

# ZONING PRACTICE

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## PRACTICE COMPOSTING



# Zoning for Small-Scale Composting in Urban Areas

By Lauren Suerth and Alfonso Morales

Composting is a natural decomposition process that converts organic materials to a biologically stable and nutrient-rich soil amendment.

Diverting organic materials from landfills to compost operations decreases the amount of greenhouse gas emissions in the air and prolongs the life of existing landfills (Harrison & Richard 1992). Compost is a marketable commodity that, when added to soil, improves the chemical, physical, and biological characteristics of the land, which reduces the need for water, fertilizers, and pesticides (Cooperband 2002). Furthermore, participation in composting can build awareness about the full life cycle of food.

The interplay between federal, state, and local laws for municipal solid waste (MSW) can

be complicated, and historically, governments have subjected organic and inorganic waste to the same standards. However, it is important to distinguish between the historical intent of MSW laws and the ability for composting to safely support sustainability initiatives and community garden uses (Arroyo-Rodriguez and Germain 2012b).

This article provides planners and zoning professionals with the basic context of MSW regulations for organic waste so they can better understand the factors that influence how and where composting can occur in a specific jurisdiction. The following sections will analyze the

traditional MSW regulatory regimes and recent efforts that permit composting activities in urban areas and identify zoning regulations that sanction composting activities as a method to create healthy soil for urban agriculture uses.

## THE COMPOSITION OF MUNICIPAL SOLID WASTE IN THE UNITED STATES

The U.S. Environmental Protection Agency (EPA) has collected and reported data on the generation and disposal of MSW for more than 30 years. Analyzing 30 years of MSW data provides valuable insight on the amount and composition of the waste stream, which



Greg Lawless

➞ A municipal compost and recycling facility in Cedar Rapids, Iowa.

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### About the Authors

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allows planners to identify opportunities to manage the system in a more sustainable manner.

The “Facts and Figures for 2012” report, first and foremost, demonstrates the increasing presence of waste in modern society. Between 1980 and 2012, the amount of solid waste generated per person per day has increased from 3.66 to 4.38 pounds. In 2012, Americans generated about 251 million tons of trash and discarded over 136 million tons to the landfill (54 percent), recycled almost 65 million tons (26 percent), and composted around 21 million tons (eight percent) (U.S. Environmental Protection Agency 2014b). These percentages, however, are not consistent with the composition of the MSW because 55 percent of the trash is organic materials (i.e., food scraps, paper/paperboard, and yard trimmings), which are recyclable and compostable. This discrepancy identifies the need to increase the presence and use of waste recovery programs.

There are approximately 9,800 curbside recycling and 3,120 community composting programs in the U.S., so Americans have opportunities to sustainably dispose organic materials (U.S. Environmental Protection Agency 2013; U.S. Environmental Protection Agency 2014b). These programs, however, are not as ubiquitous as traditional disposal systems, and the amount of organic waste recovered through the programs varies significantly according to the material. This is evident by analyzing the generation and management data for specific materials. For example, in 2012 Americans generated 36.4 million tons of food waste (14.5 percent of the waste stream), disposed of 34.7 million tons (95.2 percent), and composted

Decomposing food waste represents 90 percent of a landfill’s methane emissions, and landfills accounted for 18.2 percent of all greenhouse gas emissions in the United States.

1.7 million tons (4.8 percent) of the material. Meanwhile, Americans generated 34.0 million tons of yard trimmings (13.5 percent of the waste stream), disposing of 14.4 million tons (42.3 percent) and composting 19.6 million tons (57.7 percent) (U.S. Environmental Protection Agency 2014b).

When organic material is in a landfill, it decomposes and converts to methane, which is a greenhouse gas 25 times more powerful than carbon dioxide (Gunders 2012). Food scraps have high moisture content so they decay faster than other organic and inorganic materials, and as a result, they produce a disproportionately large amount of methane. Decomposing food waste represents 90 percent of a landfill’s methane emissions, and landfills

accounted for 18.2 percent of all greenhouse gas emissions in the United States in 2012 (Gunders 2012). It is important to note that this is a natural process that occurs during composting, but turning or aerating the compost pile replenishes it with oxygen and mitigates the amount of methane produced (Cooperband 2002). As a result, it is important that the United States manage its waste in a more sustainable manner.

### THE REGULATORY FRAMEWORK FOR COMPOSTING IN THE UNITED STATES

The regulatory framework for solid waste varies significantly from state to state, which means each state has different requirements for composting specific materials. But most, if not all, regulate composting by controlling the siting, permitting, and operations of MSW treatment and disposal facilities. Unlike traditional recycling waste streams, state composting regulations have two components: (1) the siting, permitting, and operation requirements for regulated activities and (2) a list of exempt activities. The standards and requirements for the regulated and exempt activities vary by state. Most states, however, limit the exempt activities by restricting (1) the type of materials to yard trimmings and food scraps, (2) the source of the materials and use of the product to the site in which it was generated, and (3) the size of the pile/facility (Purman 2008). For regulators, the objective of these thresholds is to exempt operations that landowners can maintain in a nuisance-free manner, which typically include smaller operations. This article refers to the exempt operations as small-scale composting.



Martin Bailey

➡ Nitrogen-based food waste being added to carbon-based material to form a compost windrow at an urban farm in Ohio.

facilitate the production of food closer to consumers, but it has largely ignored the intrinsic connection between urban agriculture and sustainable disposal practices. Rural farmers compost vegetative waste and animal feces to recycle the material and restore nutrients to their soils. When cities integrate composting into their jurisdiction through urban agriculture regulations, it can facilitate the same results but at a community level.

When a city explicitly addresses composting in its zoning code, the primary purpose is to develop regulations that protect public health and the environment and promote effective composting (Purman 2008). The following subsections identify the zoning requirements that are vital to urban composting. Each subsection will identify the important aspects of the criterion and provide examples of how other municipalities address it. The criteria and content are based on a survey of zoning codes in states that recently updated their regulations to promote composting. The objective of the survey was to identify cities that address composting as a nonresidential land use and to understand how they regulate the activity.

### Consistency

Local composting regulations should align with state requirements. This will not only avoid confusion among government regulators, enforcement agencies, and residents, but it will also ensure that local uses have the full benefit

Several states, including Ohio, Wisconsin, and Massachusetts, have amended their composting regulations to decrease the procedural requirements for regulated operations and to increase the size thresholds for permit-exempt activities. There are two approaches to increasing these thresholds: (1) exempt operations according to the total land area dedicated to the use on the parcel or (2) exempt activities up to a specific size (e.g., 50 cubic yards at one time). The state of Illinois's Environmental Protection Act clarifies that composting operations are not pollution control facilities and therefore are not subject to the same standards as everyday waste facilities (State of Illinois 2013). This is a unique approach because it formally recognizes composting as a sustainable disposal method that works with the traditional MSW stream. These regulations encourage local governments to figure out an alternative solution to managing organic waste (Arroyo-Rodriguez and Germain 2012a).

A local government can promote small-scale composting by establishing it as a permitted use throughout its jurisdiction. This is a significant change to most zoning codes because cities typically limit it to residential properties and impose strict size and setback requirements. Most of the cities that address small-scale composting outside residential districts only permit it as an accessory activity to an urban agriculture primary use. However, some urban agriculture regulations do not

recognize composting. Given the natural connection between the two uses, it is an excellent method to sanction small-scale composting as a distinct use (Arroyo-Rodriguez and Germain 2012a).

### LOCAL ZONING METHODS

Since its resurgence in the late 20th century, the local food movement has primarily focused on establishing and promoting methods that



Martin Bailey

➡ Bins made of wood pallets and filled with layers of carbon and nitrogen waste materials that will become compost for urban farmers in the Lower Ninth Ward of New Orleans.

of state exemptions. For example, the state of Ohio exempts composting activities with an aggregate area of 300 square feet, but Cincinnati's zoning code stipulates that "a maximum area of 200 square feet may be used for composting" (§1419-41). Furthermore, Ohio allows landowners to compost materials that they did not generate on their site, but Cincinnati expressly prohibits this practice.

The differences between these state and local regulations are minor, but inconsistencies can impact a landowner's perception of the regulatory burdens associated with the activity. Localities can avoid this misconception and promote transparency by synchronizing the state and local thresholds for urban composting.

### Use Classification

There are two primary methods to permit composting in zoning codes: (1) establish composting as an accessory use in specific zoning districts and (2) describe composting as part of a defined use category (e.g., community gardens or another use that benefits from on-site composting). In either approach, the city should list compost piles and bins as acceptable accessory structures or composting as a permissible accessory use. Madison, Wisconsin, regulates composting according to the first method. More specifically, it permits composting as an accessory use in several zoning districts throughout the city and has separate permissions for various urban agricultural uses (§§28.032, 28.061, 28.082, and 28.091). The city permits composting wherever it allows urban agriculture activities; in doing so it recognizes that composting is an appropriate accessory use to community gardens.

The second method permits composting by imposing additional development regulations on the primary use category and outlining the composting standards in that section. For example, Cincinnati's zoning code permits community gardens as primary or accessory uses in several districts throughout the city, subject to additional standards. These use-specific standards clarify that composting is included as part of a community garden use and outline limitations on composting activities (§1419-41(i)). In effect, the second approach recognizes the inherent relationship between composting and urban agriculture and ensures that the activities support each other.

Several cities allow community gardens and urban farms throughout their jurisdiction but they do not address composting in their

zoning code. In this case, a planner can integrate the use by establishing it as an accessory use and permitting it in the districts that it allows urban agriculture uses. However, since the municipal code may address composting in its MSW and health and safety sections, it is important to review every aspect of the code that relates to the proposed changes and apply consistent principles and language.

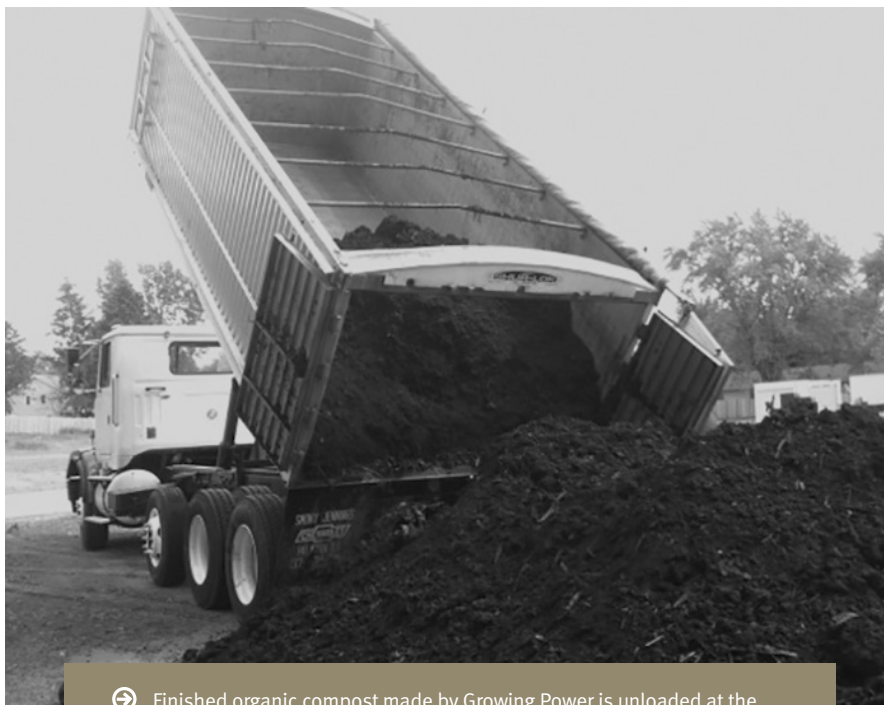
### Definitions

Every zoning code includes a definitions section to clarify key terms, and localities looking to

encourage composting should define the terms *composting* (as a use or activity) and *compost* (as the product of that use or activity). Composting definitions vary among government agencies and departments, but in order to promote the activity as a sustainable disposal method, such definitions should include three factors. First, the definition should convey the management criteria (i.e., turning the piles to avoid odors and vermin nuisances) (Arroyo-Rodríguez and Germain 2012b). Second, cities should tailor the definition to the intensity and type of composting that it wants to encourage or address: large-

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➡ Finished organic compost made by Growing Power is unloaded at the Resilience Research Center in Madison, Wisconsin (above). The compost was then laid in rows to create growing beds for later planting (below).



Photos by Martin Bailkey

tion Agency 2014a). Meanwhile, Boston's zoning code combines its definition for composting and compost into one term and integrates the criteria in a more concise manner. There, composting "is a process of accelerated biodegradation and stabilization of organic material under controlled conditions yielding a product [that] can safely be used as a fertilizer" (§89-2.7).

#### THE SCARCITY OF SAMPLE DEFINITIONS

The prevalence of local small-scale composting regulations is limited. Consequently, few cities define composting or compost in their zoning code, and most of the existing definitions are not congruent with the recommendations in this article. The absence of operational zoning definitions is problematic because it restricts the use and perception of composting as a sustainable waste management method throughout a city and, particularly, as an accessory use to urban agriculture. Furthermore, in many communities, the local public works department is responsible for waste operations and regulations, so most cities only define composting in code sections dealing explicitly with solid waste management or public health. The planning and public works departments have unique relationships with composting that require separate definitions. The definitions should articulate how composting activities interact with the departments' principal objectives, and our suggested definition enhances the planner's ability to achieve these objectives through the zoning code.

#### Permissible Materials and Compost Application

The zoning code should list all of the materials that a landowner can use in a composting operation, the source of the materials, and the application of the final product. These criteria will dictate the role and effect of composting in a city because they connect the activity to other functions within the municipality, such as urban agriculture uses and waste disposal operations. Despite intent, it is likely that most of the existing compost regulations will have a minor impact on diverting organic waste from landfills because they limit the permissible materials to organic waste generated on the site of the composting activity. This severely restricts

medium-, and small-scale activities. And third, the definition should include food scraps as a component of the activity and product to ensure that it promotes composting as a method to mitigate landfill and food waste problems.

For example, the EPA states that composting is the process of "combining organic wastes (e.g., yard trimmings, food scraps, manures) in

proper ratios into piles, rows, or vessels; adding moisture and 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"; compost means "organic material that can be used as a soil amendment or as a medium to grow plants" (U.S. Environmental Protec-

the variety of compostable materials and quantity of compost that an operation can produce, and, as a result, the benefits will be negligible (Arroyo-Rodríguez & Germain 2012). A city can promote composting as an appropriate urban land use and a sustainable disposal method by addressing the permissible compost materials, their source, and the application of the product in its zoning code.

Given the sensitive nature of composting, cities should remember that there is no “one-size-fits-all” approach to regulating composting activities. Instead, they should tailor the ordinance to their goals by following some general best practices and selecting additional standards that they can support.

Two best practices include: (1) synchronizing thresholds with state requirements and (2) recognizing that certain organic materials may not be appropriate in every district (e.g., animal manure may cause a noticeable odor in a downtown or residential district) (Arroyo-Rodríguez and Germain 2012b). If a city wants to show additional support for composting, they should consider:

- limiting composting materials to source separated organics (Harrison & Richard 1992);
- accepting composting materials from off-site sources (Arroyo-Rodríguez and Germain 2012a); and
- permitting the use of the product on off-site locations (Arroyo-Rodríguez and Germain 2012a).

Regardless of their approach, this section should be very specific because vague criteria could lead to unintended interpretations and

potential nuisances. The number of cities with a comprehensive small-scale composting ordinance is small, so there is not an example that includes all of the recommended material and application factors. However, Boston integrates most of the standards in its zoning code (see § 89-8).

## The zoning code should list all of the materials that a landowner can use in a composting operation, the source of the materials, and the application of the final product.

### Site Restrictions

Composting operations are subject to the size and setback requirements of either the zoning districts accessory use standards or the development criteria specific to the primary use. As previously mentioned, the composting area size limitations should be consistent with the state regulations. The setback requirements differ from the size limitations because they influence the location of the compost pile or bin on the property.

Setback requirements for small-scale composting activities vary by community. Some cities establish setbacks specifically for com-

posting activities, and others subject composting to district-wide setbacks for all primary or accessory uses or structures. When composting is permitted in association with an urban agricultural use, it may be subject only to setbacks governing that use, or it may be subject to additional locational restrictions. For example, both Cincinnati (§1419-41(i)) and Dayton, Ohio, (§150.420.1.5) establish setback requirements specifically for composting activities. Chicago, on the other hand, does not specify setbacks for urban agriculture accessory uses and only limits composting in association with urban agricultural activities through size limitations that apply to all small-scale composting activities (§7-28-115).

### CONCLUSION

Local governments control a large portion of the organic materials generated within their jurisdictions through traditional MSW practices. Based on the landfill emission statistics, this approach is problematic. However, by increasing the thresholds for permit-exempt composting operations, several states have recognized composting as a sustainable disposal method, and there is a corollary need for local zoning regulations that encourage diverting food waste from the landfill. Localities can and should take advantage of this deregulation by sanctioning composting through zoning. When doing so, planners and zoning professionals should consider the following criteria: consistency with state requirements, use classification, definitions, permissible materials and application methods, and site restrictions. These factors ensure that composting uses advance the health, safety, and welfare of the community.

Cover image by Tye Carnelli/Thinkstock/iStock; design concept by Lisa Barton

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DOES YOUR COMMUNITY'S  
ZONING CODE PERMIT  
COMPOSTING?

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