



Benefits of Cover Crops in Urban Farms and Gardens

Using cover crops to address common challenges in urban areas

By Abigail Harper and Vicki Morrone

An empty vegetable bed or bare field is the perfect time to plant a cover crop. Cover crops are plants grown to improve soil quality, rather than for harvest and sale. These crops are planted in areas that will not be used for food production for a period of at least four weeks to an entire season. Cover crops provide environmental benefits and build soil quality, which ultimately improve crop productivity.

Cover crops are useful to all farms, regardless of their size, and can help address challenges unique to urban growers. The roots, stems and flowers from these plants will benefit the soil in the short and long term. The table below will assist you to identify soil challenges common in urban areas and some of the ways cover crops can help address the problem.



Figure 1 Bee pollinating a buckwheat flower. Cover crops attract insects essential for crops to produce fruit or seed.

Cover Crop Opportunities (continued on following page)

Challenge common on urban farms	Signs of this challenge	Cover crop solution	Suggested cover crops
Poor quality topsoil: Urban soils are often poor if fertile topsoil has been removed for construction and replaced with less productive soil (fill-dirt). Poor management degrades soil over time.	Soil is light in color, fine and dusty, and dries too quickly after watering. Plants do not grow well even with additional compost or fertilizer.	Cover crops can help build soil organic matter and add nutrients back into the soil.	<i>Oats, buckwheat, mustard and rye provide substantial organic matter. Oats and vetch grown together provide nitrogen, organic matter, and loosen soil compaction.</i>
Compacted soils: Urban soils previously used for buildings can be highly compacted, making it difficult for water and roots to penetrate.	After a medium to heavy rain, water sits on the soil longer than other areas. Root crops, such as carrots, do not grow down but branch.	Cover crops with deep roots help aerate soil through root growth and decomposition.	<i>Daikon radish pushes through compacted soils and improves drainage and aeration.</i>
Nutrient run-off: Over-fertilization and soil erosion in urban areas can contribute to contaminate lakes, rivers, and municipal water systems.	Garden borders and surrounding ditches are darker green than elsewhere in garden due to nitrogen runoff.	Cover crops provide year-round ground cover. Roots greatly reduce erosion and filter nutrients to keep them in the soil.	<i>Crops with strong root systems, like rye, clover, mustard and oats, reduce erosion.</i>

To contact an expert in your area, visit msue.anr.msu.edu/experts or call 888-MSUE4MI (888-678-3464)

MSU is an affirmative-action, equal-opportunity employer, committed to achieving excellence through a diverse workforce and inclusive culture that encourages all people to reach their full potential. Michigan State University Extension programs and materials are open to all without regard to race, color, national origin, gender, gender identity, religion, age, height, weight, disability, political beliefs, sexual orientation, marital status, family status or veteran status. Issued in furtherance of MSU Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Jeffrey W. Dwyer, Director, MSU Extension, East Lansing, MI 48824. This information is for educational purposes only. Reference to commercial products or trade names does not imply endorsement by MSU Extension or bias against those not mentioned.



For additional information, visit www.canr.msu.edu/outreach

Challenge common on urban farms	Signs of this challenge	Cover crop solution	Suggested cover crops
Limited water: Urban areas often have expensive or hard to access water.	Plants have no irrigation system or mulch to hold moisture, and plants require frequent watering.	Cover crops hold water in the soil, and roots make channels for water to penetrate.	<i>Deep rooted cover crops, like Daikon radish, and plants with many branching roots, like oats or rye, increase water penetration.</i>
High Input Costs: Nutrient inputs (manure, fertilizer, compost) are expensive in small quantities, especially if transportation is required.	Small farms purchase small amounts, so cannot access bulk prices, and often have additional transportation costs.	Legume cover crops add nitrogen and organic matter, which provide food for microbes to make nutrients available.	<i>Clover, hairy vetch, and other legumes (nitrogen fixers) supply nitrogen and add organic matter.</i>
Lack of Pollinators: Urban areas have less land to grow flowers for insects that are important to agricultural ecology.	Beneficial insects, like honeybees or other pollinators, are rarely seen.	Cover crops provide a food source for beneficial insects when grown long enough to flower.	<i>Buckwheat, hairy vetch, clover, and mustard flowers provide food for pollinators.</i>
Weed pervasiveness: Urban areas can have high weed pressure, which, if left uncontrolled, can smother crops.	A high quantity of weeds produce flower heads, and weeds persist from year to year.	Cover crops grown on empty area can keep weeds from germinating and shade out weeds that do grow	<i>Buckwheat, oats, mustard, and rye compete with weeds if planted before weeds start to grow. When they are cut or die they provide mulch for vegetable crops</i>
Limited growing area: Farmers with small amounts of land often plant the same crop type in the same soil each year.	Plants are in the same or similar location each year. Gardens have areas that remain empty for a period of time.	Cover crops grown at the end of the season in raised beds or rows can add organic matter to the soil.	<i>Buckwheat in the spring or Winter Rye in the late fall add to the organic matter.</i>



Figure 2 Nodules on hairy vetch roots add nitrogen to the soil.

For more resources on cover crops, visit the MSU Extension Cover Crops Website: https://www.canr.msu.edu/cover_crops/.

Additional Resources:

- Midwest cover crop council cover crop selector tool: <http://mccc.msu.edu/covercroptool/vegtool.php>
- Managing Cover Crops Profitably: <https://www.sare.org/Learning-Center/Books/Managing-Cover-Crops-Profitably-3rd-Edition>
- SARE Cover Crop Video Series: <https://www.sare.org/Events/Cover-Crop-Conferences/National-Conference-on-Cover-Crops-and-Soil-Health/Cover-Crop-Innovators-Video-Series>
- Identifying Natural Enemies in Crops and Landscapes. Compiled and edited by Mary Gardiner, Christina DiFonzo, Michael Brewer and Takuji Noma. Michigan State University Extension Bulletin, E-2949.

To contact an expert in your area, visit msue.anr.msu.edu/experts or call 888-MSUE4MI (888-678-3464)