008. There is justifiably much excitement and enthusiasm for such projects, and for the positive outcomes they create. Urban gardening and agriculture can help build healthier lifestyles, improved ecological health, cultivate community ties, provide an experiential learning environment, and much more. Bringing agriculture to cities makes urban dwellers - those often most disconnected from the food system – part of the good food movement happening across America. However, the long history of land uses in urban areas present potential roadblocks; urban soil contamination is a significant and widespread issue in urban spaces where various toxic substances may have been used in construction and industry throughout the history of the site. Though urban farmers and gardeners must be cautious of contamination, there is no need to throw in the trowel. Farmers and gardeners have come up with creative strategies to cope with soil contamination and continue to grow delicious and safe produce, and with it, healthier, more beautiful and more connected urban communities, and what's more, local government is starting to pay attention.

Cultivating potential

We often think of urban land as being prohibitively expensive for agriculture, but the truth is that enormous amounts of unused land exist in cities across the country. Chicago has an estimated 70,000 vacant land parcels, Philadelphia has 31,000. Though not all of these sites are contaminated, many are – it is estimated that between 130,000 and 425,000 vacant industrial sites has some level of contamination.¹ The use of this vacant land for local agriculture production and marketing is increasingly attractive as public interest in sustainable and locally produced food increases. In tough economic times,

conversion of unused urban space can revitalize ailing neighborhoods - improving aesthetics, creating jobs and attracting new business and investment.

Our population in the US as well as throughout the world has become an increasingly urban one; 50% of the world's population and 80% of the US' population now lives in cities². The solution to this demographic shift has been transport via fossil fuels – food typically travels from 1,500 to 2,500 miles to reach our plates³.

¹ Bailkey and Nasr. *From Brownfields to Greenfields: Producing Food in North American Cities*.

² Brook and Davina, *The Peri-Urban Interface: a Tale of Two Cities*; US Dept. of Transportation

³ Community Food Security Coalition.
<http://www.foodsecurity.org/PrimerCFSCUAC.pdf>

Economic crisis has created increased potential for cultivation on urban land, but also an increased need – in 2010, 14.5% of American households, 17% of households in principle cities, were food insecure⁴. At the same time, obesity in urban communities is an enormous problem, and it is tied to poverty and the consumption of healthy food. 9% of Upper East Side residents were obese, compared to over 30% East Harlem and Brownsville, numbers that correlated with rates of fruit and vegetable consumption in those neighborhoods⁵. Finding ways to grow affordable, healthy food on our urban land, much of which now lies vacant, is therefore a great priority for the future health and wellbeing of our society.

What is a brownfield, and what are the risks?

The EPA defines a brownfield as “a property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.”⁶ These can include obviously hazardous sites such as former gas stations or dumping grounds, but more innocuous former land uses can also pose a problem. Common sources for contaminants include lead paint, pesticides, fertilizers, treated lumber, petroleum or gasoline, landfill refuse, auto or machinery parts. Perceived contamination can be just as significant; if land is covered in refuse and assumed to be unsafe, it will likely not be used, even if the soil is not contaminated.

⁴ USDA Economic Research Service.
[http://www.ers.usda.gov/Briefing/FoodSecurity/stats_gra
phs.htm](http://www.ers.usda.gov/Briefing/FoodSecurity/stats_gra
phs.htm)

⁵ http://www.urbandesignlab.columbia.edu/sitefiles/file/urban_agriculture_nyc.pdf

⁶ <http://www.epa.gov/brownfields/urbanag/index.html>

The actual risk that soil contamination poses to human health depends on many factors. Uptake of contaminants generally occurs through ingestion, inhalation or skin contact. Exposure is more likely when you are working closely in the soil – which of course happens frequently when gardening and farming. Children can be more exposed to contaminants through playing with (and eating) the soil. Contaminants can make their way into food produced in the soil via soil particles stuck to the outside of produce, by entering the plant tissue itself, or through animal products that we consume such as meat, eggs or dairy. The extent to which contaminants actually enter to the food we grow at harmful levels is unclear, but the more significant and common pathway for contamination is direct soil contact – either touching or eating the soil or breathing in dust.⁷ Making the issue more complex, although the EPA has set official standards for what constitutes safe levels of lead exposure, researchers have been unable to pinpoint at what level lead presents no health risk. To sum it up, the actual amount of contaminants that one is exposed to by cultivating contaminated land and the amount of exposure that is actually harmful is difficult to establish.

Lead

The most common urban soil contaminant is lead, as the substance was used widely in both paint and gasoline until the late 1970s. Because of this, urban sites that formerly contained a building or are located near a high-traffic street can contain higher levels of lead contamination. Lead does occur naturally in soil at a range of 7 to 30 ppm (10 ppm is the average), but greatly elevated levels are a likely a sign of contamination. Although the EPA sets an official “allowable limit” for lead in soils, there is significant disagreement amongst researchers regarding what constitutes a safe level of lead in soil. This is due to different

⁷ *Sources and Impacts of Soil Contaminants*. Cornell Waste Management Institute.

assumptions regarding how much and for how long individuals will be exposed to the soil, the age and health of the individual, the different ways that individuals can be exposed to lead, as well as general uncertainty of exposure effects.

The EPA and the New York State DEC have both established a baseline of 400 ppm of lead or less as being safe for “residential use” – which takes into account all potential uptake pathways, including direct soil contact and vegetable production, but does not account for consumption of animal products produced on site. In general, if some or all of the soil on a property exceeds this baseline number, it is recommended to restrict exposure to soil.⁸

So how do you know if your land is contaminated?

In some cases, the only way to tell if a site is contaminated is by getting the soil tested (See Resources section for more information on how to do this). In New York State sellers of property are required to disclose environmental testing results to buyers, though these rules differ across states. You can also carry out preliminary sleuthing for contaminants by investigating the site’s history – what activities took place there? What chemicals were used there, where and how much? However, because soil testing is expensive and official remediation processes can be lengthy and complicated, some urban gardeners opt to assume that their land is contaminated, and employ cost-effective strategies to use the land safely.

Putting brownfields to good use

Urban soil contamination does not prevent land from being used for food production! The best approach to using the land will depend on site history, what you plan to use the land for, and who will be exposed. Phytoremediation or

⁸ *Guide to Soil Testing and Interpreting Results*. Cornell Waste Management Institute.

phytoextraction (using plants to either break down contaminants in soil or absorb contaminants into plant tissue and remove plants) are useful for some contaminants such as arsenic, oil, and some pesticides, but is not effective for lead. These strategies are additionally expensive and their efficacy is variable.⁹ Given these shortcomings, strategies for minimizing the bioavailability and uptake of contaminants from the soil rather than removing them can be preferable. Many of these strategies for dealing with contamination also promote healthy, more productive soils.

In addition to direct agricultural use, brownfields can be used for a multitude of other creative, beneficial projects. Around the country, brownfields have been converted from unused, ugly and hazardous spaces into valuable and beautiful uses, including community gardens and parks, farmers markets, and other gathering places. In cases where soil can not be safely cultivated, farmers have used hydroponic systems as well as greenhouses on formerly abandoned brownfields.

Brownfield cleanup has many indirect positive effects as well – studies show that community gardens and vacant land improvement increases surrounding property values and improves neighborhood vitality. Green spaces also make people happy – they provide important social and psychological benefits in the urban environment.¹⁰

Urban agriculture and progressive land use policy

In urban and peri-urban areas, land zoning and land use policies conform to the development model that excludes food production from

⁹ S. Rock and K. Scheckel. *The State of Scientific Knowledge and Research Needs*. 9/21/2010. EPA

¹⁰ Chlesura, A. 2003. *The Role of Urban Parks in a Sustainable City*. *Landscape and Urban Planning* 68 (1): 129-138.

these communities. This includes not only promoting local food production, but also healthy food access – allowing space for farmers markets, food cooperative and supermarkets rather than convenience stores and fast food. Cities in the US and elsewhere are starting to change these policies, but much improvement still must be made.

After Seattle’s City Council declared 2010 the “Year of Urban Agriculture”, the city made some of the most progressive code changes to date. The Department of Planning and Development expanded their definitions of horticulture, urban farm, aquaculture, animal husbandry and community gardens, land uses that are often missing from in conventional zoning bylaws. Seattle expanded zoning allowances for these land uses in commercial, industrial and residential zones, including allowing urban farms in residential areas, waiving the building height limit for rooftop food producing greenhouses, allowing farmers markets as an accepted multipurpose land use and increasing the number of chickens allowed per household.¹¹

Chicago is also jumping on board – Mayor Rahm Emmanuel recently introduced an ordinance to promote urban gardening and farming in the city. Mayor Emmanuel stated “by making it easier for communities to turn vacant lots into urban farms, we can help transform eyesores into engines of local economic activity that will supply fresh fruits and vegetables to the neighborhood.”¹² The ordinance expanded size limits for community gardens, relaxed fencing and parking

requirements for urban farms, allowed hydroponic and aquaponic systems as well as keeping of honeybees. These moves are seen not only as a boon to healthy food production and greenery in cities, but a practical strategy to create good jobs.

These changes are innovative as well and cost-effective and practical, and make a huge difference for urban farmers and gardeners looking to start growing food in their communities. More city governments must be urged to jump on this bandwagon and help start an urban food production revolution.

Tightening budgets are no excuse!

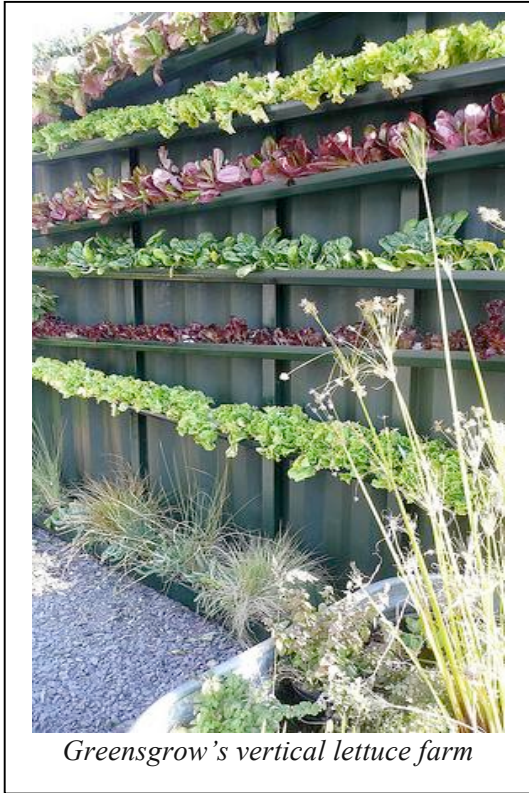
Through local governments face significant budget cuts and are unlikely to invest significant funds in urban agriculture, strategic planning and use of current resources can go a long way to making a city or town more hospitable to urban agriculture projects. Inclusion of language in municipal strategic plans pertaining to the reduction of barriers to and promotion of urban agriculture can demonstrate long-term government commitment to the issue. Council resolutions, zoning ordinances, and land use plans are examples of tools local government can use to channel current resources for such a purpose. Local government can also take advantage of local partnerships – with non-profits, school districts, academic institutions, businesses, county health departments, hospitals or neighborhood associations. These entities may possess expertise, resources, and/or enthusiasm for strengthening local food systems.

One easy thing that city government can do to reduce their own costs and help urban farmers is to reuse food waste and brush to create a city composting program. Such a program can reduce landfill costs for government, and provide a source for free compost for city farmers and gardeners.

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<http://www.foodandsocietyfellows.org/digest/article/when-local-governments-give-carrots-urban-agriculture>
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http://www.cityofchicago.org/city/en/depts/mayor/press_room/press_releases/2011/july_2011/mayor_rahm_emmanuelandaldermanameyapawarinintroduceordinancetosupport.html



Greensgrow's vertical lettuce farm

Success story: Greensgrow Philadelphia Project

The Project is housed on an abandoned brownfield site in Philadelphia, formerly a galvanized steel plant. After the EPA remediated the site, it sat abandoned for years until the Greensgrow Project took over. The Project now encompasses a greenhouse, three drained, irrigated raised beds with high tunnels, a 4,000 sq. ft hydroponic system for growing greens, a nursery hoophouse, flower beds, bee hives, a farm market, a retail nursery, and a vermiculture project in the works. The Project uses community input to make production decisions, allows residents to sell various value-added goods at the farm market, and offers discounted CSAs for low-income community members. Farm operations are run by a cooperative of fifteen farmers.

The Project's mission, to carry out "an environmentally friendly and entrepreneur based re-use of blighted land that will bring fresh produce and other farm products to city

neighborhoods", is a perfect example of the exciting potential of urban brownfield land, with a little help from the EPA and lots of ingenuity.

Re-thinking agriculture's rural bias

In a country where both hunger and obesity are a persistent and growing problem, it is clear that the problems with our food system are complex. However, some simple solutions are being implemented, in urban and rural communities across the country. If we can engage more people in producing clean, healthy food where it is especially hard to find, we can improve our communities from the ground up. This means creative integration of food production into the human landscape – growing food on rooftops, on walls, in alleyways, along streets, and on previously blighted, abandoned land. And while these projects are championed by everyday farmers and gardeners, local and federal government has a role to play. Encouraging urban agriculture is not simply good health and environmental policy; it is good economic policy. We must stop financing big agriculture, and start thinking small – and this means progressive policy to help agriculture of all shapes and sizes become a fixture of our urban landscapes.

Got your eye on a brownfield?

The EPA awards funding to state and local governments or associated redevelopment agencies to assess and clean up brownfields and put them to beneficial use. To date, thousands of sites have been assessed and cleaned up through the EPA's Brownfields program.¹³ To ensure that such projects serve to revitalize communities in an equitable and sustainable way, it is crucial that the planning and implementation process be inclusive and community-based.

¹³ EPA Brownfields Assessment Fact Sheet

The American Planning Association, with a grant from the EPA, has developed a comprehensive guide to community-based brownfield redevelopment that can be used by community organizations and residents who take on such projects. This guide can be found at:

<http://www.planning.org/research/brownfields/pdf/brownfieldsguide.pdf>

For more information on applying for EPA grants and finding other funding sources, check out this page:

<http://www.epa.gov/brownfields/matters.htm>

Selected Resources and Interesting Reads

“The potential for urban agriculture in New York City: growing capacity, food security, & green infrastructure”. Columbia Earth Institute.
http://www.urbandesignlab.columbia.edu/sitefiles/file/urban_agriculture_nyc.pdf

Extremely comprehensive analysis and discussion of food security in New York City, and the potential for expansion of urban agriculture. Includes a thorough suite of policy recommendations for city government.

Grewal, SS and P. Grewal. “Can cities become self-reliant in food?” Cities (Article in Press).

Fascinating study indicates the potential of Cleveland to meet up to 100% of its fresh produce needs by cultivating abandoned urban lands.

Vegetable Gardens are Booming in a Fallow Economy. NY Times.

<http://www.nytimes.com/2011/09/09/us/09gardening.html?emc=eta1>

A timely NYT article on home and market food production in rural areas hard hit by economic hardships.

Delaware Valley Rural Planning Commission Municipal Food System Planning Implementation Tool

http://www.ruaf.org/ruaf_bieb/upload/3304.pdf

Cornell Waste Management Institute – Soil Quality and Testing

<http://cwmi.css.cornell.edu/soilquality.htm#research>

Soil Testing Supplies and Services

Brooklyn College ESAC

<http://www.brooklyn.cuny.edu/pub/departments/esac/1535.htm>

Agro-One (Cornell University’s affiliated soil testing service for home and market growers)

<http://www.dairyone.com/AgroOne/default.htm>