

Compost Production, Application and Assessment of Soil Health Impacts on Urban Agriculture Soils in Indiana

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Outline

- **Urban Agriculture (UA) in Purdue Extension**
- **UA Definition, Scope, Scale, and Challenges**
- **Soil Health**
- **Compost Production**
- **UA in IN**

UA in Purdue Extension?

FOUR PILLARS – ONE FOUNDATION

For more than 100 years, Purdue Extension has helped strengthen Indiana. But you may not be aware of all the ways in which we do so. Explore this site to discover what Extension Does.



Agriculture &
Natural Resources



Community
Development



Health & Human
Sciences



4-H Youth
Development

PURDUE
UNIVERSITY

Diversified Farming
and Food Systems



HOW DO YOU
BUILD
COMMUNITY
WITH URBAN AGRICULTURE?



UA Definition?

Cation exchange capacity (CEC): The total capacity of a soil to hold exchangeable cations.

My UA Definition...

The practice of cultivating, processing and distributing food in urban and peri-urban areas.

Urban Farmers



Northwest Indiana Veteran's Village, Gary, IN
Photo credit: Purdue Extension



The Elephant Gardens, Indianapolis, IN
Theelephantgardensindy.com



Community Hospital Gardens, Anderson, IN
Photo credit: Nathan Shoaf

Urban Areas

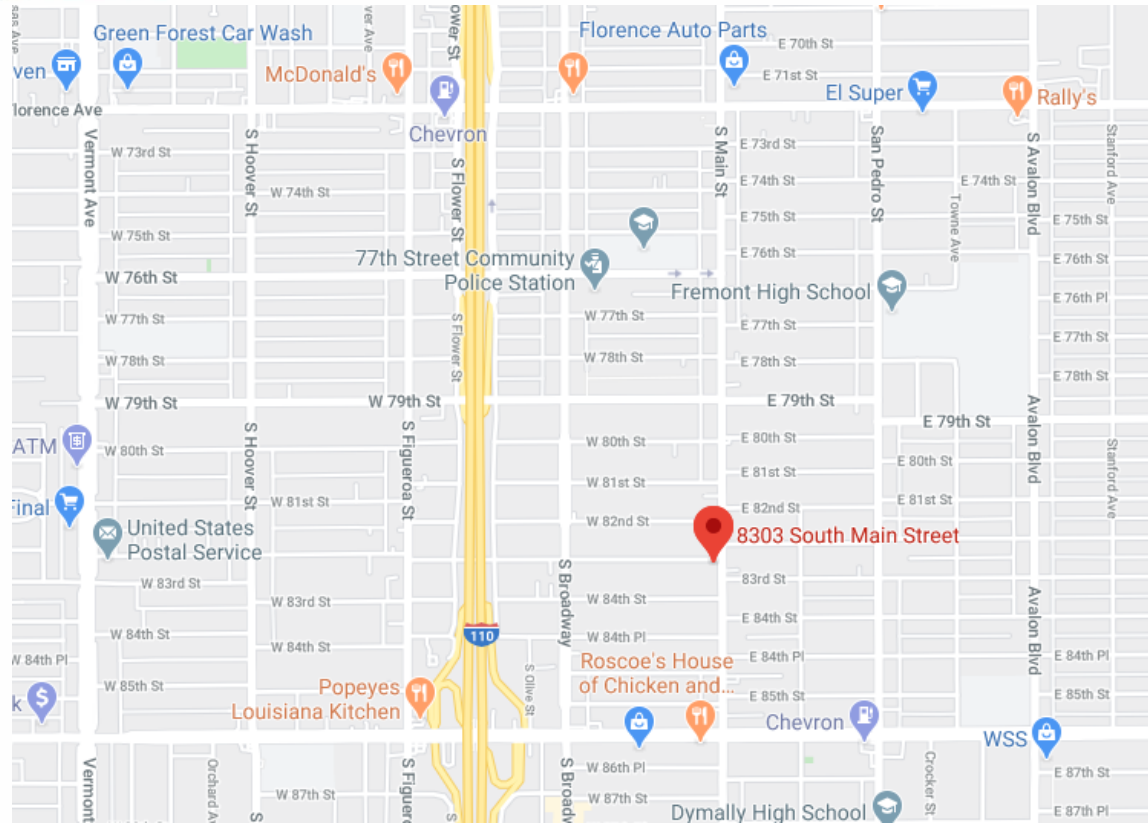


PCC Community Markets, Seattle, WA
PCCmarkets.com



Fiesta Rancho Market, Compton, CA
Photo credit: Los Angeles Street Photography

Food Desert?

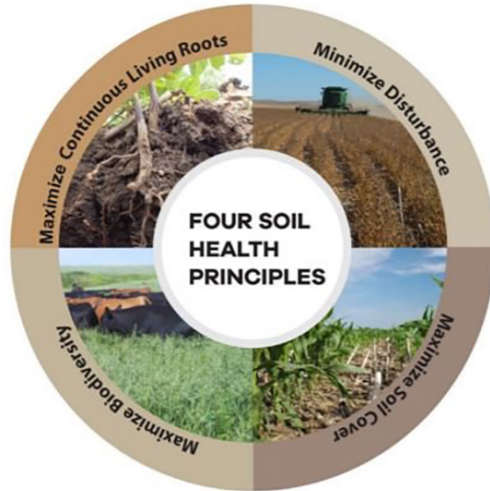


UA Challenges

- Cultural competency
- Food access
- Resource access—funds/land
- Zoning
- Redevelopment
- **Soil Health**



Soil Health



NRCS-USDA



Nature.org

Urban Soil Health

- Site land use history
- Physical characteristics
- OM
- Nutrients
- pH
- Contamination

General Source	Examples of Previous Site Uses	Specific Contaminants
Paint (before 1978)	Old residential buildings; mining; leather tanning; landfill operations; aircraft component manufacturing	Lead
High traffic areas	Next to heavily trafficked roadways or highways; near roadways built before leaded fuel was phased out	Lead, zinc, polycyclic aromatic hydrocarbons (PAHs)
Treated lumber	Lumber treatment facilities	Arsenic, chromium, copper
Burning wastes	Landfill operations	PAHs, dioxins
Contaminated manure	Copper and zinc salts added to animal feed	Copper, zinc
Coal ash	Coal-fired power plants; landfills	Molybdenum, sulfur
Sewage sludge	Sewage treatment plants; agriculture	Cadmium, copper, zinc, lead, persistent bioaccumulative toxins (PBTs)
Petroleum spills	Gas stations; residential/commercial/industrial uses (anywhere an aboveground or underground storage tank is or has been located)	PAHs, benzene, toluene, xylene, ethyl benzene
Pesticides	Widespread pesticide use, such as in orchards; pesticide formulation, packaging and shipping	Lead, arsenic, mercury, chlordane and other chlorinated pesticides
Commercial/industrial site use		PAHs, petroleum products, solvents, lead, other heavy metals (such as arsenic, cadmium, chromium, lead, mercury and zinc)
Dry cleaners		Stoddard solvent and tetrachloroethene
Metal finishing operations		Metals and cyanides

EPA's Toxic Release Inventory (TRI) can provide information to communities about sites where contaminants were released into the environment. The Envirofacts database allows users to enter location information, such as zip code, address or county location, to get information about releases in their area. The database is available online at: www.epa.gov/enviro.

Urban Soil Health: Contamination

- Phase I Assessment
- Phase II Assessment
- Brownfields
- Soil to Human
- Soil to Plant to Human
- Risk-based cleanup standards based on anticipated property reuse

- (a) Shall not use or allow the use of the Real Estate for residential purposes, including, but not limited to, daily child care facilities or educational facilities for children (e.g., daycare centers or K-12 schools).
- (b) Shall not use or allow the use or extraction of groundwater at the Real Estate for any purpose, including, but not limited to: human or animal consumption, gardening, industrial processes, or agriculture, except that groundwater may be extracted in conjunction with environmental investigation and/or remediation activities.
- (c) Shall not use the Real Estate for any agricultural use.

Indiana Environmental Restrictive Covenant
Indiana Department of Environmental Management

Urban Soil Health: BMPs

- Soil amendments
- Cover Crops
- Crop Rotation
- Raised Garden Beds
- Mulch pathways/beds
- Pest mgmt.
- Food safety



Community Hospital Gardens, Anderson, IN
Photo credit: Nathan Shoaf



Pumpkin Field, Vincennes, IN
Photo credit: Nathan Shoaf

Compost Production & Application

- Many urban farmers struggle with poor soil health and limited crop productivity in these soils
- Increase interest organic management practices
- Increased interest in compost production on site
- Reduce costs
- Enhance on-farm profitability



Rainier Beach Urban Farm & Wetland, Seattle, WA
Photo credit: Berger Partnership PS

IN Organic Production

- Promotion of reintegrating food production in urban landscapes
- Increased demand for organic, chemical-free produce
- 122% increase in USDA NOP certified organic production farms

Table 51. Organic Agriculture: 2017 and 2012

[For meaning of abbreviations and symbols, see introductory text.]

Item	2017	2012
VALUE OF SALES OF CERTIFIED OR EXEMPT ORGANICALLY PRODUCED COMMODITIES		
Total organic product sales farms	575	283
..... \$1,000	75,506	35,695
Average per farm dollars	131,315	126,131
By value of sales:		
\$1 to \$4,999 farms	74	60
..... \$1,000	168	131
\$5,000 to \$9,999 farms	52	22
..... \$1,000	353	152
\$10,000 to \$24,999 farms	87	24
..... \$1,000	1,433	399
\$25,000 to \$49,999 farms	58	24
..... \$1,000	1,998	903
\$50,000 or more farms	304	153
..... \$1,000	71,555	34,110
TYPE OF PRODUCTION		
USDA National Organic Program certified organic production farms	602	271
USDA National Organic Program organic production exempt from certification farms	55	53
Acres transitioning into USDA National Organic Program organic production farms	160	141

USDA-NASS 2017 Census of Agriculture

Connecting, Networking and Collaborating

- Discussions and connections with new populations
- Networking opportunities
- Collaborating on projects...actual work!



Commercial Watermelon Farm, Vincennes, IN
Photo credit: Dan Egel

UA Important to IN

- Urban soil health challenges
- Demographics
- Different crops
- Maintain cultural heritage
- Youth development
- Workforce training
- Reduce neighborhood blight
- Farm tours



Garden Party, Los Angeles, CA
Photo credit: Steve Thrasher

Desired Outcomes

- Improved health and food security
- Improved economic development
- Increased educational opportunities
- Increased trust in Extension
- Increased networking opportunities for urban farmers
- Increased collaborative efforts between farmers, Extension staff, faculty and other agencies



Maple Hill Farms, West Point, IN
Photo credit: Nathan Shoaf

Questions?

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