Planning for Compost

Leveraging BioResources for Resilient Communities and Economies

PEOPLE • FOOD • LAND

Writing and Research By:

Calla Rose Ostrander
Stephanie Cain

Commissioned By

The People, Food and Land Foundation

Funded by

The Schmidt Family Foundation

John Wick

Peggy Rathmann

Acknowledgements & Gratitudes

The completion of this paper has been a collaborative process and could only be possible thanks to the many individuals and organizations who volunteered their time to support our endeavors. In this section we would like to thank the countless reviewers, resource providers, interviewees, and funders who have supported the development of this project.

Special thanks to the following for providing information and insight during the writing and research collection process:

ATIP Foundation: Rick Brenner
CalCAN: Brian Shobe
California Alliance for Community Composting: Kourtnii Brown
Californians Against Waste: Nick Lapis, Lanh Nguyen, and Erica Parker
California Compost Coalition: Neil Edgar
California Resource Recovery Association: John Davis
CalRecycle: Timothy Hall, Kristen Pidcock, Kyle Pogue, Brian Stalker, and Heather Williams
CalTrans: Kenneth Murray
Institute for Local Self Reliance: Sophia Jones, Brenda Platt, and Julia Spector
Integrated Waste Management Consulting: Matthew Cotton
LA Compost: Michael Martinez and Gina Vollono
UC Davis: Catherine Brinkley and Carisse Geronimo
UC Santa Cruz: Elliot Campbell and Liliana Hinojoza
Zero Foodprint: Anthony Minyt and Leo Beckerman

Edited by Ursula R. Ostrander
Designed by Vasco Morelli

Published July, 2025

Table of Contents

EXECUTIVE SUMMARY

COMPOST

is a versatile and valuable bioresource that planners can harness to systematically support multiple sustainable development goals.

The benefits compost can bring to communities are broad. Its creation can foster community connectivity and place-based economic development. Its application to soils can strengthen local soil systems and support ecosystem resilience to extreme weather events. We at People, Food and Land Foundation (PFL) contend that holistic compost planning can drive systemic improvements in community and ecological health.

→

This document aims to provide a basic understanding of the benefits that localized composting can bring to municipalities and act as a helpful guide for harnessing its full potential based on the specific needs within your community. The document is divided into three parts.

Part I: A Planners Guide to Compost

Part I: A Planners Guide to Compost suggests reframing compost as a resource rather than only as an organic waste diversion strategy. This section highlights the multiple benefits of compost creation and its end-use applications to soils. These benefits expand well into systemic and crucial municipal processes and community-level welfare.

Part II: Steps to Successful Circular Compost Planning

Part II: Steps to Successful Circular Compost Planning guides planners on identifying the unique needs and strengths of their community in order to plan for compost in ways that are place-based and tailored to local goals. This section calls for assessing your community's existing conditions and needs, harnessing existing planning tools to support these needs, and offers some considerations to improve the overall framework of composting strategies in planning documents. Additionally, this section provides information on the benefits of decentralized, small-to-medium-scale composting.

Part III: A Planners Checklist

Part III: A Planners Checklist summarizes key points and presents composting-specific language found in existing Climate Action Plans (CAPs) and General Plans (GPs). These examples contain holistic compost management strategies that support community-led composting, soil building and carbon farming initiatives, municipal landscaping projects, and key compost market development strategies

Throughout the paper, case studies highlight multiple existing compost planning strategies, including those proposed in California CAPs and GPs, composting initiatives supported by public-private partnerships, and zoning ordinance updates that support overall composting strategies.

People, Food and Land Foundation's Mission:

"To further the economic and social development of rural America, and to promote and assist the growth and development of small farms and farming cooperatives.

"The primary objective of this corporation will be to benefit the rural community by creating new self-employment opportunities easing rural poverty and reducing out-migration from rural areas to overcrowded cities, reducing welfare rolls, increasing self-sufficiency and protecting the rural environment."

Introduc

Planners are in a powerful position to reframe organic materials from solid wastes whose harmful effects need to be mitigated to valuable bioresources that can be developed in ways that build community, environmental, and economic health. This document provides planners with basic language, frameworks, and tools surrounding composting. If done thoughtfully and in concert with key stakeholders, composting can meet multiple state- and community-level goals.

Planners frequently must grapple with multiple systemic issues, including housing, environmental quality, equity, and disaster responses. When faced with big problems, decision makers often seek big solutions. However planners know well that systems are synergistic and "big" solutions can come with unintended consequences and at the expense of the local community. Place-based and community-driven strategies that are low cost and low impact, while sometimes less technology-fancy and less of a "wow" factor, can often support more holistic and economical alternatives. When planners shift from a lens of "waste management" to one where organic materials are seen as natural resources that can be "developed" in ways that center the unique needs and goals of local communities, many interwoven benefits can emerge.

Existing Compost Planning Guides

There are existing resources for planning for the integration of composting sites into California communities. Predominantly driven by state-level regulations, including the Short Lived Climate Pollutants Act of 2016 (SB 1383), these resources offer planners practical steps for increasing composting capacity through the planning process, specifically at the land use and zoning level. The following are some of the main documents that guide compost planning:

1.

The California Governor's Office of Planning and Research (OPR) General Plan Guidelines is the main resource guide for planners when developing their general plans. It focuses on guidance on establishing commercial composting facilities for compliance with state and local legislation. According to state legislation, land use elements of general plans must plan for "solid and liquid disposal facilities." Compost is listed as a potential strategy to ensure compliance with SB 1383, the Solid Waste: Diversion Act of 2011, the Solid Waste: Organic Waste Act of 2014, the AB 32 Scoping Plan, and local requirements. According to this guidance, land use elements should first take inventory on the necessary infrastructure needed to recover edible food, a key component of SB 1383, and consider the need for additional organics recycling operations such as compost, mulching, and anaerobic digestion. The guidance specifically calls out the following: "...the general plan should consider the infrastructure that is needed to support increased diversion of organics from landfills, including the location of new facilities, the possibility of upgrading existing facilities to accommodate organic material specifically, (i.e., co-locating composting and digestion facilities at existing facilities such as transfer stations, material recovery facilities, and landfills), or the creation of new curbside collection requirements for food scraps with yard waste."

2.

The Institute for Local Government Model Goals, Policies, Zoning and Development Standards for Composting and Remanufacturing Facilities guides California planners on how to understand and utilize language to support the construction of new composting infrastructure. The guide focuses on commercial composting design and operation standards to ensure compliance with local zoning codes and other state and local regulations. The document also provides crucial definitions for understanding composting infrastructure projects and state-level regulation.

3.

The U.S. based Institute of Local and Self-Reliance (ILSR) Model Municipal Zoning Ordinance on Community Composting publication provides suggested language for incorporating community composting initiatives into approved land uses. The purpose of this model zoning ordinance is to ensure that community composting as a permissible land use to advance the many "environmental, public health, equity, waste management cost, and job benefits of community composting." The guide also calls out the need to explicitly define community composting as a land use distinct from industrial-scale composting and municipal solid waste management and disposal. In addition to the need to increase composting capacity through community composting, the ordinance calls to encourage the use of compost as a "community resource that contributes to erosion control, drought protection, stormwater management, improved soil health, and carbon sequestration."

In addition to these resources that explicitly suggest composting as a means to satisfy municipal and community needs, the APA Policy Guides encourage planners to choose strategies that uplift communities and support sustainable planning outcomes. The APA Policy Guides listed below contain goals that PFL suggests composting can support:

1.

Guide on Community and Regional Food Planning: Composting strategies can "help build stronger, sustainable, and more self-reliant community and regional food systems," and "suggest ways the industrial food system may interact with communities and regions to enhance benefits such as economic vitality, public health, ecological sustainability, social equity, and cultural diversity."

2.

Guide on Planning for Sustainability: Composting can support the planning practices including, "fostering projects/activities that promote economic development by efficiently and equitably distributing resources and goods; minimizing, reusing and recycling waste; and protecting natural ecosystems." Composting strategies can also support planning outcomes such as, "resilient, diverse, and self-sufficient local economies that meet the needs of residents and build on the unique characteristics of the community to the greatest extent possible," and, "communities with a healthy economy, environment and social climate that function in harmony with natural ecosystems and other species and allow people to lead healthy, productive and enjoyable lives."

3.

Guide on Healthy Communities: Composting can support goals including "integration of health into key planning and policy documents at the local level," and, "better understanding of, and more emphasis on, changes that increase protective and restorative health factors, such as a greater understanding of how specific factors (e.g., improved air quality, stable housing, reduced levels of violence) serve to protect the current health status of groups and can play an important role in repairing past health inequity and injustice."

These existing composting guides provide great information for planners to comply with state and local regulation when expanding composting capacity. The first two documents focus heavily on large scale commercial composting facilities as the assumed way to increase capacity, and therefore provide helpful guidance on land use and zoning policies to facilitate their development. The ILSR guide also provides helpful language that opens capacity for community composting, which is an entirely different compost processing method with vastly different impacts on land and communities.

While these existing guides are necessary for successful compost planning strategies, in this document we propose that planners go beyond the basics of adding the appropriate language to land use elements and zoning codes This document provides additional guidance for planners to disband from

the traditional waste management narrative of compost, and shift to a bioresource management lens. This document urges planners to look upstream for available composting materials and downstream for potential soil-building uses by actively assessing community needs and stimulating local composting markets.

Bioresource

Nonfossil biogenic resources which can be used by humans for multiple purposes: to produce food, create substantial products, and/or act as energy carriers.

ex:

"Biomass is a typical sustainable bioresource, which refers to all kinds of organisms formed through photosynthesis using readily available carbon dioxide, water and sunlight in the atmosphere, including all animals, plants and microorganisms."

Renewable and Sustainable Energy Reviews, 2022

Part I: A Planner's Guide to Compost

Complex and systemic challenges require strategies specific to the opportunities available within a place that are also culturally relevant and economically uplifting. The abundance of organic materials means that every community has an opportunity to develop these bountiful bioresources in unique ways tailored to their socio-economic, cultural, and environmental needs. In the planning field, compost is largely viewed as a diversion method that prevents organic waste from ending up in landfills. Seen within the larger biogeochemical cycles that give rise to all life on earth, composting is essential in rebuilding soil health and remedying the negative impacts of industrial agriculture and climate change. Compost creation and use can provide positive impacts to many sectors within a jurisdiction, including local nutrient-dense food production, economic development, public health, hazard mitigation, and climate action.

Compost as a *Multi-Benefit* Planning Strategy

Compost is a uniquely valuable bioresource because its creation and application can simultaneously support multiple goals.

It intersects multiple climate, ecological, and socioeconomic benefits at different scales, from macro factors to micro factors. Macro factors include greenhouse gas reduction, food system security, and economic circularity. Micro factors include flood mitigation, soil surface temperature reduction (when accompanied with plants), fire prevention, and community education and engagement. An intentionally developed composting program can satisfy many different community needs across multiple sectors and, if structured thoughtfully with the community, also support additional goals and programs that may initially seem unrelated. Figure 2 summarizes some of the many interrelated benefits compost can provide.

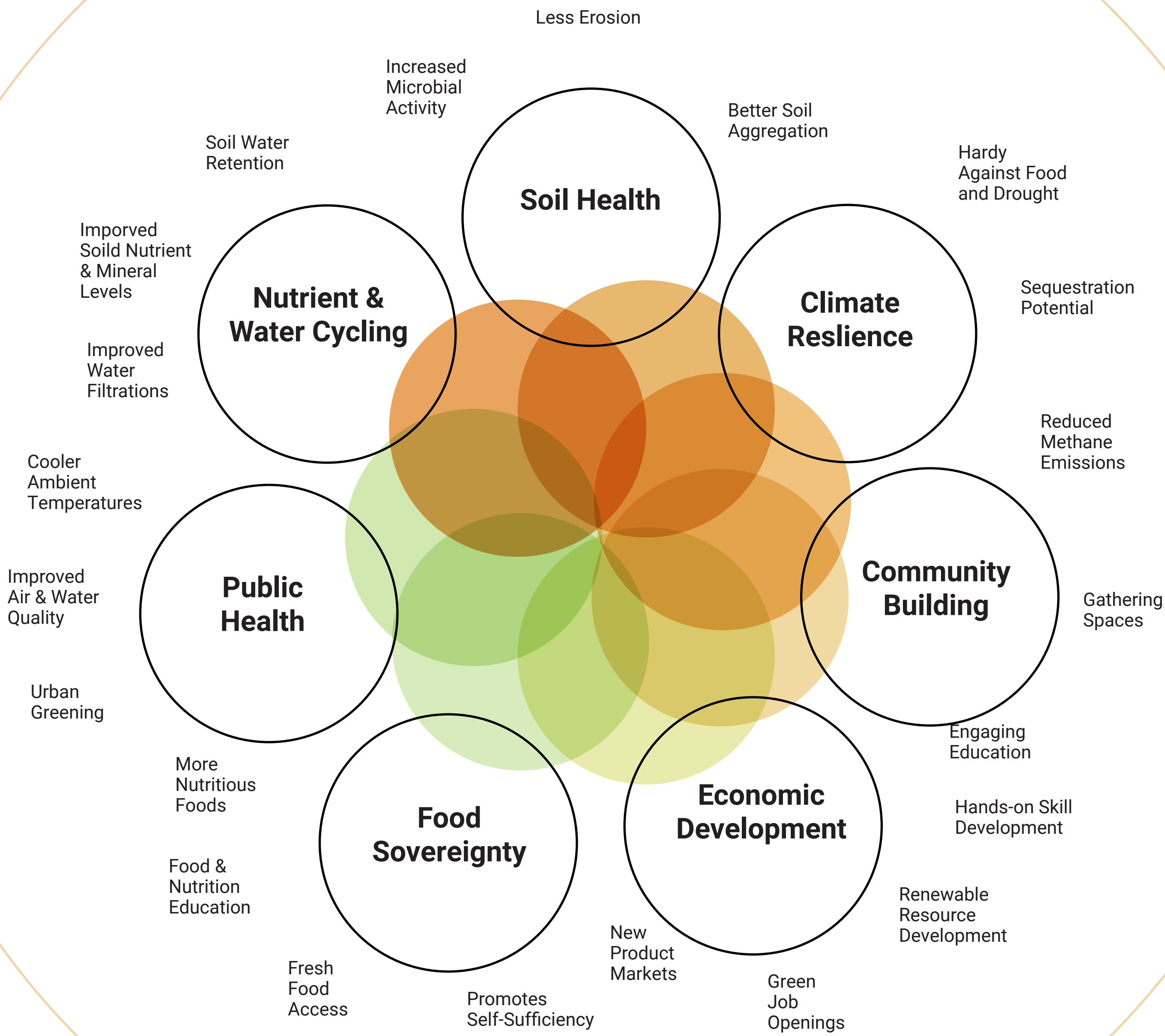

Figure 2: The Multiple & Interrelated Benefits of Compost.

Compost's Role in Soil Health and Nutrient Cycling

1%

increase in SOM

can lead to an additional

2,850 gallons

of water retained

per acre of soil[3]

Compost closes nutrient loops by stabilizing and recirculating nutrients from waste streams back into the soil. Composting organic materials is a uniquely superior way of facilitating the biochemical process of binding available nutrients to carbon, stabilizing these otherwise volatile nutrients and thus preventing water and air pollution.[1] When applied with the right conditions taken into consideration, research shows that even a single application of compost can increase soil health long-term.[2] Compost has multiple biological, chemical, and physical mechanisms of improving soil health, including its ability to increase soil organic matter (SOM) content. Figure 3 shows depleted soil versus soil with improved SOM. Improved SOM significantly increases water holding capacity, essential for resillience. SOM improves water infiltration and retention, nutrient availability and uptake in plants, and carbon storage.

Figure 3: Compacted soil versus well-aggregated soil. Aggregated soil allows for water to infiltrate, soil microorganisms to move through, and roots to be properly distributed. Source: Sustainable Agriculture Research and Education (SARE), Ch 6. Soil Degradation: Erosion, Compaction, and Contamination.

The Municipal Benefits of Compost

Compost can provide high-level benefits to communities that are agricultural, urban, or suburban, and help align jurisdictions with state legislation regarding waste diversion goals or organic material landfill bans.

However, the value of compost exceeds any linear accounting metric in carbon or cost savings and should not be planned for with only those benefits in mind.

We applaud the efforts of planners across the state for successfully improving organic materials diversion rates and SB 1383 compliance despite significant challenges. Since January of 2022, 92% of reporting jurisdictions have implemented curbside collection programs that have pushed the needle towards meeting SB 1383 goals.[4] As we continue to expand and improve upon implimentation of SB 1383, these initiatives remain crucial to meeting state diversion goals.

As planners look to find strategies that support SB 1383 while simultaneously serving additional community benefits, PFL recommends supplementing larger curbside collection and commercial composting initiatives with local, smaller composting initiatives at the community level and on farm. These project add resilience to communities and help to nuture existing or inspiring new grassroots movements and small business.

The Short Lived Climate Pollutants Act of 2016, also known as the Mandatory Organics Recycling Law or SB 1383, requires all jurisdictions in California to provide access to organics recycling to residents in order to meet a statewide goal of diverting 75% of organic waste from landfills while increasing food recovery by 20%.

In short, SB 1383 requires municipalities ensuring edible food feeds people first, and all remaining organic materials to be collected, recycled into a resource, and utilized.

Food waste prevention has been shown to be more effective the farther upstream the intervention takes place, while composting has arisen as an effective strategy when it comes to both diverting organic materials from landfills and enhancing the adoption of regenerative land management practices.[5]

Executive Order 82-20 lays out the following directive:

"5. The California Natural Resources Agency, the California Department of Food and Agriculture, the California Environmental Protection Agency, the Governor's Office of Planning and Research, and other state agencies, shall use existing authorities and resources to identify and implement near- and long-term actions to accelerate natural removal of carbon and build climate resilience in our forests, wetlands, urban greenspaces, agricultural soils, and land conservation activities in ways that serve all communities and in particular low-income, disadvantaged and vulnerable communities."

SB 1383 provides significant opportunities for municipalities to drive the market development of compost as a bioresource.

The legislation requires municipalities to identify existing organic recycling capacity and plan for expanding capacity diversion goals. The legislation also requires municipalities to procure a certain amount of recycled products with the intention of stimulating end-use markets including compost. Leveraging procurement requirements to directly provide fiscal support to local composting operations can catalyze local economic development within that sector. This will be discussed further in a later section in Part 1, Building Self-Reliance and Circular Economies.

Cities can leverage local compost creation to support municipal finances.

Sales taxes generated from a new and growing market can provide jurisdictions with alternative sources of income that could potentially fund other important projects. Local composting development also leads to local business creation, increased job opportunities, and more payroll money circulating within the jurisdiction.

The soil health improvements associated with compost application to soils can also help cities reduce municipal spending, primarily due to water conservation. Soil with more organic matter can be watered less frequently, reducing municipal irrigation costs. Compost can also reduce the need for synthetic and chemical inputs to grassy open spaces and urban landscaping, such as publicly maintained parks or buildings. Local compost production can ensure competitive pricing by reducing transportation costs to end users, often a significant component of compost pricing.

Increasing composting capacity within jurisdictions can also help align with other state-level nature-based climate solution policies.

California has long been an environmental leader and its recent focus on supporting nature-based climate solutions in natural and working lands, and programs such as the California Department of Food & Agriculture's Healthy Soils Initiative, are increasingly supporting compost use in agriculture.[6] Compost application to soils has been demonstrated to reverse carbon loss in rangelands and row crops and increase soil carbon sequestration. Although there are yet to be any specific mandates on improving carbon sequestration at the city or county level, accelerating pathways for seamless adoptions of these practices will benefit municipalities when it comes to enhancing resilience to climate change-induced weather catastrophes in the near term, regenerate degraded landscapes and rebalance local water and carbon cycling in the long term.

Timeline and Key Compost Legislation in California (provided by Californians Against Waste):

2011

AB 341 (Chesbro, 2011)

Summary:
Established a statewide goal to achieve a 75% recycling, composting, and source reduction rate by 2020. Built upon the existing 50% local government diversion mandate from AB 939 and shifted the focus to statewide outcomes rather than "diversion" accounting. The goal required significant diversion of organic waste to meet the target.

Impact:
Highlighted the need for improved organics recovery, with an additional 23 million tons per year required to meet the 75% target.

2014

AB 1594 (Williams, 2014)

Summary:
Phased out the use of green material as Alternative Daily Cover (ADC) at landfills for meeting diversion mandates.

Timeline:

- August 2018: Local jurisdictions must report plans to CalRecycle for recycling green materials used as ADC.
- 2020: ADC use no longer counted toward diversion mandates.

Impact:
Removed a low-cost outlet for green materials and incentivized composting.

AB 1826 (Chesbro, 2014)

Summary:
Required large commercial generators of organic waste to arrange for collection and recycling.

Timeline:

- April 2016: Businesses generating 8+ cubic yards of organic material per week.
- January 2017: Businesses generating 4+ cubic yards per week.
- January 2019: Businesses generating 4+ cubic yards of any solid waste per week.
- 2020: CalRecycle may extend to businesses generating 2+ cubic yards if state goals are unmet.

Impact:
Encouraged jurisdictions to create infrastructure and enforce organics recycling policies.

2015

AB 876 (McCarty, 2015)

Summary:
Required counties to estimate organic waste generation over 15 years and identify infrastructure needs in annual reports to CalRecycle starting August 2017.

Impact:
Improved long-term planning for composting and organics recycling facilities.

AB 1045 (Irwin, 2015)

Summary:
Directed California EPA to coordinate across agencies to develop and implement policies to divert organic waste. Established a greenhouse gas reduction target of 5 million metric tons annually through compost application.

Impact:
Fostered collaboration among regulatory bodies and promoted composting for carbon sequestration.

2016

SB 1383 (Lara, 2016)

Summary:
Set targets to reduce short-lived climate pollutants, including methane from landfills, with organics diversion as a central strategy.

- Goals:
  - 50% reduction in organic waste disposal by 2020 (compared to 2014).
  - 75% reduction by 2025.
  - Recovery of 20% of edible food waste for human consumption by 2025.

Impact:
Mandated statewide organics recycling programs, edible food recovery, contamination monitoring, and compost procurement by local governments. Enforcement began in 2022.

2018

AB 2411 (McCarty, 2018)

Summary:
Required CalRecycle and CalTrans to promote compost use for slope stabilization, vegetation establishment after wildfires, and along roadways.

Impact:
Encouraged use of compost in wildfire recovery and infrastructure projects.

AB 1981 (Limon, 2018)

Summary:
Expanded AB 1045 to include compost use for post-fire cleanup, emphasizing erosion control and ecosystem restoration.

Impact:
Promoted integrated woody biomass and compost strategies.

2019

AB 827 (McCarty, 2019)

Summary:
Required public-facing businesses to provide visible, accessible organic waste and recycling bins alongside trash bins, with clear educational signage.

Impact:
Enhanced consumer participation in organics diversion.

2024

AB 2346 (Lee, 2024)

Summary:
Provided additional tools for local jurisdictions to meet SB 1383 requirements, including procurement targets based on waste characterization data and expanded edible food recovery.

Impact:
Improved flexibility in achieving organics diversion goals.

AB 2902 (Wood, 2024)

Summary:
Addressed SB 1383 implementation challenges in rural areas, extending waivers and allowing alternative compliance strategies.

Impact:
Reduced compliance burden for low-population jurisdictions.

SB 1046 (Laird, 2024)

Summary:
Required CalRecycle to prepare a programmatic Environmental Impact Report (EIR) to streamline the development of small and medium compost facilities.

Impact:
Facilitated the expansion of composting infrastructure.

Soil Health and Human Health Nexus

Compost's ability to restore soil health while alleviating areas from high concentrations of polluting organic materials can lead to greater improvements in public health. Soil health has profound influences on human health. Like much of society, our food system is reliant on fossil fuels and the synthetic inputs from which they're derived (including nitrogen fertilizers, chemical pesticides, and herbicides). This system has severe negative consequences on farmers and farm workers, agricultural communities, and consumers. Generations of tilling the soil and the resulting loss of soil organic matter, as well as the simultaneous over-application of synthetic and chemical inputs, have destroyed both soil structure and soil microbiological and fungal communities. These practices, and the corresponding lack of recirculation of organic matter, have drastically increased erosion and reduced the nutritional value of our food (compost was a central practice in agriculture worldwide until the advent of synthetic nitrogen fertilizers). [7]

According to the United Nations Food and Agriculture Organization (FAO) at the current rate of soil erosion we may have less than 60 harvests left globally.

Figure 4: Confined Cattle Operations in the Central Valley. Photo retrieved from MidValley Times, credit to Rigo Moran.

At the same time, high concentrations of manure from confined animal feeding operations and intensive synthetic fertilizer use have resulted in significantly higher rates of pollution-caused chronic illness for people living in and around agriculture. People of color and low-income residents are disproportionately burdened with a wide variety of illnesses, including asthma and cancer, related to over-use of synthetic nitrogen, an over-concentration of confined animal feeding operations, and soil erosion.[8 9 10 11]

The racial and ethnic groups who have historically stewarded California's agricultural lands, namely indigenous, Latino/Latina, Asian, and black people, are the communities who are suffering the worst of our current food system's injustices.

Figure 5: Compost can support local greening initiatives, including community gardens and park maintenance. Picture courtesy of LA Compost.

The decisions that the planning profession has made and continues to make have had adverse and lasting effects on these communities. Planners are in a unique position to move forward solutions that promote self-reliance and equity. However, no stand-alone strategy can begin to remedy the decades of these injustices. Genuine solutions must be tailored to and created with the communities they wish to serve.

As destructive to the land and farmers as our industrial food systems have been, there is an opportunity to continue to produce enough food to feed the world while healing the soil and the impacted communities that live on and tend to it. Investing in compost creation and application ensures food security, closes nutrient loops, regenerates lost topsoil, and improves public health. Local compost creation can further influence public health in many other ways, including decreasing water contamination from both manures and synthetic fertilizers, decreasing the need for pesticide use, increasing soil production for community gardens, and improving the health of green spaces.

Compost as a Local Hazard Mitigation Strategy

Aside from benefits directly supporting our food systems, compost application can have a direct positive impact on environmental hazard mitigation and safety-building.

The Federal Emergency Management Agency (FEMA) requires all cities and counties to formally adopt a hazard mitigation plan, focused on community building and resilience to natural disasters and extreme weather. Compost can be a powerful strategy that aligns with FEMA recommendations for strategies that reduce long-term vulnerabilities while enhancing community connectivity.

Healthy soils, resulting from compost use instead of synthetic fertilization, work to absorb and store more water, decreasing flooding during storms, supporting plants' and trees' vitality during high heat events, and providing stabilization for local ambient temperatures. Compost application helps to mitigate impacts from major climate events.[12]

1. **Flood Resistance:**

Compost application, in concert with keeping the ground covered with living plants is an essential strategy for increasing Soil Organic Matter. Higher levels of SOM significantly decrease flood risk and minimize soil runoff during storm events. The US Composting Council has guidelines on how to utilize compost to support various low-impact development stormwater management projects.[13] CalTrans also recommends application of compost as a means for erosion control during storm events.[14] Figure 4 shows an example of agricultural runoff, which occurs when rains are not absorbed into the soil, causing soil and synthetic fertilizers to erode into waterways. Using compost to improve soil structure can reduce runoff events.[15]

Figure 6: Example of agricultural runoff, damaging fields and polluting waterways. Photo retrieved from Farm Progress (2024)

2. Extreme Heat Mitigation:

The California Natural Resources Agency calls out increasing community composting spaces as a way to "utilize nature-based solutions as part of cooling strategies in public and private spaces," within their Protecting Californians from Extreme Heat State Action Plan.[16] Compost application has been shown to alleviate urban heat island impacts when coupled with urban greening strategies.[17] It is well known within the planning community that urban heat effects have major implications for public health and that these effects disproportionately affect both communities of color and low-income communities.[18] As California grapples with more instances of extreme heat coupled with vapor pressure deficit (a condition where hot dry air sucks moisture out of the landscape), compost application can support water retention in soils, helping plants and trees stay hydrated.[19]

3. Wildfire Prevention and Recovery:

Compost can be a valuable tool in wildfire prevention and recovery.[20] Compost creation from mulched woody biomass provides an alternate market for excess fire fuel across the state. Compost application also facilitates the recovery of landscapes post-fire events by acting like a natural wetting agent, making the soil more permeable to water. Adding organic matter, which improves soil structure, increases water retention capacity, and stimulates beneficial microbial activity which helps to break down the waxy substances causing the soil to repel water, allowing it to absorb moisture more effectively.[21] [22] [23] Agricultural lands can also be regarded as potential defensible spaces that can slow or prevent wildfire expansion. Managing these lands with compost, especially when coupled with other conservation practices such as native plantings and riparian restorations, can prevent these areas from over-drying in times of extreme heat and drought, acting as buffers against fires.

CALIFORNIA LAWS, FIRE RECOVERY & COMPOST

Increasing local composting capacity, particularly through decentralized composting hubs, could improve community and ecological resilience post fires.

AB 2411 (McCarty, 2018)

SEC. 5. Section 42243 of the Public Resources Code is amended to read:

42243. The Department of Forestry and Fire Protection, the Department of Parks and Recreation, and the Department of General Services shall initiate programs to restore public lands that use compost, co-compost, rice straw, and chemically fixed sewage sludge and shall use those products or materials wherever possible.

SEC. 6. Section 42243.5 of the Public Resources Code, is added to read:

42243.5. On or before December 31, 2019, the department shall develop and implement a plan to maximize the use of compost for slope stabilization and for establishing vegetation in the course of providing debris removal services following a wildfire.

AB 1981 (Limon, 2018)

SECTION 1. 42649.87. (a) The California Environmental Protection Agency, in coordination with the department, the State Water Resources Control Board, the State Air Resources Board, the Department of Food and Agriculture, and the Department of Forestry and Fire Protection, shall develop and implement policies to aid in diverting organic waste from landfills by promoting the use of agricultural, forestry, and urban organic waste as a feedstock for compost and by promoting the appropriate use of that compost throughout the state to improve the state's soil organic matter.

SEC. 5. Promote watershed health, reduce fire risk, and improve postfire recovery by encouraging projects that use woody biomass from forests and working lands and that promote the management of woody biomass through onsite wood chip application and integration with other organic waste streams for the purpose of creating compost, where appropriate.

SEC. 6. Support postfire recovery efforts to reduce erosion and stabilize fire-damaged land by encouraging the application of compost, while taking into consideration site-specific ecology, to restore soil aggregation, increase water infiltration, reduce runoff, prevent erosion, and support plant growth, where appropriate.

Building Self-Reliance and Circular Economies

Composting organic materials is a sustainable resource development strategy that can build place-based, circular economies.

Compost is, in many ways, the poster child for a successful circular economy because it relies on natural and renewable patterns of growth and decay, rescuing organic or biological bioproducts that are currently considered "wastes" and reintroducing them into essential agricultural and landscape management supply chains. Compost-supported industries have the potential to satisfy the fundamental resource-efficiency needs of circular economies, as summarized in Figure 7. Proper planning can systematically empower communities to develop locally and regionally available organic materials into value-added products, creating a new economic avenue for small businesses.

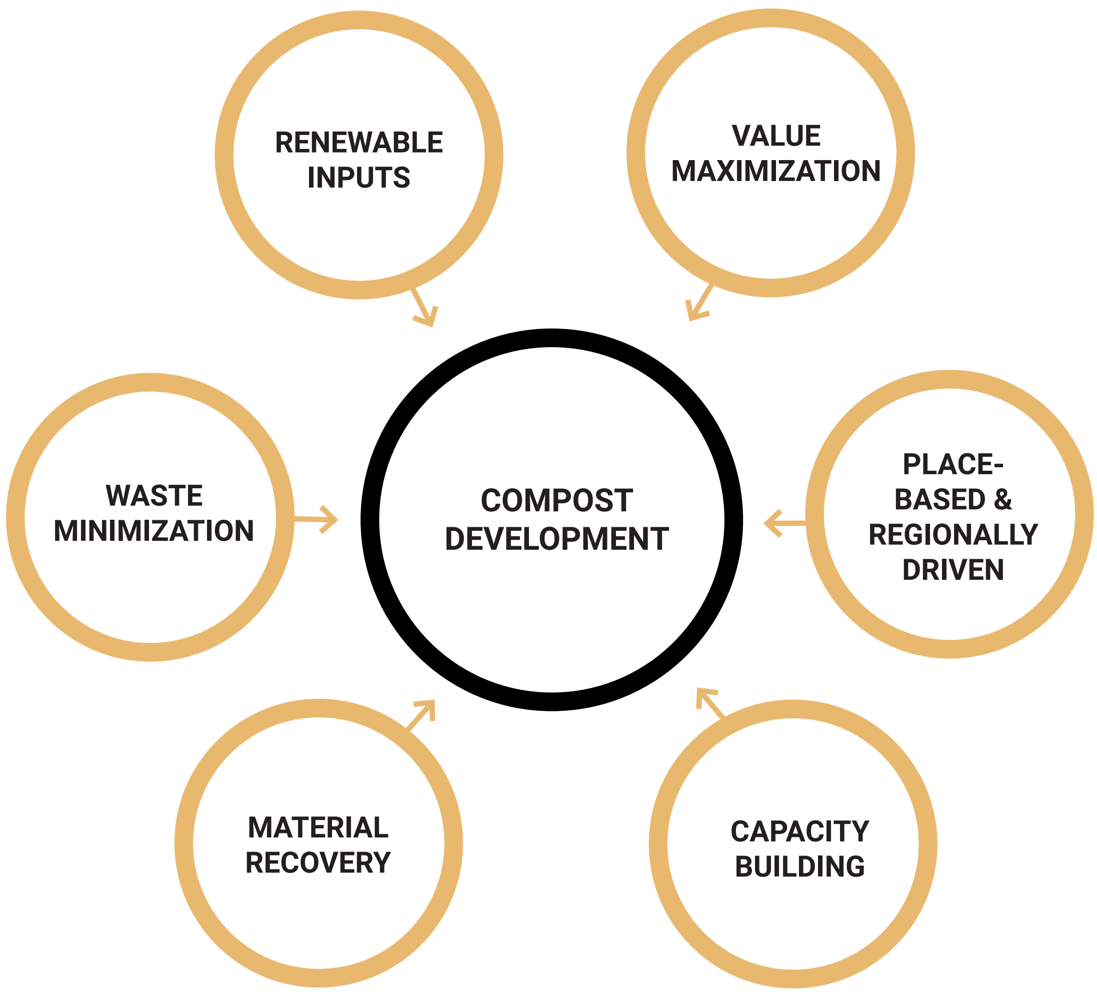

Figure 7: Foundational requirements for a resource-based circular economy. Adapted from Indeed Innovation, Circular Economy 101.

Planners can develop policies and programs that directly support potential end-user markets for compost to ensure the growth of a compost bioeconomy. A healthy bioeconomy relies on renewable materials needed to develop a product and the ecologically relevant end use of that product, in this case, compost application to soils. Agriculture remains the biggest and fastest-growing market for compost use, and other potential markets are only expanding.[24] CalTrans, the state transportation agency, has been purchasing significant amounts of compost annually for soil erosion and roadside remediation projects since 2007.[25] Many emerging or underutilized markets could benefit from compost use, including residential landscaping, community gardens, roadside management, golf courses, parks, open spaces, and farms.

As municipalities look to comply with SB 1383, market drivers need to be considered at the local and regional levels to ensure that the compost created is reaching end users for soil building and soil carbon sequestration projects. Analyzing compost markets and barriers faced by composters and consumers can ensure that your jurisdiction is making the best market-driven investments and most relevant community education campaigns. This ensures successful project development and ongoing market function that align with the goals and needs of your community.

A

bio-economy

refers to an economic system that is based on the sustainable use of biological resources, processes, and principles. It leverages renewable biological materials—such as plants, animals, microorganisms, and organic resources—to develop products in sectors like agriculture, soil amendments, forestry, fisheries, energy, pharmaceuticals, chemicals, and biotechnology.

Strong demand for compost is currentlty blocked by supply stagnation as excess organic materials continue to be underutilized from a lack of composting capacity.

Recent reports indicate that the amount of available high-grade compost is not meeting growing demands, especially when it comes to agriculture.[26] [27] An interview with CalTrans revealed that the highly variable cost and accessibility of compost can sometimes limit its use in projects.[28] This is especially true for projects that require less common compost products, such as medium- and coarse-grade compost, or that require transporting compost on roads that cannot support larger hauling vehicles.

Permitting and funding obstacles often slow or stall larger commercial composting facility development, and prioritizing the contruction of these centralized facilities can limit the amount of readily available compost at competitive prices. Organic feedstock and finished compost are heavy and expensive to transport far distances, often accounting for nearly 40% of total compost prices.[29] Supplementing regional composting capacity with distributed and integrated composting sites creates conditions for a strong and resilient economy. Figure 8 outlines the key components to a healthy, compost-driven, circular bioeconomy.

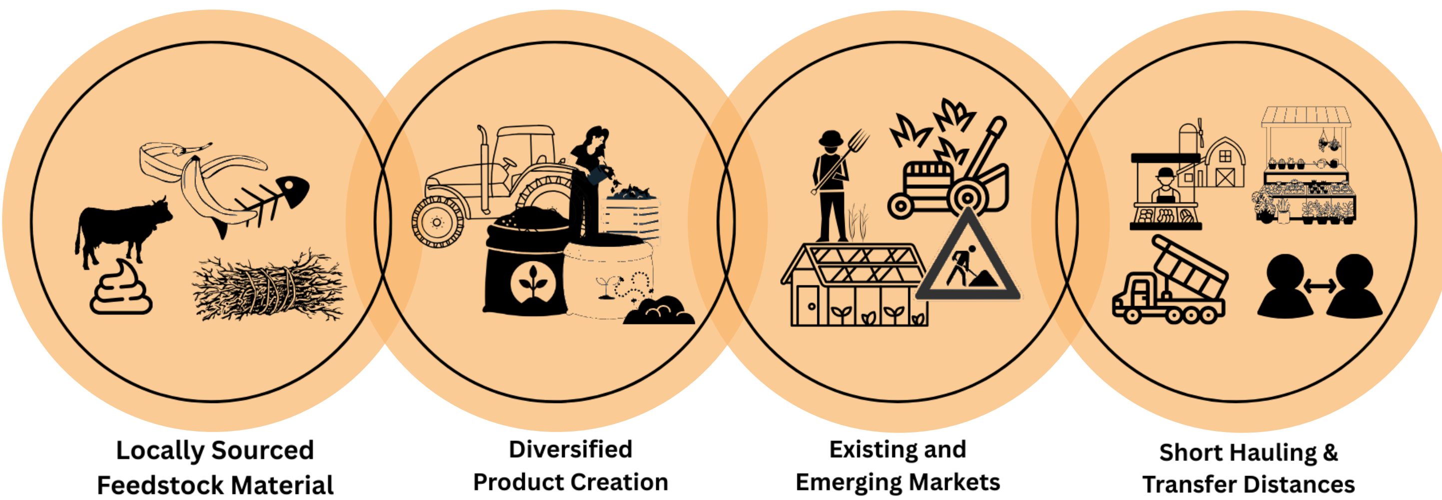

Figure 8: Components of a healthy compost economy.

Establishing composting sites close to their end-uses will fortify local and regional composting markets. This keeps the costs associated with feedstock hauling and finished compost transportation low and establishes more options for community members and businesses to divert their organic materials. For example, if the goal is to use compost on park soils, then explore supporting a composting site located at the park and process nearby organic feedstock materials, such as landscaping and other municipal organics. This proximity to end-uses is what will drive the bioeconomy, as it supplies an established demand with minimal miles traveled leading to competitive compost pricing and reliable end-use markets.

As a planner, there are tools and strategies that could be used to stimulate a local bioeconomy to comply with SB 1383, catalyze end-use markets, and integrate compost benefits across sectors within your community. Some of those strategies include the following:

1. Analyze existing compost markets within your jurisdiction. Spend time learning where the majority of compost that is being used for land application is made, how far the finished compost is traveling to for utilization, and what industries are the biggest purchasers of compost. Interview compost creators and end-users to determine if there are obstacles or financial constraints limiting the amount of compost being created, purchased, or used.

2. Determine underutilized markets that could benefit from compost use for either soil building, water conservation, fertilization, hazard mitigation, or environmental justice benefits. These can include private landscaping, golf courses, public landscape maintenance, urban and rural agriculture, and open spaces. Determine who would be potential buyers within these categories and engage with potential individuals, companies, and agencies that could potentially benefit from compost use.

3. Focus on developing decentralized, small and medium scale composting sites that could directly feed into these industries. This will reduce transportation costs for buyers while also promoting small-business development and adaptive reuse of underutilized land, particularly for areas with high percentages of lot vacancy or jurisdictions committed to limiting sprawled development.

4. Leverage SB 1383 procurement requirements to purchase locally-owned and developed compost for municipal projects, such as sequestration, remediation, urban heat cooling, and water-smart landscaping. Provide compost-specific business development resources to community members and support compost start-ups with technical assistance on permitting and compliance requirements.

Ensuring a connection between compost operations and end-users is the key to developing strong and resilient circular bioeconomies.

Planners can utilize these findings to guide holistic compost market development and strengthen existing economies that surround it. Identification of potential markets allows jurisdictions to specifically support the type of composting operations that would best suit those markets. Focusing on community or on-farm decentralized composting can provide diversified, high quality compost material for a variety of potential end markets.

CASE STUDY

San Diego County

The County of San Diego conducted a compost and mulch market analysis for their jurisdiction to identify opportunities for untapped markets and determine opportunities for improved engagement with potential buyers. They determined the following:

1. More investment in market development is needed, with a focus on creating pilot programs and meaningful education campaigns on all the benefits of compost.
2. Conduct a regional business case for compost use regarding the potential long-term savings in irrigation, fertilizer, and maintenance with increased compost use versus the cost of purchasing, transporting, and spreading compost.
3. Increase compost industry and market education across all market segments.

CASE STUDY

County of San Mateo Climate Action Plan

The County of San Mateo took a comprehensive approach that links waste management, agriculture, and community engagement to address climate and ecosystem health. The county demonstrates how local CAPs can drive meaningful environmental and social impact by integrating composting into its broader goals; focusing on local agricultural areas, community gardens, schools, and other composting sites.

The county's CAP strategies include:

1. Providing technical assistance and incentives for composting to improve and increase the availability of high-quality and affordable local agricultural compost.
2. Offering essential equipment like compost spreaders for carbon farming practices.
3. Ensuring affordability of compost by distributing county-procured compost at reduced or no cost.
4. Developing community garden programs to support composting at the local level.
5. Supporting community gardeners with funding, tools, and workshops through the existing Community Garden Partnership Program.30

The county has implemented robust composting strategies as part of its 2022 Climate Action Plan (CAP) which lists four main sectors responsible for emissions reductions, including Waste & Consumption and Working Lands. The plan aims to increase composting capacity while simultaneously applying compost to agricultural soils to drive carbon sequestration and reduce waste. Most significantly, the county strategizes to align local regulations to statewide streamlining permitting efforts for on-farm composting and climate beneficial agricultural practices. This includes assessing local permitting and ordinances to identify barriers and using effective planning to reduce these barriers. The plan also states that the county will participate in the statewide Cutting Green Tape initiative to improve permitting and funding efficiencies for ecological restoration and stewardship.

The initiatives aim to achieve multiple goals. The main goal is reducing waste and increasing organic material diversion for SB 1383 compliance while enhancing soil health and sequestration through compost application. The county also aims to strengthen sustainability in agriculture and other natural working lands, including urban green spaces. The county hopes to improve access, tenure, and ownership for the next generation of farmers and ranchers to ensure food sovereignty for their communities.

Part II: Steps to Successful Circular Compost Planning

Planning for Compost as a BioResource

Compost planning for bioresource development relies on holistic and systematic strategies that address the full lifecycle of compost and are place-specific. Figure 9 summarizes the main components of the cyclical compost planning process.

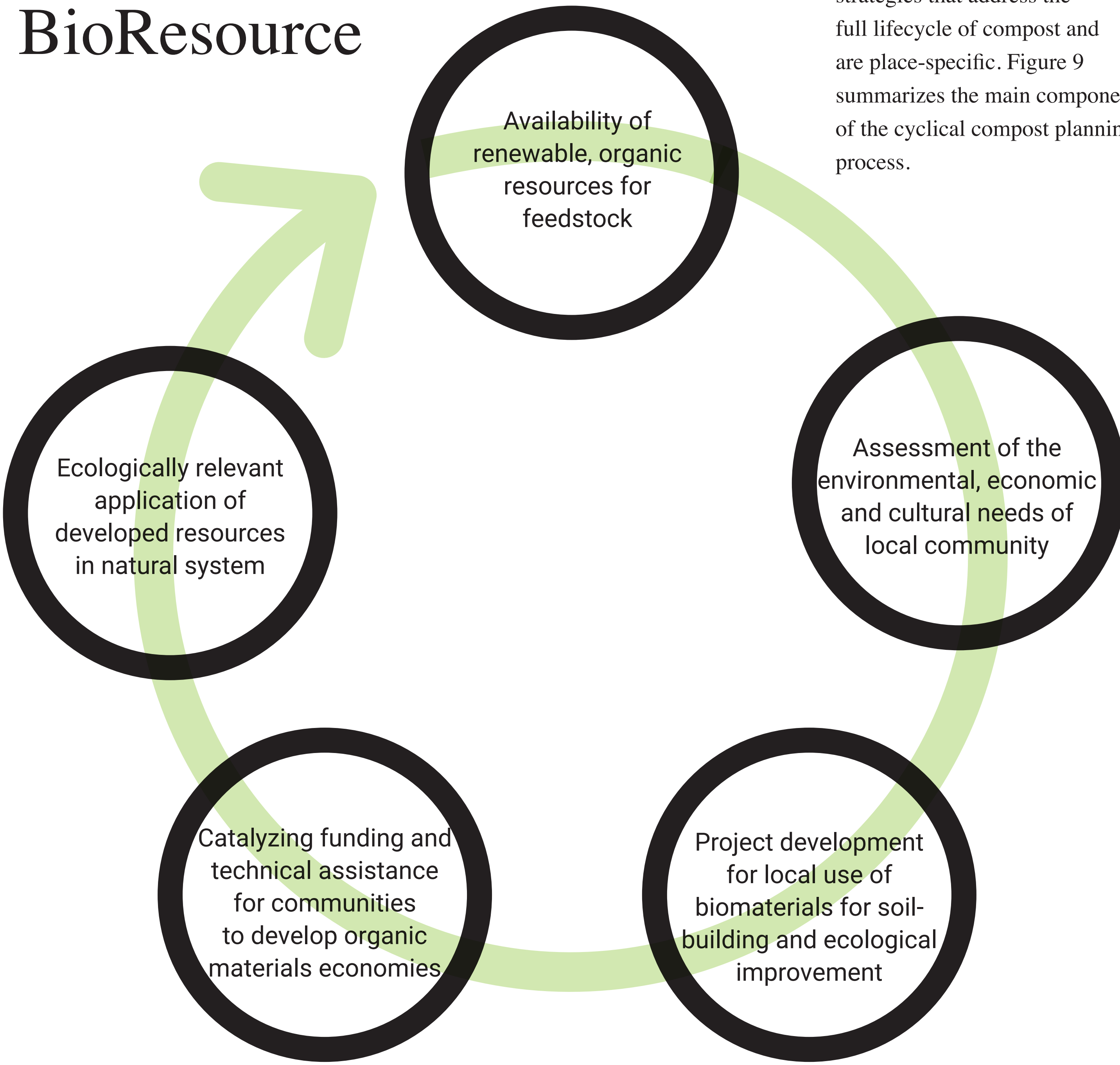

Figure 9: The Cyclical Compost Planning Process

Harnessing the full potential of compost planning for communities requires the best use of all available tools and the alignment of compost with existing planning frameworks surrounding public health and equity. This section breaks down essential steps for planners to enact when considering the best use of compost for their communities.

STEP 1

Assessing Community Needs & Resources

Understanding community goals is the most important step in determining the types of composting operations and compost products to plan for.

Planners can tailor the scale, locations, and priorities of composting operations and finished compost products to the needs of a community. It is vital to assess the community's environmental, social, and economic needs upfront to ensure the compost product being produced and how it is produced will provide its intended benefits. This assessment will provide important insights into what kind and scale of composting operations best suit your community's goals.

Planners should thoroughly assess and address goals and challenges, including where feedstock is available, how to best process those materials, where the finished compost products will be used, and where finished products are in demand. Here are some questions to guide this preliminary assessment process:

1 Feedstock Assessment:

What feedstocks are available to, or abundant in your community? Is it food material, landscaping materials, agricultural manure or crop residue, or potential fire fuel such as excess brush and grasses? How much of each of these feedstocks is produced annually and which ones are only available upon certain events? Who are the key stakeholders and potential collaborators when it comes to accessing these feedstocks? What local jurisdictional permissions or policies would be needed to access this feedstock? Could planners facilitate community members receiving permission to process municipally-owned green waste, business owned food waste, or privately-owned agricultural feedstock, such as CAFO manure? What long-term policies could be enacted to ensure community ownership over feedstock materials? See Appendix A: A Planner's Guide to Assessing Feedstocks.

2 Stakeholders:

a. Haulers: Does your jurisdiction operate a franchise agreement with haulers? Who are your existing haulers? When does the agreement next come up for re-negotiation?
b. Community Composters: Do you have an existing network of community composters? Have you engaged with them? Do you know what their needs and barriers to growth are? Do you know what their goals for growth and expansion are?
c. Agricultural Community: What kind of agriculture exists in and around your community? Who are the leaders in these spaces? Do you want your compost production to contribute to local agricultural spaces and food systems?
d. Schools: Do the schools in your community have or wish to build gardens or green spaces? Could compost help build the soil in these spaces to limit health-risk exposures from synthetic fertilizers or pesticides?
e. Parks: What properties and property types does your Parks and Recreation Department manage? What opportunities are there for reducing synthetic fertilizer use and reducing environmental concerns with compost application to park land? What opportunities are there for hosting community composting sites on park property?
f. End Users: Who would be purchasing finished compost? What are the main industries that could benefit from compost use in your area? What are the barriers for their increased use of compost products (e.g. cost, transportation, spreading).

Assessing Community Needs & Resources (cont'd)

3 Education:

Does your community value opportunities for community building, such as public events and education programs? Do they prioritize or desire youth engagement or after-school programs? Do education goals include improving source separation?

4 Food Security and Food Access:

Does your community suffer from high rates of food insecurity? What are the barriers to food access (transportation options, affordability, land ownership, permitting rules, etc.)? Is there currently a network of existing community gardens? Have you gauged resident interest in participating in such programs? Do those gardens act as composting sites? Are there urban or peri-urban farms and agricultural producers that could benefit from compost use? Does your community have access to community, private, or institutional prep kitchens? Are the non-profits or NGOs working on farm-to-school programs?

5 Environmental Justice:

Does your area suffer from air and water quality issues due to agricultural pollution? Are there new green spaces planned for communities currently lacking access and could compost creation be included in these spaces?

6 Brownfields:

Does your community prioritize remediating existing brownfields? Do you have an inventory of potential sites and owners who may be interested in coordinating on remediation and benefit from compost? Does your community wish to engage in ecological restoration projects? Does your area suffer from air or water quality issues due to soil erosion? Have you engaged with local ecological advocacy groups?

7 City or County Parks:

Does your municipality currently use compost? Could you utilize it to support water quality or remediation or regeneration goals? Does your municipality wish to reduce costs on landscaping, such as fertilizer and watering costs? Does your community wish to plant more trees and native plants for ambient cooling and greening? What kind of green or open spaces are most prevalent in your community?

8 Job Creation:

Are there private community composters already operating in your locality? Does your jurisdiction have goals related to green job creation? Are there any local labor groups that can provide insight and collaborate?

9 Markets & End Uses:

Does your community have parks, golf courses, landscaping businesses, agricultural producers, or natural landscapes that could benefit from compost use? Are there active or prospective projects that could benefit from compost as a soil-building amendment, such as to improve soil erosion, fire remediation, conservation, roadside maintenance, or other municipal uses? Is your community agricultural or located adjacent to agriculture?

The answers to these questions, garnered from the community and key stakeholders, will guide planners to more successful and robust compost planning that considers which styles of composting sites and what kind of compost products would best suit the needs of the community.

STEP 2

Evaluate Key Considerations

In addition to gathering a high-level understanding of community goals as outlined above, it is essential to delve more deeply into the key considerations laid out below. These are the most important considerations in determining a composting program's logistics and overall success.

Mapping Feedstock Availability:

Feedstock accessibility will depend on where materials are located and when they are available. For example, food material and landscaping materials are often a consistent and invariable feedstock, while agricultural or fire fuel may surge during certain times of the year or become available in single large events. Understanding which feedstocks your community may access throughout the year will help estimate processing capacity, which may determine the ideal size and style of the operation. It is also important to understand who has ownership, or who believes they have ownership, over certain feedstock and whether community members could have access to it. This is especially important when negotiating franchise agreements with commercial composting facilities (individuals own their materials until they go into the hauler bin) or when planning for community-based processing of agricultural materials (feedstock such as CAFO manure). Understanding ownership can allow planners to facilitate pathways for guaranteed processing of materials for community-based composting operations.

Building Stakeholder Support:

Gathering community support by engaging with all stakeholders early on is crucial for a successful program. Stakeholders may include existing composters (community or commercial), surrounding agriculturalists, agencies with jurisdiction over certain feedstocks, community members, schools, and other local jurisdictions (such as the county a city is located within). Large commercial composting operations are an unpopular land use. Community members and decision-makers alike are often wary of unintended nuisances, such as pests and odor. The more stakeholder support gathered for a potential composting project and the more aligned the project is with the goals of those stakeholders, the more successful the project will be. Likewise, the more supplemental options for composting sites like community gardens, schools, parks, or farms are explored, the less the need may be for the development of new large commercial facilities.

Planning for End Use (Compost Application):

To plan for the full lifecycle of compost, one must plan for its applications. This step lies outside the purview of a diversion-oriented approach to composting and is, therefore, missing from most planning documents. However, at the center of planning for place-based bioeconomies is the identification of existing and new potential markets or uses for the finished products. Planners should assess local needs for compost, including municipal uses, food system uses, and/or ecological remediation uses, and aim to tap into existing organizations and communities that are experienced in composting projects that exist across the state, including local Resource Conservation Districts (RCDs).
Building Stacked and Circular Economies:
Involving adjacent industries that could support or benefit from compost production and application provides a supportive network and stronger markets. Synergistic planning for these adjacent industries to support each other can strengthen the circular economy. Connecting composters to local businesses and regional industries that could benefit from their product creates stronger partnerships and improves affordability for end users. These industries include food and fiber industries, plant nurseries, agricultural industries, farmer's markets, landscaping companies, and others.

STEP 3

Utilize Existing Planning Tools to Support Composting Programs

Zoning is one of the most significant tools available to planners to facilitate decentralized composting operations.

Planners have access to a unique set of tools that can directly support aspiring composting operations in becoming active, functional, and relevant to a community.

A planner advocating for a composting site can often be the difference between successful implementation and a failed project. In addition to updating planning documents to align composting goals with implementation opportunities, planners can provide direct support for aspiring composters by adjusting municipal zoning codes, setting up funding opportunities, and facilitating collaboration between stakeholders.

Zoning Codes:

One of the biggest obstacles for small-scale compost producers is navigating the confusing and often expensive permitting process surrounding waste management regulations.[31] If a jurisdiction does not have composting-specific language within their zoning codes, composters are often pushed to apply for land use approval, such as a conditional use permit (CUP). CUP applications average around $12,000, serving as an immediate barrier to composters, and can trigger a potentially long and costly CEQA process. Modifying municipal codes to accommodate specific composting operations that benefit the community could enable these operations to be approved "by-right," removing the need for conditional and costly land use approvals. Typically, changes to municipal codes can be spurred by General Plan policies, as zoning codes must align with the General Plan's provisions. Taking advantage of general plan updates to address the need for increased composting can align future adjustments to zoning codes. Additionally, an advocate at the local planning level can keep composters informed about zoning and regulatory changes that may affect existing and prospective operations.

The Insitute of Local Self-Reliance (ILSR) provides community composting zoning resources and model ordinances from across the United States.[32] Additionally, the National Resources Defence Council released a Model Municipal Zoning Ordinance on Community Composting, supported by ILSR and community composters.[33]

Utilize Existing Planning Tools to Support Composting Programs (cont'd)

Funding Opportunities:

Planners have several funding avenues to support composting projects, including but not limited to, application of grants and facilitation of public-private partnerships.

Designing compost creation and application strategies with reliable funding avenues in mind often improves chances of success.

Grants can be incredible tools in securing funding for start-up project costs than can often be inhibitory. Informal interviews with planners suggest that writing grant-specific metrics, such as timelines and cost estimates, into climate action plans can potentially improve their community's chances of receiving funding. Planners are also positioned well to advise potential composters and land stewards on upcoming grant opportunities that would support their goals. Potential grants that financially support composting activities may also simultaneously address other activities such as brownfield remediation, improving water quality, reducing emissions at dairies, and community resilience projects. If planners have a good sense of what the community needs, they can be quick to respond to relevant opportunities and connect resources with the right people.

In addition to grants, public-private partnerships are often an alternate way to catalyze projects until they become more self-sufficient in their funding. Planners should find ways to facilitate market opportunities for composters of all sizes, particularly for small-scale composting ventures.

Catalyzing strong, local composting markets provide composters with consistent revenue streams and end-users with diverse compost products and competitive pricing.

These opportunities can be found between city and county agencies, private markets such as landscaping, and during infrastructure project bidding for large contracts, such as the erosion remediation campaigns lead by CalTrans. One avenue to support local composting operations is prioritizing community-based and on-farm compost for SB 1383's procurement requirements. Collaborating with your local Public Works department to ensure procurement plans align with community expectations and overarching municipality goals is a way to ensure compliance with CalRecycle while stimulating local compost markets sustainably.

Community Collaboration:

Planning is a dynamic, multi-disciplinary field that requires frequent collaboration with multiple different municipal departments, community-based organizations, state and regional regulatory agencies, and community members. This expansive network is one of the greatest values a planner can provide to support an aspiring composting project. Planners have the opportunity to aid composters in navigating the complicated permitting and implementation process, connecting them to helpful and necessary resources.

Planners can connect composters to potential community allies, advocate to regional and state agencies to facilitate permitting processes and assist in the CEQA process and other potential natural and cultural resource protection processes. Additionally, planners should collaborate amongst themselves with planning divisions from surrounding jurisdictions and within Public Works departments with solid waste and agriculture divisions.

Synergistic Grant Opportunities: There are multiple different grants that could be used to support composting projects depending on your community's needs and goals.

1. **Community Composting for Green Spaces (CCGS) Grant Program:**

   Aims to increase the number and capacity of small-scale composting programs in green spaces of disadvantaged and low-income communities.

2. **Healthy Soils Program (HSP):**

   Provides financial assistance for implementation of conservation management that improve soil health, sequester carbon and reduce greenhouse gas emissions.

3. **Regional Farm Equipment-Sharing Program (New Program):**

   Will fund equipment sharing programs that allow farmers to borrow or lease high-value equipment for healthy soil practices.

4. **California Farmland Conservancy Program (CFCP):**

   Grants to protect agricultural lands under threat of conversion to nonagricultural uses and for the improvement of lands protected by a conservation easement.

5. **USDA's Farmers Market Promotion Program:**

   Funds projects that develop, coordinate, and expand direct producer-to consumer markets to help increase access to and availability of locally and regionally produced agricultural products.

CASE STUDY COMMUNITY COLLABORATION:

County of Santa Clara & Martial Cottle Park

The composting site at Martial Cottle Park is a collaborative effort involving Santa Clara County, the California Department of Parks and Recreation, the University of California Cooperative Extension (UCCE), the Santa Clara Valley Water District, and community-based composters. Volunteers, including Master Composters, play a key role in running the site. The site operates as a Compost Education Center, offering free workshops, school visits, and community events focused on backyard and worm composting. It houses three main composting projects:

1. An Aerated Static Pile (ASP) windrow system for processing horse manure and green materials. The ASP site is on zoned agricultural land but stays small, processing around 50 cubic yards of on-site manure and some green materials annually.
2. A vermicomposting operation for food materials from local restaurants. The vermicomposting and demonstration site are maintained with less than 100 cubic yards of materials on site to remain excluded from permitting.
3. A small-scale demonstration site for community composting education, run by volunteers. Master Composters trained by UCCE experts offer free workshops, K-12 school visits, and table at community events to teach backyard and worm composting.

The project addresses water quality challenges linked to local livestock farming, securing a $60,000 Water District Safe Clean Water grant for infrastructure and operational needs.

It secured the continuous flow-through vermicomposting bin, ASP system, irrigation systems, solar power system, shade structures, tarps, tools, and cement composting storage. The site itself was acquired through a no-cost Memorandum of Understanding after the park was donated to the county in 2014. Currently, it is funded by the Recycling and Waste Reduction Commission of Santa Clara County using tipping fees collected from waste processing facilities. The site is predominantly run by volunteers. In 2023, the program engaged nearly 5,000 students, residents, and volunteers in educational activities.

STEP 4

Consider Community, On-Farm, and In-Park Composting

Despite SB 1383 passing in 2016 and providing regulated entities six years to plan for it coming into effect in 2022, many municipalities are struggling to meet diversion and procurement requirements set forth in the law.[34] High costs associated with building new commercial-scale facilities have been noted as the most significant barrier to compliance. Decentralized small and medium sized operations in open space, parks, and agriculture offer less costly capital outlays while also reducing the transportation costs of finished compost borne by consumers.

Local, decentralized and small to medium composting operations are far less costly to develop and can save jurisdictions hundreds of thousands of dollars in annual hauling costs.

Decentralized and smaller sites can also play a crucial role in correcting environmental injustice in both rural agricultural communities and urban centers. With proper engagement, these communities have opportunities to reclaim and repurpose the organic materials that have previously adversely impacted their health and use them to develop resilient small businesses based on restorative relationships with the soil and each other.

Figure 10: Three-binned community composting system run by LA Compost, Southern California's largest community composting organization.

Figure 11: Mini-windrow community composting system run by LA Compost

Benefits Unique to Decentralized Composting

We define decentralized composting as a network of small- to medium-scale, low-impact composting operations. These operations differ significantly from large, industrial composting sites in many ways and, therefore, have benefits that are unique to this scale of composting. Smaller composting sites are better equipped to allow for community engagement and often result in cleaner and diversified compost products. Three main examples of decentralized composting sites include community composting, on-farm composting, and in-park composting.

Community Composting

Community composting sites are scalable and adaptable, and provide meaningful opportunities for community building. These sites are often small, volunteer-dependent operations that offer much more value to communities than organic diversion. There are many benefits of decentralized composting that are well-documented by various community-led ground and non-profit organizations such as the Institute of Local and Self-Reliance (ISLR), the California Alliance for Community Composting (CACC), and the United States Composting Council (USCC). These include but are not limited to:

Community Engagement and Education:

As a hands-on group practice, community-scale composting provides unique and meaningful community engagement and education opportunities. Participating in the process of composting means visualizing the alchemy that is turning food and plant scraps into fertilizer to grow more food and plants. This provides foundational, apolitical education on how nature works and enhances the individual's experience of connection to natural processes.

Actively participating in the composting process is more successful in educating the public on organic diversion and nutrient recycling than traditional curbside pickup campaigns.

Community composting often relies on positive engagement from community members for its logistical success, as it needs to maintain and process enough materials to operate continuously. This leads to active community programming, frequent public events, and steady volunteer opportunities.

Figure 12: Community composting benefits all generations. Picture courtesy of LA Compost.

Benefits Unique to Decentralized Composting (cont'd)

Increased Accessibility & Activating Public Spaces:

The small and adaptive nature of community composting sites makes them well-equipped to provide increased access to organics diversion and compost products. The low-cost and low-impact nature of community composting makes them good candidates for activating spaces. Community composting sites can provide engaging activities for all community members, including members of diverse socio-economic backgrounds. They can accompany many adjacent community needs, promote local businesses and services, and provide a unique sense of place. To ensure these projects will improve accessibility for certain community members, they should be developed in concert with community leaders and community institutions such as schools, places of worship, community gardens, or social clubs.

Cleaner Compost Products:

Community composters create cleaner compost products. They are more effective at creating behavioral changes at the community level regarding source separation and minimizing contamination. Since most community composting operations rely on onsite hand sorting of organic materials, there is a greater opportunity to sort out contamination before the composting process begins.

Improved Community Connectivity During Disasters:

Community compost projects bring neighbors and strangers together by offering engagement opportunities that are appropriate for all ages and educational, racial, and economic backgrounds. Enhancing social connectivity in a community provides numerous benefits that have been documented to help communities respond more effectively during disasters. Strong social ties create networks of support and trust that can facilitate collective problem-solving in times of crisis. Key benefits of fostering community connectivity include the following:

1. Improved Information Sharing: Well-connected communities can more quickly disseminate critical information, such as evacuation orders or safety measures, ensuring more people are informed and can act promptly.
2. Faster Emergency Response: Strong social networks enable neighbors to assist one another during disasters, such as checking on vulnerable individuals, offering transportation, or providing shelter, often before emergency responders arrive.
3. Access to Resources: Socially connected communities are better at pooling and distributing resources like food, water, medical supplies, and tools, ensuring no one is left without essential support.

CASE STUDY COMMUNITY COLLABORATION:

City of Half Moon Bay

The City of Half Moon Bay's Climate Action Plan leverages community composting to enhance waste diversion, support agriculture, and educate residents. By creating a multiple strategies, from local compost sites to regional partnerships, the city addresses both immediate waste management challenges and long-term sustainability goals. The plan prioritizes compost application to soils, citing public lands managed by the Parks Department for compost application to drive soil health.

The plan aims to meet waste diversion goals more effectively while supporting the city's growing agricultural sector with high-quality compost. The city determined that there is a significant need for a new market of decentralized, high-quality compost products for agricultural uses. The City of Half Moon Bay chose to structure their solid waste improvement strategies with community and school composting as the catalyst for widespread behavioral changes, citing their educational programming potential.

The city aims to alleviate reliance on large-scale composting facilities by engaging in distributed community composting for the additional purpose of educating the public on waste reduction and nutrient cycling. The CAP specifies that the city will procure over 1,000 tons of compost annually for the next 20 years.

CAP strategies include:

1. Reflecting the needs and priorities determined by community members, including community gardeners and agriculturalists.
2. Establishing community compost sites at gardens and schools to act as educational hubs.
3. Developing a city-wide network of decentralized composting sites.
4. Regional-level market involvement through partnering with the county's compost trading program to secure additional compost for its growing agricultural sector.
5. Supporting public land and agricultural compost applications.
6. Emphasizing education on waste reduction through composting demonstrations and programming.

Benefits Unique to Decentralized Composting (cont'd)

On-Farm and In-Park Composting

Decentralized composting hubs can be coupled with increased opportunities for stimulating local composting markets while increasing site-level compost production capacity. On-farm composting connects to localized food production, while in-park composting can provide many of the benefits seen in community composting at an increased scale. Both provide the additional benefits uniquely seen at this scale, including the following:

Activation of Local Composting Markets:

Decentralized composting options are better positioned to serve local composting markets and can provide operators with an additional income source. On-farm composting can provide adjacent agricultural operations with high-quality products that are better tailored to the specific needs of the region. On-farm compost production also allows agricultural producers to turn their waste management from a cost issue to an income source. In-park composting can similarly provide municipalities and local businesses with readily available, high-quality compost for landscaping, maintenance, or conservation projects.

Figure 13: In-Park composting at Griffith Park. Picture courtesy of LA Compost.

Figure 14: On-Farm horse manure composting. Photo taken by Michael Westendorf, Rutgers University.

More Affordable Compost:

Both on-farm and in-park composting programs can significantly reduce compost costs for local consumers. The transportation costs of hauling finished compost products from composting sites to consumers are considered the biggest barrier to affordable compost. We estimate that consumers pay between half and one-third of their total compost costs for transportation alone due to most consumers having to haul compost more than 20 miles.[35] Decentralized composting keeps composters closer to feedstock sources and their prospective buyers, resulting in significantly lower prices.

CASE STUDY

West Marin County Green Material Management & On Farm Composting

West Marin Compost located on the LaFranchi Dairy in Nicasio Marin combines onsite dairy manures with equestrian manures, green materials, and fire fuel load reduction woody biomass from the surrounding county. The four-acre operation processes approximately 7,000 cubic yards of separated manure solids per year servicing 450 heads of pasture grazed cattle. The site was developed by augmenting the existing manure pond to separate solids and liquids and then grading and surface hardening to create the space for windrow composting. Piles are turned with mechanical turners, though the operators would like to upgrade to covered aerated static piles in the future.

The site was financed through investments by the dairy, Marin County, the local waste hauler and state grants. The Marin Resource Conservation District played a large role in project facilitation and grant applications. Development of a compost site in the county saved the County of Marin funds by reducing trucking distances for woody biomass disposal. It also worked to reduce illegal manure dumping from equestrian operations into local water bodies. Recently, as woody biomass from fire fuel load reduction has increased significantly, West Marin Compost has created plans to co-locate a small wood mill to produce locally sourced and sold timber products in addition to mulches and compost.

Benefits Unique to Decentralized Composting (cont'd)

Community & Commercial Compost:

Carving out space for community-scale organic waste hauling and composting operations within or in addition to exclusive franchise hauling agreements can complement, rather than create competition for, existing large-scale commercial composting facilities.

Small and medium-sized composting sites, particularly those that act as compost demonstration and education centers, provide additional community benefits that support overall public participation rates, education and community-building chief among them. Community garden composters, on-farm composters, and youth-centered composting programs often directly engage with community members through volunteering and educational workshops. These programs provide hands-on opportunities for communities to learn about source separation, building and caring for compost, food security, and other topics and skills.

There is evidence that community and commercial composting can complement each other by utilizing the unique strengths of each. In areas with existing commercial facilities, opening smaller community composting facilities that provide community education has led to improvements in contamination levels within those larger facilities thanks to educational campaigns driven by community composters.[36] Community composting operations can also provide pick-up services to residents who would otherwise not receive service from larger commercial facilities, especially in neighborhoods that would be hard to access with a large collection truck due to road size or housing arrangements. Community composters can address this gap by providing drop-off locations, bike pick-ups, or direct pick-ups with smaller vehicles.

STEP 5

Improve Overall Circular Compost Planning Frameworks

Compost policies, plans, and programs are most often written within the frameworks of waste management and lack a meaningful approach to managing the full lifecycle of compost or closing nutrient loops in our food systems. Agriculture is already the largest end market for compost in California, demanding more product than current commercial composters can supply.

To facilitate organic materials returning to the food systems PFL recommends two new frameworks to improve holistic compost planning in your jurisdiction:

1 Compost as resource management

2 Connecting urban and rural nutrient loops using compost as a soil amendment

From Waste Management to Resource Management

Framing compost exclusively as a waste management activity leads planners to rely only on existing waste management systems rather than looking to create new and holistic systems. Creating new avenues for compost can lead to compost creation for use in parks and urban or rural agriculture or in meeting other community needs and goals. Utilizing existing waste management systems to support compost creation is not inherently poor planning; however, expanding the frame from waste to resource management allows for additional solutions to arise. Making a conscientious effort to work with communities and surrounding agricultural producers to identify and plan for composting operations that best suit these communities' needs can lead to creating sites that vary in scale, feedstock type, and finished compost product. Diversified production then helps to expand compost markets and ensures a product for every compost user, whether organic farmers, ranchers, or land and resource management organizations.

From Table to Farm: Connecting Urban & Rural Carbon & Nutrient Cycles

Closing nutrient and carbon cycles is the key to developing circular bioeconomies. However, a large disconnect exists between urban compost production and rural agriculture. This gap highlights an opportunity for increased collaboration between planners in cities and their respective counties to establish regional, closed-loop bioresource economies through careful placement of composting sites.

Urban waste systems and rural agricultural systems predominantly operate in disconnected parallels. Urban areas have the highest concentrations of food waste. However, if SB 1383 diversion rates are achieved, there would only be space for 8 to 26% of the diverted organic materials to be applied to urban lands.[37] In comparison, rural areas are the largest producers of the agricultural food products, and agriculturalists rely heavily on fertility inputs to ensure crop production. The key to closing the urban-rural nutrient loops is recycling nutrients and carbon from organic materials back into the food system. Composting provides an opportunity to return nutrients to the food system in high volumes. Promoting small-scale urban farming is crucial to public health and equitable food access and has multiple other benefits. At the same time, rural agriculture provides the bulk of our country's food production. Assessing opportunities for both is essential. While rural agriculture provides the bulk of our country's food production, promoting small-scale urban farming is crucial to public health and equitable food access and has multiple other benefits.

Planners have the opportunity to support adjacent soil, food, and fiber systems by planning for compost site development on or near areas where the product is used. These uses can include supporting surrounding agriculture, landscape maintenance, park and open space sequestration projects, brownfield remediation projects, and more.

CASE STUDY

San Diego Composting Zoning Ordinance

The County of San Diego's updated zoning code has transformed composting by enabling small- and medium-scale operations to process off-site organic materials. By reducing permitting barriers and defining composting activities across land use types, the Organic Materials Processing Ordinance decentralizes composting, diversifies compost products, and strengthens connections between local farms, gardens, and communities. This distributed model of increasing composting capacity creates opportunities small businesses and diverse compost creation, creating a more resilient bioeconomy.

This update expands the ability to process off-site organic materials at farms, backyards, and community gardens by reducing permitting barriers that previously limited composting to on-site materials or required costly permits for off-site processing. This significant change has completely restructured the flow of organic materials and compost throughout agricultural and municipal communities, benefiting the overall nutrient flow between urban and rural.

The ordinance works by:

1. Defining composting activities under categories like agricultural operations, community composting, and commercial composting.
2. Specifying which land use types allow each operation and the size and feedstocks permitted.
3. Simplifying permit requirements, with some operations no longer requiring permits, avoiding previous costs of $15,000–$100,000 and lengthy approval times of 1–2 years.[38]
4. Establishing operational and siting requirements to ensure compliance and environmental safety.

CASE STUDY (CONT.)

The ordinance fosters greater interconnectivity between farms, residents, businesses, and community gardens and reduces the burden of costly and time-consuming permits, encouraging broader participation in composting activities.

Figure 13 maps out the circulation of organic materials before the ordinance update. It shows that the majority of organic materials were either reaching landfills or larger centralized processing sites. There were some opportunities for community composting, but growth and scale were limited by permitting restrictions. Some restrictions did not allow for more than a certain amount of organic material on site at any given time, and others did not allow site to process materials brought in from off-site.

Where *did* organic material go?

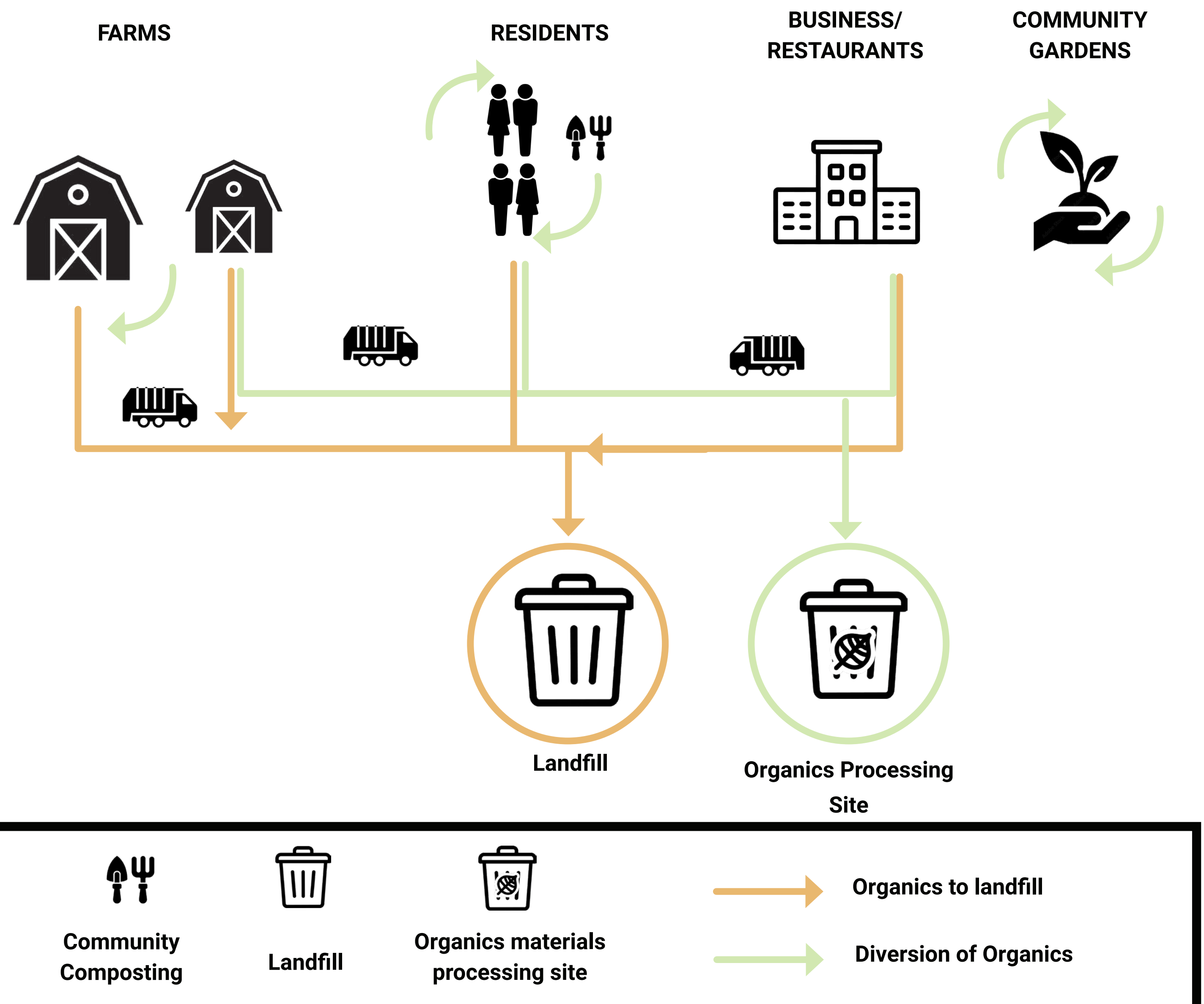

Figure 15: Flow of organic materials prior to zoning ordinance update, adapted from the Institute of Local Self-Reliance

CASE STUDY (CONT.)

Figure 14 shows the new flow of organic materials after the zoning ordinance update. Now, community composters and on-farm composters can bring in and processs organic materials from off-site. A partnership between the Department of Public Works and the Solana Center provides compost training to ensure best management practices are being used on each site.

This strengthens the local composting capacity by opening up new avenues for farms, residents, and businesses to compost their organic materials. It also creates a stronger economic base for budding compost markets and provides opportunties for new small businesses.

Reducing permitting requirements by explicitly defining acceptable land uses and materials at each composting scale allowed more small and medium-sized composting operations.

Where do organic material go *now*?

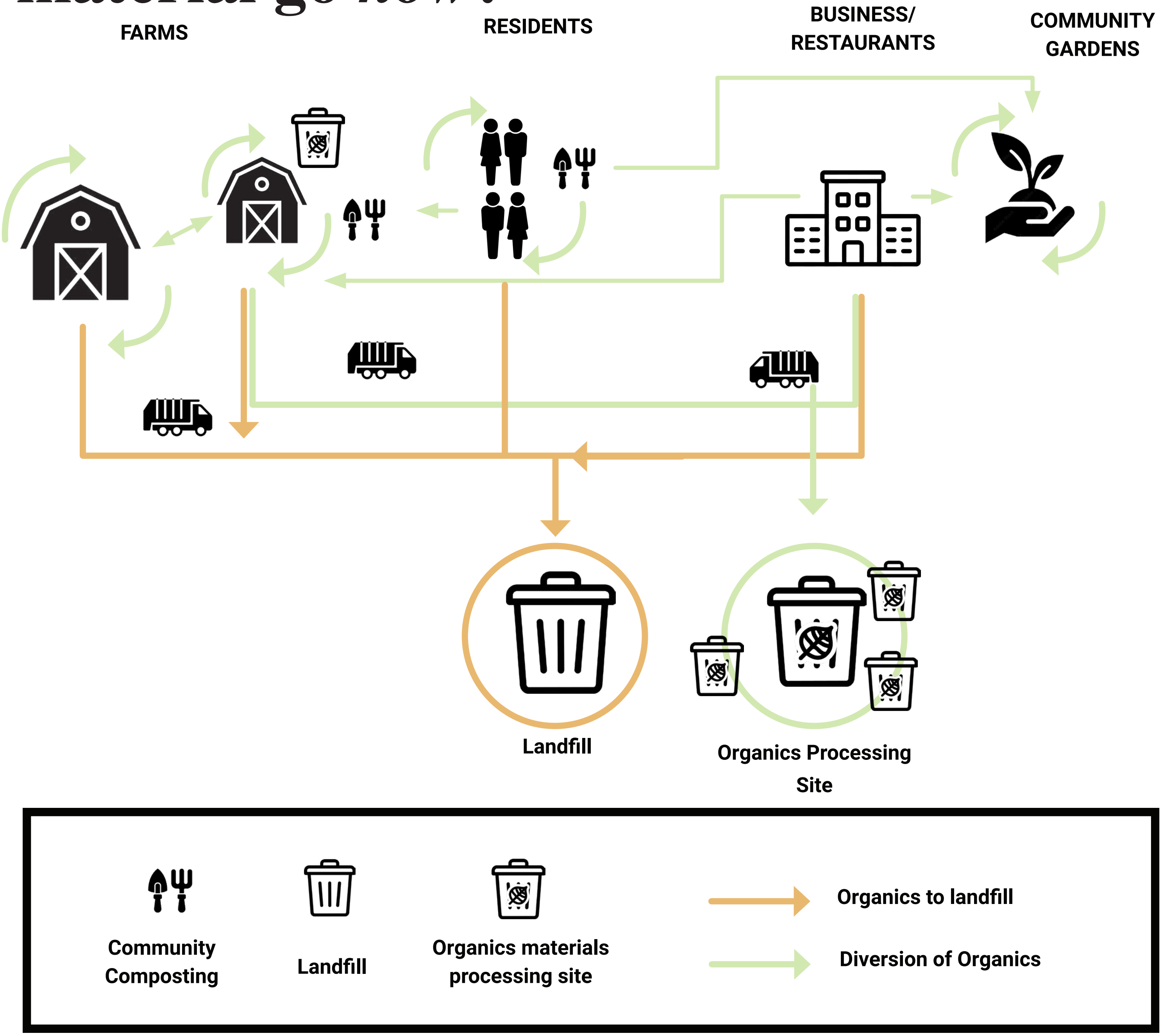

Figure 16: Flow of organic materials after ordinance update, adapted from the Institute of Local Self-Reliance

Part III: A Planners Checklist

STEP 1

Assessing Community Needs & Resources

Center your community's specific goals before planning the types of compost operations and products that would support those goals. Here are some considerations to guide the preliminary assessment:

☐ **Evaluate Available Feedstock:**

- ☐ Material Type
- ☐ Volume by Type
- ☐ Seasons Available
- ☐ Stakeholders/Permissions Involved

☐ **Identify Existing and Potential Stakeholders:**

- ☐ Haulers
- ☐ Community Composters
- ☐ Agricultural Community
- ☐ Schools
- ☐ Parks
- ☐ Community, Private, or Institutional Prep Kitchens
- ☐ End-users

☐ **Consider Public Education & Engagement Opportunities:**

- ☐ Public Events
- ☐ Education Programs
- ☐ Youth Programs
- ☐ Source Separation

☐ **Identify New Opportunities to Improve Food Access:**

- ☐ Food Security Assessment
- ☐ Existing/Potential Community Garden Networks
- ☐ Urban or Peri-urban Farms and Agricultural Producers
- ☐ Government, Citizen Groups, and NGOs Working on Farm-to-School Food Programs

☐ **Identify Environmental Justice Concerns:**

- ☐ Water Contamination
- ☐ Air Quality Issues
- ☐ Urban Heat Island Effect
- ☐ Access to Green Space

☐ **Identify Brownfield Remediation Potential:**

- ☐ Brownfield Location and Ownership
- ☐ Ecological Restoration Projects
- ☐ Soil Erosion Issues
- ☐ Local Ecological Advocacy Groups

☐ **Consider Composting for City or County Parks:**

- ☐ Potential Municipal Uses for Compost
- ☐ Municipality Wastewater and Climate Goals
- ☐ Municipal Landscaping Costs Associated with Water, Fertilizer, and Compost Purchase
- ☐ Tree Plantings and Open Spaces

☐ **Identify Job Creation Goals & Potential Partners:**

- ☐ Jurisdictional Green Job Goals
- ☐ Existing Community Composters
- ☐ Labor Groups

☐ **Identify and Evaluate Existing and Potential Markets & End Uses:**

- ☐ Parks
- ☐ Golf Courses
- ☐ Landscaping Businesses
- ☐ Agriculture
- ☐ Natral Landscapes
- ☐ Erosion Control
- ☐ Fire Remediation
- ☐ Conservation
- ☐ Roadside Maintenance
- ☐ Other Municipal Projects

STEP 2

Evaluate Key Considerations

Focus on the following main considerations that will influence the logistics and overall success of composting programs:

☐ Mapping Feedstock Availability:

- ☐ Collect data on seasonal feedstock availability in your area to estimate necessary processing capacity and help determine ideal size and type of composting operation(s)*
- ☐ Take stock on the feedstock materials available in your area:
  - ☐ Food scraps, food processing & post-consumer food materials
  - ☐ Green materials
  - ☐ Other woody biomass
  - ☐ Agricultural materials

☐ Building Stakeholder Support:

- ☐ Engage with and connect existing and potential stakeholders
- ☐ Collate individual stakeholders' goals and concerns
- ☐ Collaborate with/involve stakeholders at each stage of the compost lifecycle:
  - ☐ Generators
  - ☐ Haulers
  - ☐ Composters
  - ☐ End users
  - ☐ Relevant governmental/regulatory agencies
- ☐ Consider supplemental options for composting sites:
  - ☐ Community gardens
  - ☐ Schools
  - ☐ Parks
  - ☐ Farms
  - ☐ Other: ____________________

☐ Planning For End Use Compost Application:

- ☐ Understand ecologically relevant projects that could be supported through compost application
  - ☐ ____________________
  - ☐ ____________________
- ☐ Ensure technical assistance and equipment availability for spreading compost
- ☐ Tap into existing organizations and communities that are experienced in composting application
  - ☐ ____________________
  - ☐ ____________________
- ☐ Support consistent and sustainable funding for application

☐ Building Stacked and Circular Economies:

- ☐ Consider industries and markets that could be complementary to compost creation and application:
  - ☐ Food industries
  - ☐ Fiber industries
  - ☐ Plant nurseries
  - ☐ Agricultural industries
  - ☐ Farmers markets
  - ☐ Landscaping companies
  - ☐ Other: ____________________

*See Appendix C for more guidance on Feedstock Assessments.

STEP 3

Utilize Existing Planning Tools to Support Composting Programs

Determine what planning tools are at your disposal:

☐ Zoning Codes:

- ☐ Determine whether "composting" is an approved land use in your zoning code:
  - ☐ Yes
  - ☐ No
- ☐ Determine cost of Conditional Use Permits in your region
  - ☐ $____________________
- ☐ Modify municipal codes to allow small-scale low impact operations "by-right" approval
- ☐ Consider zoning changes that integrate composting into the landscape

☐ Funding Opportunities:

- ☐ Advise potential composters and land stewards on upcoming grant opportunities
  - ☐ ______________________________
  - ☐ ______________________________
  - ☐ ______________________________
- ☐ Apply for grants that support goals that could align with composting:
  - ☐ Emissions Reductions
  - ☐ Brownfield Remediation
  - ☐ Water Quality Improvement
  - ☐ Economic Development
  - ☐ Other: ____________________________
- ☐ Leverage SB 1383 procurement requirements to support diverse, locally produced compost products
- ☐ Consider public-private partnerships that support multiple goals
  - ☐ ______________________________
  - ☐ ______________________________
  - ☐ ______________________________

☐ Community Collaboration:

- ☐ Use your expansive planning network to build support for prospective composting projects
- ☐ Connect composters to potential community allies, permitting resources, and relevant government professionals:
  - ☐ ______________________________
  - ☐ ______________________________
  - ☐ ______________________________
  - ☐ ______________________________
- ☐ Advocate to local, regional, and state agencies to facilitate permitting processes for composting operations:
  - ☐ ______________________________
  - ☐ ______________________________
  - ☐ ______________________________
  - ☐ ______________________________

☐ Access to Utilities:

- ☐ Support composters, particularly those in rural areas, in accessing utilities
  - ☐ Water
  - ☐ Electricity
  - ☐ Gas
- ☐ Provide public resources
- ☐ Indicate potential funding avenues

STEP 4

Consider Community, On-Farm, or In-Park Composting

Tailer the development of decentralized composting to meet your community's priorities.

☐ **Harness Benefits Unique to Community, On-Farm, and In-Park Composting:**

- ☐ Community Engagement and Education
  - ☐ ____________________
  - ☐ ____________________
- ☐ Increased Accessibility
  - ☐ ____________________
  - ☐ ____________________
- ☐ Activation of Public Space
  - ☐ ____________________
  - ☐ ____________________
- ☐ Cleaner Compost Products
  - ☐ ____________________
  - ☐ ____________________
- ☐ Improved Community
  - ☐ ____________________
  - ☐ ____________________
- ☐ Connectivity During Disasters
  - ☐ ____________________
  - ☐ ____________________
- ☐ Activation of Local Composting Markets
  - ☐ ____________________
  - ☐ ____________________
- ☐ More Affordable Compost
  - ☐ ____________________
  - ☐ ____________________
- ☐ Alternative Income Sources
  - ☐ ____________________
  - ☐ ____________________

STEP 5

Improve Overall Circular Compost Planning Frameworks

Aligning composting goals, policies and strategies with the following frameworks will strengthen existing or prospective composting programs:

☐ Shift Compost Strategies from Waste Diversion to Resource Management:

☐ Create new avenues for compost strategies outside of existing waste systems

- ☐ ______________________________
- ☐ ______________________________
- ☐ ______________________________

☐ Consider composting strategies that meet multiple community needs and goals

- ☐ ______________________________
- ☐ ______________________________
- ☐ ______________________________

☐ Provide increased opportunities for more community members to participate in the creation of compost

- ☐ ______________________________
- ☐ ______________________________
- ☐ ______________________________

☐ Plan for the full lifecycle of compost, including compost application to soils

- ☐ ______________________________
- ☐ ______________________________
- ☐ ______________________________

☐ Recirculate Nutrients and Close Nutrient Loops:

☐ Center compost policy around improving soil health

- ☐ ______________________________
- ☐ ______________________________
- ☐ ______________________________

☐ Consider the nexus between urban and rural nutrient loops when planning for compost creation and application to soils

- ☐ ______________________________
- ☐ ______________________________
- ☐ ______________________________

☐ Leverage regional recirculation of nutrients to support place-based bioeconomies

- ☐ ______________________________
- ☐ ______________________________
- ☐ ______________________________

☐ Expand potential compost application projects beyond just urban community gardens.

- ☐ Food Systems
- ☐ Fiber Systems
- ☐ Landscaping Projects
- ☐ Conservation Projects
- ☐ Disaster Prevention Projects
- ☐ ______________________________
- ☐ ______________________________
- ☐ ______________________________

Compost Language in Planning Documents

This section highlights good examples of goals, policies, and programs in both Climate Action Plans and General Plans.

California Climate Action Plans

County of Santa Barbara CAP:

This CAP included plans to pilot a "Compost Application Expansion Program." The program will allow the county to study the application of compost on rangeland and orchards for improved vegetation, soil health, and carbon storage and use the results to guide future planning processes.

The City of San Jose CAP:

San Jose is the first municipality in California to go as far as to add a Natural and Working Lands Element to their CAP. Compost application is called out as a primary regenerative agricultural and urban greening strategy. The strategy is supported by cost assumptions and place-based land management analyses.

City of Fremont CAP:

This CAP highlighted policies that promote the use of locally produced compost in landscape projects to improve soil health, sequester carbon, and manage water efficiently while addressing erosion and weeds. One strategy specified the need to require contractors to meet California's Water Efficient Landscape Ordinance by incorporating compost in new and renovated landscapes. Lastly, the plan calls to establish communal compost hubs to provide free access for urban farms, community groups, and food growers, enhancing flood and drought resilience.

City of Oceanside CAP:

The city plans to expand and support composting programs at all levels, including schools, commercial facilities, and households, while educating landscapers about the cost savings and benefits of utilizing composting facilities. The city also plans to develop food scrap diversion programs with an explicit hierarchy that prioritizes prevention first, feeding people second, converting material to animal feed, and composting as a last resort. The plan calls to promote organics diversion through outreach, incentives, reduced barriers to composting, and development of local composting sites with a focus on urban greening and community gardens and composting centers. Lastly, the plan calls to advance carbon capture and soil health through strategies such as compost-based soil amendments and carbon farming.

City of San Diego CAP:

This plan focuses on catalyzing markets for compost. Through their SB 1383 procurement requirement target, they aim to purchase compost for municipal green space maintenance, including street easements and parks. They note that this endeavor is to "expand the demand and production of high quality compost in the city." They also plan to partner with industries to increase compost and mulch application for uses including landscaping, stormwater, and water conservation.

California General Plans

City of Berkley GP:

“Continue to make the City’s composted waste available to community and school gardens… Promote seed distribution, lead testing, and composting programs for community gardens… Provide sites for local farmers’ markets and community gardens.”

City of Chico GP:

“Support the Chico Area Recreation and Parks District and other local gardening or agricultural organizations that promote community gardens by offering classes such as gardening and composting and by allowing community gardens at their facilities.”

City of Culver City GP:

“Expand mulching and composting activities on city land to promote soil health and retain water on irrigated landscapes” A section dedicated to storing carbon in urban ecosystems includes compost application on parks and open spaces and specifies its potential to drive a local market for compost.”

City of Los Angeles GP:

“Develop a comprehensive urban agriculture program that removes barriers and supports the development of a local urban agriculture system (including community gardens)... Ensure that processes include criterion for assessing soil and water safety and promotes composting and healthy soil use, water efficiency and allow for innovations in food growing rules and procedures.”

County of Los Angeles GP:

“The Environmental Stewardship Program aims to reduce the Department of Parks and Recreations’ environmental footprint including, among other impacts, air pollutants that are produced through direct and indirect operations… Increase the use of environmentally-friendly products, and expand its recycling, composting, and mulching programs.”

City of Monterey Park GP:

“Mitigate landslide risks in Monterey Hills from increased precipitation associated with climate change by prioritizing the improvement of drainage, reconstructing aging retaining walls, installing netting and vegetation, avoiding clear cutting, and stabilizing the soil after tree clearing with compost and mulch.”

City of Richmond GP:

“Adopt guidelines and best practices to enhance long-term fiscal and environmental sustainability in the maintenance, renovation and upgrading of parks, recreational facilities and trails in the City. Include guidelines for the types of vegetation, use of recycled water, composting or in-place decomposition of plant cuttings to minimize environmental impacts.”

County of Ventura GP:

“Promote value-added alternatives to solid waste management, such as compost, energy, biochar, and wood products to avoid open burning of agricultural biomass wastes… Encourage farmers to reduce fertilizer application and transition to products that reduce or avoid nitrous oxide (N2O) emissions, such as organic composting and enhanced efficiency fertilizers… Encourage and support the efforts of resource conservation districts, farmers, and other stakeholders to expand carbon farming practices, such as reduced tilling, cover cropping, composting, biochar, and other activities that both reduce greenhouse gas (GHG) emissions and increase carbon sequestration and storage, when feasible.”

Citations

Part 1: A Planner's Guide to Compost

1 "Composting in WARM" (EPA, May 2012), https://19january2017snapshot.epa.gov/sites/production/files/2016-03/documents/cmpstng_ovrview.pdf.

2 Steven Heisey et al., "A Single Application of Compost Can Leave Lasting Impacts on Soil Microbial Community Structure and Alter Cross-Domain Interaction Networks," Frontiers in Soil Science 2 (April 5, 2022), https://doi.org/10.3389/fsoil.2022.749212

3 Libohova, Z., Seybold, C., Wysocki, D., Wills, S., Schoeneberger, P., Williams, C., Lindbo, D., Stott, D., & Owens, P. R. (2018). Reevaluating the effects of soil organic matter and other properties on available water-holding capacity using the National Cooperative Soil Survey Characterization Database. Journal of Soil and Water Conservation, 73(4), 411–421. https://doi.org/10.2489/jswc.73.4.411

4 "California's Climate Progress on SB 1383," CalRecycle, accessed June 10, 2025, https://calrecycle.ca.gov/organics/slcp/progress/.

5 Jennifer Marston, "Food Waste Reduction Targets 'out of Reach' without Major Changes to State-Level Policy, Say UC Davis, Refed," AgFunderNews, January 14, 2025, https://agfundernews.com/food-waste-reduction-targets-out-of-reach-without-major-changes-to-state-level-policy-say-uc-davis-refed.

6 "On-Farm Compost Resources," California Department of Food and Agriculture, accessed June 10, 2025, https://www.cdfa.ca.gov/healthysoils/ofcwg.html.

7 Raju Lal Bhardwaj et al., "An Alarming Decline in the Nutritional Quality of Foods: The Biggest Challenge for Future Generations' Health," Foods 13, no. 6 (March 14, 2024): 877, https://doi.org/10.3390/foods13060877.

8 Molly Armus, Allison Fabrizio, and Carlin Molander, rep., A Brown Cloud Over the Golden State: How Dairy Digesters Are Driving CAFO Expansion and Environmental (Friends of the Earth, 2024).

9 Arbor J.L Quist, Jill E Johnston, and Mike D Fliss, rep., Disparities of Industrial Animal Operations in California, Iowa, and North Carolina (Earth Justice, 2022).

10 Thomas Harter et al., rep., Addressing Nitrate in California's Drinking Water: With a Focus on Tulare Lake Basin and Salinas Valley Groundwater, 2012.

11 Nina G. Domingo et al., "Air Quality–Related Health Damages of Food," Proceedings of the National Academy of Sciences 118, no. 20 (May 10, 2021), https://doi.org/10.1073/pnas.2013637118.

12 Kelly Gravuer, rep., Compost Application Rates for California Croplands and Rangelands for a CDFA Healthy Soils Incentives Program, 2016.

13 "USCC Factsheet: Using Compost in Stormwater Management" (US Composting Council , 2008), https://www.sandiego.gov/sites/default/files/legacy/environmental-services/pdf/miramar/CompostStormwaterManagement.pdf.

14 "Erosion Control Toolbox: Compost," Erosion Control Toolbox: Compost | Caltrans, November 2019, https://dot.ca.gov/programs/design/lap-erosion-control-design/tool-1-lap-erosion-control-toolbox/tool-1k-11-compost.

Citations

Part 1: A Planner’s Guide to Compost (Cont.)

16 rep., Protecting Californians From Extreme Heat: A State Action Plan to Build Community Resilience (State of California, 2022).

17 Alondra Sierra and Sophia Hosain, “Local Composting Integral to Reducing Urban Heat Island Impacts,” BioCycle, September 13, 2022, https://www.biocycle.net/local-composting-integral-to-reducing-urban-heat-island-impacts/.

18 Angel Hsu et al., “Disproportionate Exposure to Urban Heat Island Intensity across Major US Cities,” Nature Communications 12, no. 1 (May 25, 2021), https://doi.org/10.1038/s41467-021-22799-5.

19 “Air Temperatures,” Indicators of Climate Change In California, July 2024, https://oehha.ca.gov/climate-change/epic-2022/changes-climate/air-temperatures.

20 “Post-Fire Soil Safety Webinar” (University of California ANR, October 17, 2020), https://ucanr.edu/sites/SoCo/files/337663.pdf.

21 Sally Brown, “Connections: Recycled Organics and Fire-Ravaged Soils,” BioCycle, September 2020, https://www.biocycle.net/connections-recycled-organics-and-fire-ravaged-soils/.

22 David M Crohn, Vijayasatya N Chaganti, and Namratha Reddy, “Composts as Post-Fire Erosion Control Treatments and Their Effect on Runoff Water Quality,” Transactions of the ASABE 56, no. 2 (2013): 423–35, https://doi.org/10.13031/2013.42692.

23 “COMPOST PRODUCTS USED ON FIRE DAMAGED LAND” (The State Water Resource and Conservation Board, n.d.), https://www.waterboards.ca.gov/rwqcb8/resources/docs/compost_use_guidance_document_1.pdf.

24 Publication, Analysis of the Progress Toward the SB 1383 Organic Waste Reduction Goals (California Department of Resources Recycling and Recovery, 2020).

25 Brian Larimore and Gregory Balzer, “California Agencies Partner to Increase Compost Use on Roadsides,” BioCycle, March 23, 2007, https://www.biocycle.net/california-agencies-partner-to-increase-compost-use-on-roadside/.

26 Marissa Heffernan, “California’s Composting Mandate Drives Market Growth,” Resource Recycling News, March 2024, https://resource-recycling.com/recycling/2024/01/05/californias-composting-mandate-drives-market-growth/.

27 For more information on compost markets, please see our other publication at https://peoplefoodandland.org/

28 Interview with Ken Murray, CalTrans, April 2025

29 Interview with Leo Beckerman based on Compost Connector invoices, Zero Foodprint, March 2025.

Citations

Part 2: Steps to Successful Circular Compost Planning

30 Kellyx Nelson, “Cutting Green Tape,” California Landscape Stewardship Network, accessed January 29, 2025, https://calandscapestewardshipnetwork.org/cutting-green-tape.

31 For more information on the specific permitting and cost barriers new composting sites face, please see our other publication at https://peoplefoodandland.org.

32 Visit the Institute for Local Self-Reliance at https://ilsr.org/articles/pomona-ca-composting-zoning/

33 Model Municipal Zoning Ordinance on Community Composting (NRDC, 2024), https://www.nrdc.org/sites/default/files/2024-05/model-municipal-zoning-ordinance-community-composting.pdf.

34 Cole Rosengren, “California’s Local Governments Grapple with Financial and Logistical Demands of Organics Recycling Law,” Waste Dive, June 23, 2022, https://www.wastedive.com/news/sb-1383-part-three-california-local-government-budget-pandemic/625818/.

35 According to CalRecycle’s “SB 1383 Infrastructure and Market Analysis” published April 2019

36 According to Nick Lapis from Californians Against Waste.

37 Brendan P. Harrison et al., “Quantifying the Farmland Application of Compost to Help Meet California’s Organic Waste Diversion Law,” Environmental Science & Technology 54, no. 7 (March 12, 2020): 4545–53, https://doi.org/10.1021/acs.est.9b05377.

38 Sophia Jones and Megan Matthews, “California – San Diego Zoning for Community Composting,” Institute for Local Self-Reliance, May 23, 2023, https://ilsr.org/articles/sandiego-california/.

Appendix

Appendix A:

How *does* compost work

A primer by

Dr. Alexia Cooper

Compost enhances soil health through a combination of biological, chemical, and physical mechanisms that interact synergistically within the soil environment.

Physical Mechanisms:

The addition of compost improves soil structure by enhancing aggregation and porosity, leading to enhanced water retention and reduced erosion (Gonzalez & Cooperband, 2002; Lynch et al., 2005). These changes reduce soil compaction and facilitate water infiltration, which is critical for maintaining productivity in dryland systems. Improved soil structure also aids in root penetration and reduces erosion. Research indicates that compost mulches can increase soil organic matter content, available phosphorus, and exchangeable potassium, while also improving porosity and water retention capacity.

Biological Mechanisms:

By introducing organic matter, compost serves as a substrate for soil microorganisms, playing a central role in nutrient cycling. Microbial activity decomposes organic materials, converting them into plant-available forms, thereby improving soil fertility and promoting vegetation growth. It enhances microbial activity, supporting processes like decomposition and nutrient mineralization (Heisey et al., 2022). This boost in biological activity is critical for degraded soils, where microbial communities may be depleted. Studies have shown that compost application can significantly shift microbial soil communities over multiple cropping cycles, enhancing nutrient availability and plant health (Ros et al., 2006).

Chemical Mechanisms:

Compost contributes to the stabilization of organic matter in soils through dynamic interactions driven by microbial activity and chemical processes (Anthony et al., 2024; Jain & Kalamdhad, 2020). As compost decomposes, organic compounds are transformed into simpler molecules, with some being mineralized and released as carbon dioxide while others become chemically bound to soil minerals or form complex organic structures that persist in the soil over time. These stabilized organic compounds are vital for improving soil properties, including nutrient retention and carbon storage.

Appendix A:

Compost 101

Much like a baked cake is fundamentally different from its original ingredients, compost is the result of a managed process that transforms organic materials. Unlike rot and decay, which occur in nature without human or animal influence, compost requires careful management to happen. This management is rewarded with a versatile soil amendment that enhances soil health through a combination of biological, chemical, and physical mechanisms that interact synergistically within the soil environment.

While there are many different varieties, compost is made when the original organic materials have been digested, either by worms or microbes. Because worm, or vermicomposting, is regulated under agriculture in California and because it requires a very specific and narrow range of temperature gradients, it is less relevant in widespread compost creation. This guide therefore focuses on thermophilic microbial composting. “Thermophilic” is derived from two Greek words which translate to “heat loving.” It is an oxygen-driven microbiological heating process whereby microorganisms consume all present materials, metabolizing them, binding carbon and nutrients together in the process to form new organic compounds.

As shown in Figure 1, thermophilic composting includes a feeding stage, an active "cooking" stage, and a curing stage. During the composting process, the pile must hit certain mesophilic (50 to 105 degrees F) and thermophilic (above 105 degrees F) temperatures and then rest for a sufficient time period to be considered finished (biochemically stable). Reaching these temperatures is crucial in reducing the viability of harmful bacteria, pathogens and seeds, as well as stabilizing carbon into a form that can support plant growth. A properly "cooked" compost can be safely applied as a soil amendment without fear of spreading weed seeds or food-borne illnesses. Curing time is also crucial as only a properly "cured" compost can be applied without burning existing plant communities and seed banks.

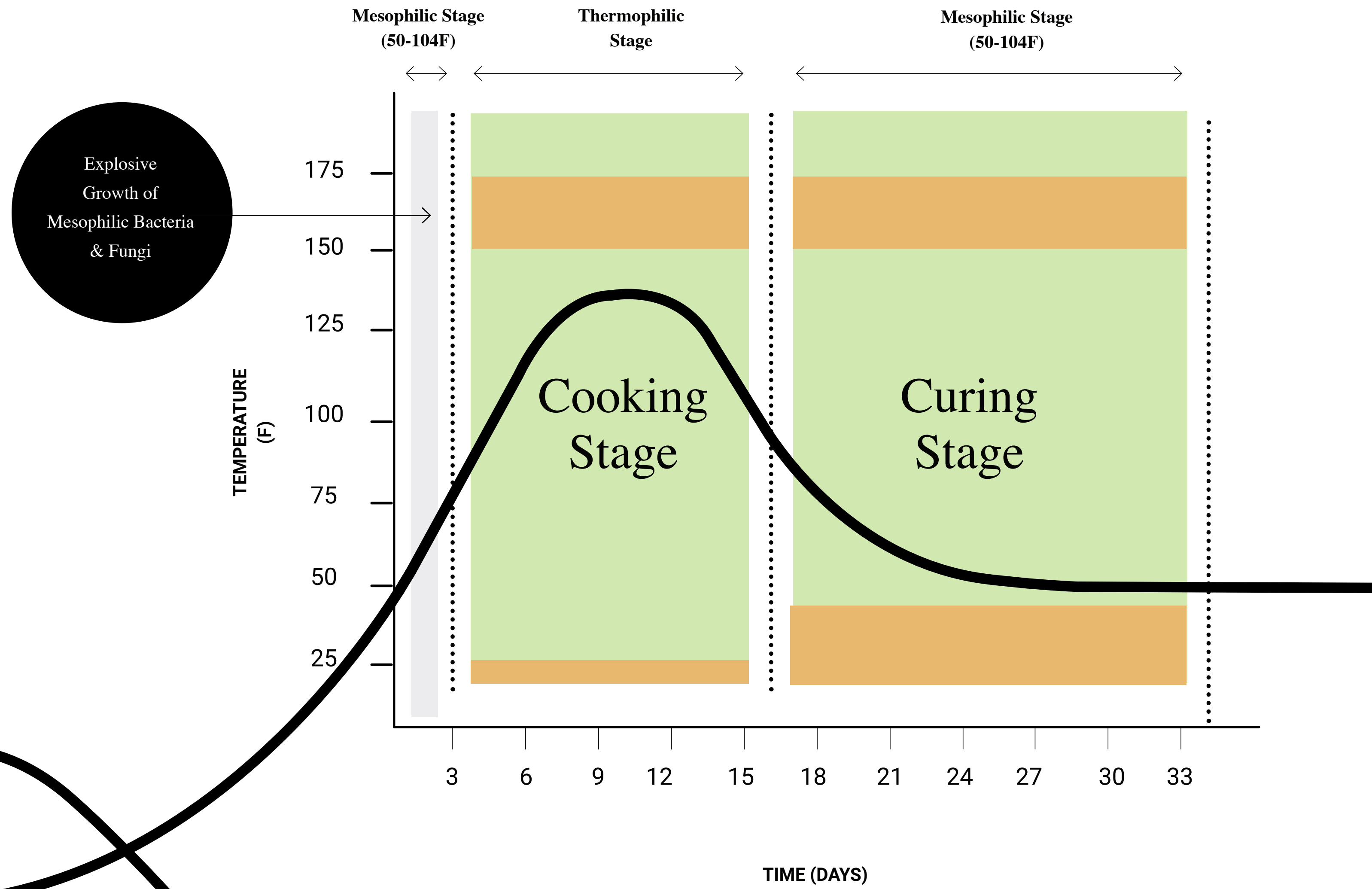

Figure 1:
The Stages of the Composting Process. Adapted from ILSR Home Composting Basics.

All organic materials are "compostable," however, unless the material has gone through the controlled thermophilic composting process, it is not compost.

The food scraps in a bucket are not compost. The manure in a pile at the side of the barn is not compost. It is also important to be aware that not all materials have the same degree of "compostability."

When considering "zero waste" strategies such as replacing plastic items with compostable to-go ware, note that while unlined paper or traditional cardboard may break down in community size compost piles, compostable plastics or lined paper products will not. These harder-to-compost items require commercial-scale facilities or sites where composting materials can reach high enough temperatures for long periods of time. Without these conditions, "compostable" materials will not properly break down.

However, even large-scale facilities often do not accept many to-go products labeled "compostable" due to difficulties in degradation.

CAUTION: Many "compostable" plastics still contain petroleum plastics. Petroleum-based polycarbonates and other polymers break down into microplastics, which pose a significant and increasing environmental and public health concern.

Understanding feedstocks

Organic materials used to make compost are commonly called “feedstocks.” Compost producers must combine proper quantities of carbon-rich feedstock (such as woody biomass and landscape materials) and nitrogen-rich feedstock (such as food material and manure) along with the right amount of moisture and proper aeration to achieve optimal thermophilic composting conditions. A general rule of thumb for compost creation is 3 parts carbonaceous to 1 part nitrogenous by volume, however nitrogenous materials can go higher if well managed in smaller quantities. **The ratio of carbon to nitrogen, known as the C:N ratio**, is important in “mixing” organic feedstocks at the start of the composting processes and is an important determinant of how a finished product should be optimally used.

Compost producers can create different compost products that suit specific land management needs by selecting the qualities and quantities of feedstock material. For example, a high nitrogen compost is ideal for the agricultural production of row crops because the management goal is to increase plant growth, which requires higher amounts of nitrogen. On the other hand, higher carbon compost is better suited for application on open space and rangelands because the goal is to enhance soil structure, increase water infiltration, and increase organic matter without causing a flush of plant growth.

ATTENTION PFAS! PFAS chemicals, or per- and polyfluoroalkyl substances have become a growing concern for composters due to their persistence and accumulation in the environment and their associated health risks. PFAS has been linked to various health issues, including hormone disruption, immune system suppression, and an increased risk of certain cancers. These synthetic chemicals, often referred to as “forever chemicals,” are commonly found in products like food packaging, nonstick coatings, and industrial materials. PFAS can leach out of their source material into surrounding organic materials, contaminating compost. The presence of PFAS in compost challenges its use in agriculture, as it may introduce these harmful substances into the food chain. To address this issue, some states and organizations are working to limit PFAS-containing materials in composting streams and to develop testing and remediation methods for contaminated compost.

Compost derived primarily from agricultural sources, such as crop residues, livestock manure, and plant-based organic materials, is generally less likely to contain PFAS compared to compost that includes high rates of contamination from urban or industrial waste streams. PFAS contamination is most commonly associated with the following materials: food packaging, industrial waste (including biosolids and waste water), textiles, carpeting, or other household items that may have been treated with PFAS.

The good news is that recent research is showing promise in fungal and microbial treatments for PFAS contaminated materials, with one study from Texas A&M AgriLife Research finding between 98% and 99% degradation from white rot treatment.

Appendix C:

A Planner's Guide to Assessing Feedstocks

To understand the potential for compost creation in and around your community you will first need to assess available organic material feedstocks. These may include (but are not limited to) municipal and commercial food waste, green materials, agricultural woody biomass, agricultural manures, forestry and fire fuel load residues, and biosolids.

Organic Material Types and Where to Find Them

Begin by gathering macro-level data related to organic material types and production volumes in and around your community. As you go through this data discovery and collection process you will need to track total existing and potential volumes of feedstocks by their location or origination points as well as the total compost, mulch, biochar or other bioresource that are currently being generated. This data will help you plan for expansion of existing infrastructure, locate new infrastructure, assess opportunities for community and on-farm composting, and calculate GHG benefits in the next steps.

Questions to be answered include:

What volume of each organic materials type is generated?

Who is the generator and where are they located?

Is a beneficial soil amendment or other bioresource currently being made from these feedstocks? If so, how much?

How much more compost, mulch, or biochar could be created with full capture of available materials?

Organic Material Types

Food waste (N): In the hierarchy of zero waste, food appropriate for human consumption should be made available to food scarce populations. Food that has spoiled or is no longer suitable for human consumption can be captured for compost.

DATA SOURCES: Sources of this nitrogen-rich feedstock may include regional food processors, commercial establishments such as restaurants, institutions like hospitals, schools, or prisons, and food rescue organizations such as food banks, etc.

Food Scraps (N): This includes bits or pieces of food, leftovers, or discarded food.

DATA SOURCES: Sources include individual households/residents, restaurants, and public institutions and commercial business with cafeterias such as schools, hospitals, and prisons.

Appendix C (Cont.)

Municipal Yard & Green Waste (C): This includes grass, grass clippings, bushes, shrubs, and their clippings from residential, commercial/retail, institutional, public spaces, or industrial sources. These materials are also generated via private properties and business and government agencies involved with maintaining yards, roads, parks or other private or public lands. NOTE: Greenwaste does not include (i) construction, renovation, and demolition wastes or (ii) clean wood.

DATA SOURCES: The most common way to identify total volumes for food scapes, food waste and municipal green waste materials are waste characterization or waste composition studies. These may be housed with the city or county Department of Sanitation, Public Works, Parks, Environment or Human Services agencies. Local Food Banks, community composters, waste haulers, and landscapers will also have a good sense of regional production or major sources of these feedstocks. You may decide to contract out for a waste characterization if one is not available. The US EPA also maintains a database of commercial food waste generation volumes by site and list of existing state and local Waste Characterization Studies. [1]

1 https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/state-and-local-data-about-materials-waste-and

Animal Manure (N): Manure from local horse stables and racetracks and cow, chicken, or hog operations may be a rich source of material. However, access to these materials may be dependent upon state regulation.

DATA SOURCES: It is possible to estimate manure generated from animal operations given the number and type of animals that occupy your local agriculture area. Horses, cows, pigs, and chickens are the most common. It also may be difficult to assess the amount available as, unlike hauled municipal organics, it is unlikely to come with a tip fee as generators either use it on-site or land-apply for no to minimal charge. Local small-scale haulers or landscapers may be willing to share information on truckloads of manure that they move.

Agricultural Woody Waste (C): Agricultural woody waste is directly related to the growing crops or raising animals and is the unwanted or unsalable materials produced from these operations.

DATA SOURCES: This waste stream may be challenging to assess, as regular reports of available materials do not yet exist. This material may not be readily available for use as many agricultural materials are repurposed by farmers back into their systems. However, the local Agricultural Extension Program, Land Grant University or Crop Report may have data available for public use.

Appendix C (Cont.)

Forestry Debris & Wood Waste (C): Given the many detrimental effects climate change has on forest and tree populations (e.g. insects, pathogens, heat stress) and lack of proper fire management over the past century, many forests are sick and will require thinning, controlled burns, and other management. Woody material from surrounding forests or urban blights may create a heavy volume of this material in your community or nearby peri-urban or rural areas. These materials offer a valuable carbon source to balance out nitrogen-heavy feedstocks such as urban food waste and agricultural manures. Woody biomass, if clean, can be chipped into mulch—another valuable soil cover.

DATA SOURCES: Data from forestry debris can be estimated by researching anticipated tree mortality and associated volumes, scheduled thinning, and availability of dead wood stock from urban and non-urban forests. Local or regional USDA Forest Service Offices and Resource Conservation Districts, also known as Soil and Water Conservation Districts should have this information. In California, state agencies such as the California Air Resources Board and California Energy Commission have conducted woody biomass availability studies, though these are high-level and may not prove useful to local planning. Local landscapers and tree removal businesses may be able to provide a snapshot of availability and destination of these materials. While not an essential data point, it is one worth considering for jurisdictions that do not have ready Carbon sources such as dense urban forests, are located in arid climates, or experiencing large forest transitions and urban forest blights. Areas vulnerable to increased wildfire risk, such as in the Southwest, Western US, or Rocky Mountain regions should especially consider proactive management of, and market creation for, this material.

Biosolids: Biosolids are a product of the wastewater treatment process when the liquids are separated from the solids. Solids are treated physically and chemically to produce biosolids—a semisolid, nutrient-rich product that can be included in compost to produce a higher-value product for soil health and farmers. The terms "biosolids" and "sewage sludge" are often used interchangeably. Biosolids are divided into "Class A" and "Class B" designations, based on class-specific treatment requirements for pollutants, pathogens, and vector attraction reduction, as well as general requirements and management practices.[2] Treatment processes for Class A biosolids eliminate pathogens, including viruses. Generally, pathogens may exist in Class B biosolids when certain requirements are met. NOTE: Although the use of biosolids currently excludes a compost or soil product from being OMRI (Organic) certified, it is already a common ingredient in bagged topsoil found in most hardware and home and garden stores around the county.

DATA SOURCES: Your department of sanitation, public utility, or waste-water treatment agency will have data on the amount of biosolids generated and their current end use.

2 https://www.epa.gov/biosolids/basic-information-about-biosolids

Mapping Materials and Sources

Once volume data on organic material type and source is collected, providing a visual representation, or "heat map," including the geographical source of materials can help you tell a comprehensive story in a compelling and simple way. Mapping the resource can also help in deciding where to support or target the development of new processing infrastructure and sites.

Example: PFL compiled the following map of food waste from commercial business, woody biomass from agriculture and forests, and dairy manure in California to assess compost's potential to supplement synthetic fertilizer needed in California agriculture.

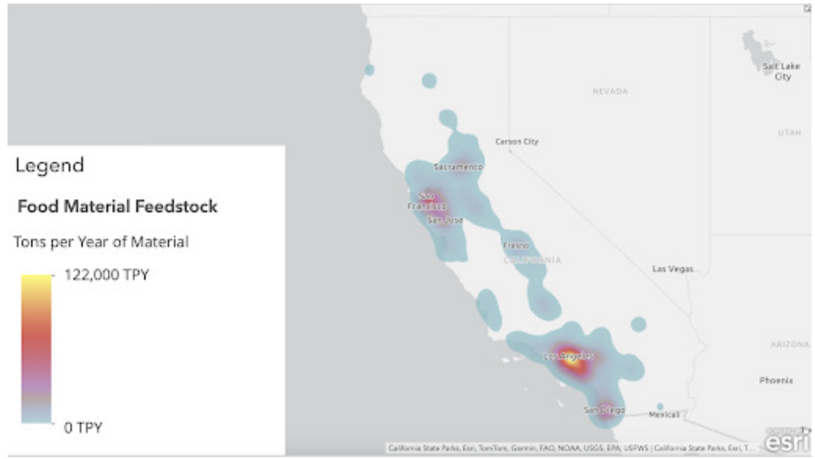

Figure 1: Food material feedstock concentrations, represented by EPA 2022 Excess Food dat

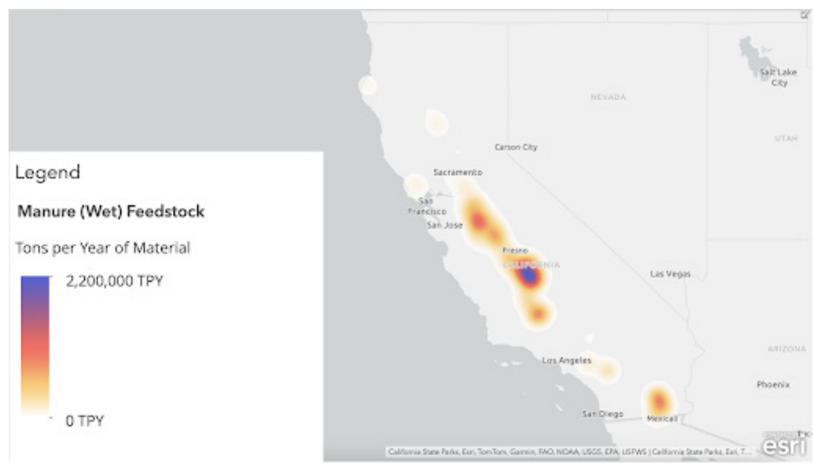

Figure 2: Concentrated Animal Feeding Operation (CAFO) cattle manure concentrations, extrapolated from The State Water Board reports.

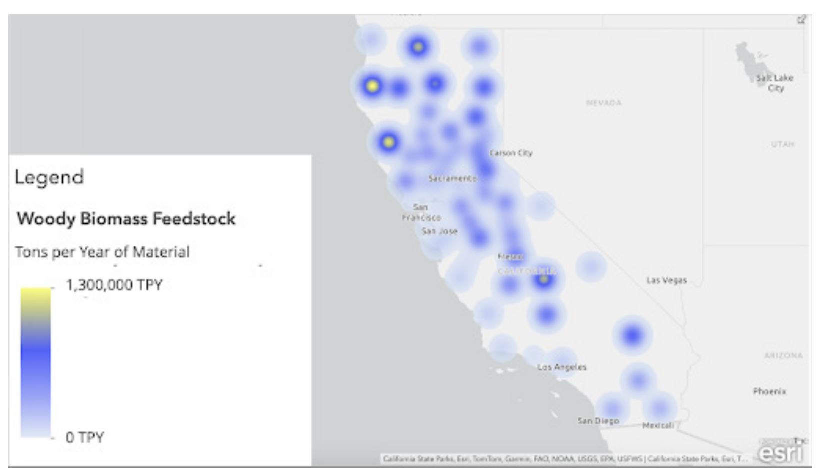

Figure 3: Agricultural and forestry woody biomass data, taken from a UC Davis report.

Appendix D:

Compost Site Sizes & Types

The size of a compost processing site is dictated by regulations that limit the amount of organic material (including both feedstock and finished compost) that can be stored on-site at any given time. **PFL defines four sizes of composting sites: small, "shmedium", medium, and commercial.** Rather than compete against each other, sites of different sizes support processing different waste streams, improve community engagement, lead to diversified compost product creation, and support a culture of composting more effectively than a one-size-fits-all approach would.

An urban community can likely make use of more than one size of compost operation, for example, developing small or "shmedium" sites with community composters while also having a commercial facility outside of city limits. An agricultural community may include all sizes; on-farm compost most often falls in the shmedium size category. However, a one-time composting event like orchard removal may reach into the medium size operation.

To visualize 100 cubic yards of compost, imagine a single standard parking space (around 10 feet by 18 feet) piled high with 15 feet of compost and feedstock materials.

Compost site sizes:

1. Small community composting sites (up to 500 cubic yards of materials)

2. Shmedium, or small-to-medium, composting sites (between 500 and 25,000 cubic yards of materials)

3. Medium composting sites (25,000 to 50,000 cubic yards of materials)

4. Large commercial composting facilities (over 50,000 cubic yards of materials)

In addition to the sizes of the composting sites, the method of composting will influence the functionality and the aesthetic of the composting operation, shaping the impact on the local community.

While there are dozens of composting methods, four main methods are most commonly used in California:

1. binned systems
2. mini-windrow systems
3. window & aerated static pile systems
4. GORE in-vessel systems.

There are various benefits and limitations to each method. Generally, small and 'shmedium' composters opt for manual systems such as bins and windrows, while larger composting systems tend to utilize more mechanized systems to reduce labor. To demonstrate what these composting sites would look like within a community, we have collected photos of existing composting sites that correlate with each of these three sizing categories and showcase different systems.

Small Binned Composting Systems

Figures 1 & 2: Three-Binned Composting System at an Urban Community Composting Site (LA Compost)

Small community composting sites generally operate with binned composting systems, such as the three-bin system shown in Figures 1 and 2. With proper signage and instruction, these binned systems are user-friendly and maintain a neat environment. The three bins generally allow for one feeding pile, one cooking pile, and one curing pile, the three main stages before a pile becomes finished compost. These systems rely on composters supporting the composting process with proper watering and aeration (or turning) of the piles at different stages of processing. A three-binned system is compact and adjustable, generally only fitting around one cubic yard of materials in each bin. This makes it ideal for locations that receive small amounts of feedstock, like a community garden, a school, or a neighborhood compost pile.

Small to Shmedium Mini-Windrow Composting

Figures 3 & 4: Mini Windrow Composting at a Park Community Composting Site (LA Compost)

Figures 5 & 6: Volunteers Turning Composting Pile and Various Piles on Site

A mini windrow system works best for sites that receive too much feedstock for the binned system and have ample access to wood chips, straw, or animal bedding. This system is an active process that relies on an attentive workforce to ensure monitoring, wetting, and aeration/ turning. Its active, hands-on nature means the compost is high-quality, properly brought through the thermophilic process, and fully cooled. With a greater capacity than the three-bin system, the mini windrow system is a good option for urban and small farms, municipal parks, or larger school systems. Other ideal locations include brownfield sites undergoing remediation, abandoned or underutilized lots, or publicly owned lands. The benefit of this system is that it can grow and shrink depending on feedstock and land availability, making it a dynamic and resilient option for growing community composting and agricultural operations.

Medium and Commercial Turned Windrow Composting & Aerated Static Piles

The most common composting method for commercial operations is some variation of the windrow method, which relies on long, tall composting piles that require regular aeration. Traditionally, composters manually or mechanically turn the piles for aeration, as shown in Figure 9 below.

Figure 7: Mechanized windrow turning at composting facility in Oceanside, 44,000 TPY (22,000 cy)

More modern or larger facilities use a light mechanization technology to create aerated static piles (ASPs) and eliminate the need for turning. ASPs eliminates the need for turning by using fans to circulate air to and from the composting piles, which can lead to reduced composting time and reduced emissions. They also often require less land for processing than traditional windrows.[1]
These systems are best for medium to large agricultural operations, large educational institutions, and commercial composting facilities with greater access to land and upfront capital. Figures 10 and 11 below show medium and large ASP operations.

Figure 8: ASP facility at the Yolo County Landfill, processes around 180,000 TPY (60,000 cy)
Figure 9: ASP facility in Vernalis, processes around 546,000 TPY (223,000 cy)

1 rep., Small/Medium Composting Project Permitting (CalRecycle, 2024).

GORE In-vessel Composting Systems

The GORE cover is a relatively new technology that aims to eliminate air emissions and expedite the composting processes, as seen in the facilities in Figures 12 and 13. It fits over a windrow pile and, equipped with an oxygen and temperature monitoring device, provides an oxygen-controlled, positively aerated system that creates ideal composting conditions while efficiently trapping odors, greenhouse gasses, and other emissions such as dust and volatile compounds. This makes GORE systems an excellent solution for composting operations in Air Pollution Control Districts facing non-attainment. The GORE system composting site in Kern, California pictured below meets all emission requirements established by the San Joaquin Valley Air Pollution Control District. GORE systems can also provide conditions that speed up the composting process to as short as 8 weeks.

Figures 10 & 11: Kern Composting Facility with GORE covers, processes about 290,000 TPY (145,000 cubic yards)

Appendix E:

Exclusive Franchise Agreements

These agreements for waste haulers grant a company the sole right to provide specified waste management services within a designated area or jurisdiction. Instituted to streamline waste collection, enhance service quality, and ensure compliance with state recycling and waste diversion mandates, they directly enable capitalization for new large commercial compost facilities. However, these exclusive contracts also tend to stifle innovation and create a barrier to entry for entrepreneurs in the organics space.

Key Features:

Sole Service Provider:

The designated waste hauler has exclusive rights to offer services like trash collection, recycling, and organic waste pickup within the specified jurisdiction.

Service Standards and Requirements:

The agreements typically outline specific service levels, including collection frequency, types of waste collected, and customer service expectations.

Rate Structures:

While the local government may set or approve service rates to ensure fairness and affordability, the waste hauler is responsible for billing and collecting payments from customers.

Contract Duration:

These agreements are usually long-term, often spanning several years, to provide stability and allow the waste hauler to invest in necessary infrastructure and services.

Compliance and Reporting:

Franchise agreements often require waste haulers to meet specific recycling and waste diversion targets, provide regular reports on waste collected and processed, and adhere to environmental regulations.

1. Limited Competition

- **Restricted Market Access:**
  By granting exclusive rights to a single waste hauler, other companies, including startups specializing in innovative composting techniques or technologies, are effectively excluded from entering the market within that jurisdiction.

- **Monopoly-Like Conditions:**
  Without competition, the exclusive hauler may lack incentives to invest in new technologies or improve efficiency.

2. Inflexibility in Contracts

- **Long--Term Agreements:**
  Many franchise agreements span several years, locking in service providers and leaving little room for the introduction of new players or methods during the contract period.

- **Predefined Processes:**
  These contracts often include rigid specifications for waste handling and processing, leaving little scope for experimenting with innovative solutions like decentralized composting, anaerobic digestion, or advanced bioconversion technologies.

3. Misalignment with Emerging Trends

Lagging Behind Innovation: Established waste haulers in exclusive agreements may prioritize compliance and cost-efficiency over adopting cutting-edge solutions, such as carbon-negative composting technologies or automated sorting systems.

Slow Adoption of Decentralized Models: Innovations like neighborhood composting hubs or app-based organic waste pickup services, which could reduce emissions and engage communities, often struggle to gain traction in areas dominated by a single franchisee.

Appendix E (Cont.)

4. Barriers to Small and Specialized Businesses

High Entry Costs: Specialized composting businesses often face prohibitive costs to enter markets with franchise agreements, including permitting, compliance, and navigating local government regulations.
Exclusion from Organics Collection: Smaller or niche providers might be excluded from collecting organic materials due to the exclusive rights granted to the franchise holder, even if they offer better environmental or economic solutions.

5. Reduced Incentives for Diversion Targets Minimal Competition-Driven Goals:

With limited market pressure, franchise haulers may focus on meeting baseline diversion targets rather than exceeding them or adopting innovative solutions that could dramatically improve organic waste diversion.

Missed Opportunities for Circular Economy: Companies offering innovative products like compostable packaging or bioenergy from organic waste may struggle to integrate their solutions within a system that prioritizes existing methods.