Journal of Agriculture, Food Systems, and Community Development
ISSN: 2152-0801 online
https://foodsystemsjournal.org

Community-based compost distribution program's role in organic waste diversion and the circular food system

SPECIAL ISSUE
Community-Based Circular Food Systems

Sponsored by
the Thomas A. Lyson Center for Civic Agriculture and Food Systems

Taylor Baisey,[a] * Kristida Chhour,[b] Isabel Cabrera,[c] and Jennifer Sowerwine [d]
University of California, Berkeley

Submitted June 12, 2024 / Revised December 7, 2024, and January 31, 2025 / Accepted February 3, 2025 / Published online April 9, 2025

Citation: Baisey, T., Chhour, K., Cabrera, I., & Sowerwine, J. (2025). Community-based compost distribution program's role in organic waste diversion and the circular food system. *Journal of Agriculture, Food Systems, and Community Development*, *14*(2), 115–144. https://doi.org/10.5304/jafscd.2025.142.011

Abstract
Nearly one-third of the entire U.S. food supply is sent to landfills. As food decomposes, it emits methane, a potent greenhouse gas that fuels global warming. To reduce greenhouse gas emissions and create a more circular food system, states across the country are mandating food waste diversion from landfills through several mechanisms, including composting. In 2016, California passed Senate Bill 1383 (SB-1383), which requires organic (including food) waste diversion from landfills in part by mandating municipal procurement of recycled organic waste products. To comply with SB-1383, the city of Albany, California, established a Compost Distribution Hub in April 2023 in partnership with an urban community farm to distribute free compost to the farm and the community. This paper investigates the successes, challenges, and initial impacts of the Compost Distribution Hub in meeting SB-1383 requirements and contrib-

[a] * *Corresponding author:* Taylor Baisey, MPH, Research Associate, Rausser College of Natural Resources, University of California, Berkeley.

Taylor Baisey is now a Research Data Analyst, Zuckerberg San Francisco General Hospital, University of California San Francisco; 1001 Potrero Avenue; San Francisco, CA 94110 USA; taylor.baisey@ucsf.edu;
https://orcid.org/0009-0006-7987-5345

[b] Kristida Chhour, M.S., Ph.D. Student, Department of Civil and Environmental Engineering, University of California, Berkeley; 631 Davis Hall; Berkeley, CA 94720-1710 USA; kristida@berkeley.edu;
https://orcid.org/0000-0001-7146-2171

[c] Isabel Cabrera, Undergraduate Student, Rausser College of Natural Resources, University of California, Berkeley; icabrera@berkeley.edu

[d] Jennifer Sowerwine, Ph.D., Associate Cooperative Extension Specialist, Rausser College of Natural Resources, University of California, Berkeley; 130 Mulford Hall #3114; Berkeley, CA 94720-3114 USA; jsowerwi@berkeley.edu;
https://orcid.org/0000-0001-9544-0903

uting to a circular food system, as well as a circular economy more broadly. Through 26 semi-structured interviews with implementing partners and community patrons and an analysis of the compost quality, we found the Compost Distribution Hub contributed to organic waste diversion requirements, provided additional social co-benefits, and contributed to the broader circular economy by recycling non-food organic waste. However, it did not contribute to a circular food system, as it sourced compost made from green waste rather than food waste. It also was unable to provide community education due to insufficient funds. To maximize community and circularity benefits, compost distribution programs must ensure that compost is sourced from food waste, incorporate community education, and dedicate funding for the educational efforts.

Keywords
compost, food waste, organic waste policy, compost distribution, Senate Bill 1383, circular food system, circular economy, climate change, qualitative study, case study, community-based circular food system

Introduction
Almost one-third (31%) of the entire U.S. food supply is sent to landfills where it releases methane, a potent greenhouse gas (GHG) that has at least 28 times the global warming potential of carbon dioxide (Agency for Toxic Substances and Disease Registry, 2001; Buzby et al., 2014; Intergovernmental Panel on Climate Change, 2023). In the U.S., landfills are the third largest source of anthropogenic methane emissions, with 58% of these emissions attributed to food waste (U.S. Environmental Protection Agency [EPA], 2023, 2024). In California, landfills—more than the agriculture, dairy, and oil and gas sectors—are the leading methane emitters, responsible for 41% of the state's point-source methane emissions (Duren et al., 2019). A major contributor to these landfill-associated methane emissions is the annual 6 million tons of food waste, which constitutes 17% of the total waste sent to landfills annually (CalRecycle, 2024).[1]

Applying the circular food system (CFS) principle of recycling food waste can be an effective strategy to curb GHG emissions (van Zanten et al., 2019, 2023). A CFS promotes planetary and human health by protecting natural resources and minimizing waste through reduction and reuse in the most sustainable way possible (Figure 1). The CFS concept derives from the circular economy (CE) framework, which has attracted significant attention from scholars and practitioners. The CE establishes closed-loop systems from production to consumption. It "tackles climate change and other global challenges, like biodiversity loss, waste, and pollution, by decoupling economic activity from the consumption of finite resources" (Ellen MacArthur Foundation, 2013, para. 1). Through a systematic literature review of 114 definitions, Kirchherr et al. (2017) defined a CE, in contrast to a "take-make-waste" linear economy, as:

> an economic system that replaces the 'end-of-life' concept with reducing, alternatively reusing, recycling and recovering materials in production/distribution and consumption processes. It operates at the micro level (products, companies, consumers), meso level (eco-industrial parks) and macro level (city, region, nation and beyond), with the aim to accom-

Author Disclosure
The research team is affiliated with both the University of California, Berkeley, and the UC Gill Tract Community Farm. The authors have no conflicts of interest that create actual, potential, or apparent conflict in roles of author.

Funding Disclosure
Financial support for this work was provided by The Green Initiative Fund, a student-fee fund of the University of California, Berkeley. This material is based upon work supported by the National Science Foundation Graduate Research Fellowship Program under Grant No. 2146752. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

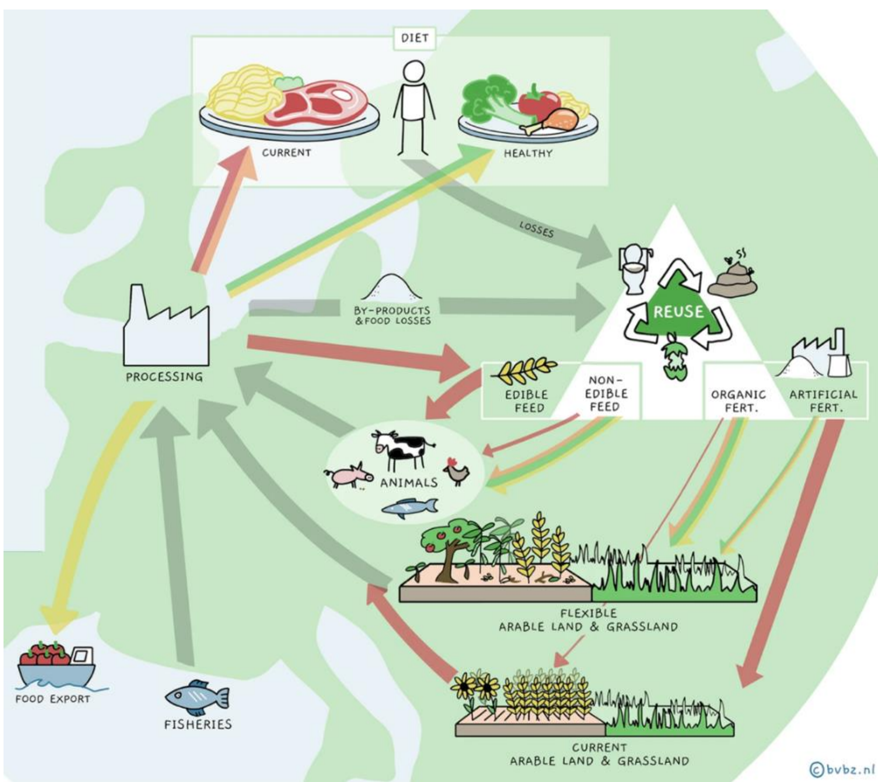
[1] Organic waste accounts for 28.4% of the total waste disposed of in California landfills. Non-food organic waste includes plant matter (leaves, branches, logs) and wood products (CalRecycle, 2024).

plish sustainable development, thus simultaneously creating environmental quality, economic prosperity and social equity, to the benefit of current and future generations. It is enabled by novel business models and responsible consumers. (p. 229)

A CFS applies principles of the CE to the food system, closing the loop between food production, consumption, and waste byproducts. Circular food systems can decrease land use, reduce GHG emissions, and provide sufficient food for growing populations. However, achieving this requires long-term, systemic planning and policies (Muscat et al., 2021; van Zanten et al., 2023).

Efforts across the U.S. to reduce methane emissions by diverting food waste from landfills are gaining traction. Nine states, including California, currently have food waste disposal bans (Concerning Organic Materials Management, 2022; Md. Code Ann., 2022; Jones, 2017; Sandson & Leib, 2019). All policies ban landfilled food waste from commercial and institutional entities that generate large amounts of food waste (e.g., more than 1 ton/week). However, California's policy, Senate Bill 1383 (SB-1383), is unique in that it also applies to residents and mandates that local jurisdictions[2] procure recycled organic waste products for distribution and use (Short-Lived Climate Pollutants, 2016). SB-1383, passed in 2016, aims to divert 75% of organic waste from landfills as part of California's broader goal to reduce emissions of short-lived climate pollutants, including methane. As of 2022, this law requires jurisdictions to procure 0.08 tons of recovered organic waste products per resident per year. These products can be used by the jurisdiction or distributed to third parties, such as farmers, businesses, and residents (California, n.d.).

Figure 1. Circular Food Systems Diagram



Adapted from van Zanten et al. (2023).

While recovered organic waste can take the form of compost, mulch, renewable gas, or electricity from biomass conversion, compost purchasing was identified as a primary strategy for meeting SB-1383 goals due to existing composting infrastructure and the myriad agricultural and environmental benefits compost offers (Abbs & Reul-Chen, 2018; CalRecycle, 2020; Recovered Organic Waste Product Procurement Target, 2020). Applying compost derived from organic waste to farmland can significantly contribute to improved soil health and support SB-1383 goals, such as reducing state GHG emissions. However, not all farmland requires annual compost application, so

[2] Local jurisdictions are defined as cities, counties, or local government agencies with regulatory authority over waste management service.

alternative methods for distributing compost must be identified (Harrison et al., 2020).

One compost utilization opportunity is to return it to the residents who generated its organic waste inputs. However, there is public concern about the quality and safety of compost produced from municipal food and yard waste (Zuniga, 2022). For example, Hall et al. (2023) note that urban residential yard waste may contain higher levels of lead dust from buildings painted before 1978. Furthermore, organic waste from public parks can contain high levels of pesticides or herbicides (Hood, 2006; U.S. EPA, 2013). The U.S. EPA also identified per- and poly-fluoroalkyl substances (PFAS) in compost derived from food waste and compostable food packaging and found that compost made from food and green waste had higher PFAS concentrations than compost from green waste alone (Choi et al., 2019; Kenny, 2021). Therefore, it is critical to assess municipal compost quality and safety as its use becomes mandated.

Analyses of SB-1383's implementation and effects to date are limited and focus primarily on technical challenges municipalities have with meeting procurement requirements and capacity limitations of composting infrastructure (Harrison et al., 2020; Mann, 2024). In this case study, we analyze: the successes and challenges of an urban, community-based, and free compost distribution program in Albany, California[3]; how and to what extent it fulfills SB-1383 organic waste procurement requirements; and its role in the CFS and CE more broadly. As more states implement food waste diversion laws, it is crucial to understand how to achieve these policies' goals through the lens of the CFS and CE, as well as recognize the downstream effects on stakeholders and communities, whose involvement is essential.

Methods

We recruited stakeholders of the Albany Compost Distribution Hub in Albany, California. We conducted semi-structured interviews and demographic surveys with them to identify the program's successes, challenges, and initial impacts. Additionally, we tested the compost to determine its safety and quality. Details of our methodology are described below.

Site Selection

The Albany Compost Distribution Hub ("the Hub") was established in April 2023 in partnership with the University of California (UC) Gill Tract Community Farm ("the Farm"), UC Berkeley, the city of Albany, California, and StopWaste of Alameda County. At the time of the study, the Hub was located on the southeastern and primary entrance of the Farm (Figure 2) and was open Sundays from 12-4 pm. During the Hub's open hours, anyone from the public could pick up compost for free without a residency requirement. Visitors could take as much compost as they liked, either by shoveling it into personal containers or into burlap bags provided by the Farm. Signage at the Hub directed visitors to complete a liability waiver and a survey administered by the city of Albany. StopWaste also provided an educational pamphlet about making and using compost that was available for visitors to take. During the study period, T.B., K.C., and I.C. staffed the hub to assist patrons and answer questions while simultaneously recruiting study participants. Data collection occurred from June to August 2023, shortly after the Hub opened.

The Hub was chosen as the site of interest due to the researchers' connections with UC Berkeley and the Farm, as well as its status as a relatively early example of SB-1383 implementation. At the time of the study, T.B. was a master's student at UC Berkeley and a volunteer at the Farm, K.C. was a doctoral student, and I.C. was an undergraduate student at UC Berkeley; none of them were previously connected with other partner entities. J.S. was a faculty member of UC Berkeley and the faculty advisor for the Farm. All research complied with UC Berkeley's IRB approval (IRB approval #2023-03-16203).

Survey

The city of Albany administered a survey to all Hub users through a QR code posted at the Hub (Appendix A) to assess how often users visited and their interest in staying connected with the Farm.

[3] The City of Albany is a relatively small San Francisco–Bay Area city of about 19,000 residents (U.S. Census Bureau, n.d.).

Figure 2. The Albany Compost Distribution Hub was located at the primary entrance of the UC Gill Tract Community Farm in Albany, California (City of Albany, CA, n.d.).

Visitors could complete the survey in English, Spanish, Mandarin, or Arabic. This survey was administered separately from our qualitative interviews, and the city of Albany provided us with anonymized survey responses. We calculated the frequency of multiple-choice answers and categorized open-ended responses by theme for responses between April 23 and August 13, 2023 (16 weeks).

Qualitative Interviews

Participants were recruited via purposive sampling, after which we conducted semi-structured interviews with them. We created interview guides, coded transcripts, and analyzed themes iteratively, as described below.

Sampling and Recruitment

We recruited participants who visited the Hub to utilize its services (users) and those who were involved in the Hub planning and implementation (implementers) between June and August 2023. "Users" included community members who visited the Hub during the study period and collected compost for their personal use (e.g., at home). We recruited users on-site during Hub open hours and invited them to participate in an in-person interview during the Hub's open hours or via phone at another scheduled time. "Implementers" included individuals employed by or associated with an implementing partner entity: the Farm, UC Berkeley, the city of Albany, and StopWaste. Due to the research team's connections with the Farm, we either knew these individuals personally or were referred to them. We emailed them to schedule virtual or in-person interviews. All participants provided verbal informed consent per Institutional Review Board approval and were offered a US$15 gift card as compensation. We offered interviews in English and Spanish, but no one chose to be interviewed in Spanish. All participants were 18 or older.

Semi-Structured Interviews

Interview guides were developed through an iterative process. "User" interview guides focused on experiences with composting, reasons for utilizing the Hub, experiences with the Hub, intended or actual compost use, and opinions of educational resources. "Implementer" interview guides focused on successes and challenges during Hub planning and implementation, key program partnerships, perceptions or knowledge of compost source and quality, and Hub contributions to SB-1383 (Appendix B). T.B., K.C., and I.C. conducted semi-structured interviews in-person, by phone, or by video conferencing (Zoom Version 5.15.5). All interviews lasted no longer than one hour and concluded with a sociodemographic questionnaire (Appendix C). Interviews were audio-recorded and transcribed using either Zoom (Version 5.15.5) or Otter.ai (Otter, 2023), followed by manual review by the research team to ensure accuracy. Users and implementers are identified numerically based on interview order.

Data Analysis

The codebook was developed deductively and inductively through an iterative process (Saldaña, 2009). T.B. and J.S. drafted a preliminary codebook prior to data collection, and T.B., K.C., and I.C. added emergent codes following preliminary coding. All interview transcripts were coded by T.B., K.C., and I.C. using Taguette software (Rampin & Rampin, 2021). Each interview was coded by two research team members who compared findings and discussed discrepancies. A third team member was consulted to resolve any discrepancies. All researchers analyzed the codes using thematic analysis, with data collection and analysis occurring simultaneously (Vaismoradi et al., 2016).

Compost Analysis

Due to public concerns about the quality and safety of municipal compost, the research team investigated the compost's source and tested it for nutrient levels and contaminants. The city provided the name of the compost vendor and product, which allowed us to identify the producer and distributor. We compared compost descriptions from the vendor, producer, and distributor to determine its feedstock, production process, and physical qualities. The city of Albany provided documentation of the volume of compost delivered to the Hub from April 2023 to April 2024.

We tested compost samples from three different compost deliveries in June, July, and August 2023. Each composite sample was composed of six subsamples from different locations in each compost pile at a depth of one foot. Brookside Laboratory Inc. (New Bremen, Ohio) processed the samples to measure nutrient content (nitrogen, phosphorus, potassium, carbon/nitrogen ratio), physical and chemical media properties (mineral content, moisture, pH), and heavy metal content (lead, cadmium, chromium, arsenic).

Results

We begin with a summary of user and implementer sociodemographics, followed by key successes, challenges, benefits, and limitations of the Hub in achieving SB-1383 goals, a circular food system, and a circular economy. From our analysis, five core themes emerged: (1) cross-disciplinary partnerships were key to success but caused delays; (2) educating Hub users was a primary goal but fell short; (3) the Hub was easy to use with room for minor improvements; (4) the Hub was perceived as a high-value program that contributed to SB-1383 procurement requirements and met consumer demand; and (5) the Hub did not close the loop in the circular food system but did reflect broader circular economy principles and aims.

User and Implementer Demographics

During the first four months of the Hub's operation, there were 156 responses to the city-led survey, averaging almost 10 users per week. However, this likely underrepresents the total number of Hub users, as not all visitors completed the survey. Of the users (n = 15) and implementers (n = 11) interviewed, the majority were white and female-identifying (Table 1). Compared to users, implementers were slightly more educated and had higher incomes. None of the implementers lived in Albany, whereas over half of the users did. A higher percentage of users and implementers were white (73.1%), female-identifying (65.4%), and held a bachelor's degree or higher (92.3%) compared to Albany residents (44.2%, 52.3%, and 75.2%, respectively) (U.S. Census Bureau, n.d.). In contrast, the median income of both users and implementers (between US$75,000-$90,000) was lower than that of Albany (US$124,469).

Theme 1: Cross-disciplinary partnerships were key to success but caused delays.

Four key stakeholders were involved in establishing and implementing the Hub. The UC Gill Tract Community Farm is a volunteer-run, 2-acre urban farm established in 2012 in Albany, California, that focuses on agroecological farming, food justice, and food distribution (Darling, 2014; UC Gill Tract Community Farm, n.d.). It was responsible for physically hosting the Hub and notifying the city when the compost supply was low. UC Berkeley is a public university in Berkeley, California, that owns the land upon which the Farm resides and was responsible for final approval of the Hub. The city of Albany's role was to acquire funding, order compost, and meet SB-1383 procurement requirements. StopWaste, a countywide agency that aims

Table 1. Sociodemographics of Albany Compost Distribution Hub Users (*n* = 15) and Implementers (*n* = 11) Interviewed

	Users (*n* = 15)	Implementers (*n* = 11)	Total (*n* = 26)
Age (mean ± SD)	44.40 ± 16.84	37.82 ± 12.75	41.62 ± 15.32
Gender identity/ies[a], *n* (%)			
Female	9 (60.0)	8 (72.7)	17 (65.4)
Male	4 (26.7)	1 (9.1)	5 (19.2)
Non-binary/Genderqueer/Agender	2 (13.3)	3 (27.3)	5 (19.2)
Prefer not to say	0 (0.0)	2 (18.2)	2 (7.7)
Racial/ethnic identity/ies[a], *n* (%)			
White	11 (73.3)	8 (72.7)	19 (73.1)
Asian/Pacific Islander	3 (20.0)	1 (9.1)	4 (15.4)
Black	1 (6.7)	1 (9.1)	2 (7.7)
Hispanic/Latinx	0 (0.0)	1 (9.1)	1 (3.9)
Highest level of education, *n* (%)			
Some college/associate's degree	2 (13.3)	0 (0.0)	2 (7.7)
Bachelor's degree	8 (53.3)	7 (63.6)	15 (57.7)
Advanced degree	5 (33.3)	4 (36.4)	9 (34.6)
Household income level, *n* (%)			
<US$24,999	1 (6.7)	1 (9.1)	2 (7.7)
US$25,000–$49,999	3 (20.0)	1 (9.1)	4 (15.4)
US$50,000–$74,999	3 (20.0)	1 (9.1)	4 (15.4)
US$75,000–$99,999	2 (13.3)	3 (27.3)	5 (19.2)
>US$100,000	4 (26.7)	5 (45.5)	9 (34.6)
Prefer not to say	2 (13.3)	0 (0.0)	2 (7.7)
Residential distance from Hub (mi[b]), *n* (%)			
<1	8 (53.3)	0 (0.0)	8 (30.8)
1–4.9	3 (20.0)	5 (45.5)	8 (30.8)
5–9.9	3 (20.0)	3 (27.3)	6 (23.1)
≥10	1 (6.7)	3 (27.3)	4 (15.4)

[a] Respondents could select all that apply.
[b] Metric conversions: <1.0 mi = <1.6 km; 1.0–4.9 mi = 1.6–7.9 km; 5.0–9.9 mi = 8.0–15.9 km; ≥10 mi = ≥16.0 km

to educate the public about waste reduction, provided pamphlets about home composting, trained Gill Tract volunteer farmers in composting, and facilitated partnerships, particularly between the Farm and the city of Albany (Alameda County Waste Management Authority, n.d.). The Hub's co-location at a community farm fostered interdisciplinary partnerships among the farm, university, city, county, and community, all of which were critical for program success. Implementers recommended that future hubs similarly be city-funded and located at a community farm, with a neutral third-party facilitating stakeholder relationships.

These partnerships were not only essential to the Hub's success but also a key outcome, especially considering the lack of prior relationships between stakeholders. The Farm shared, "it was also nice to feel legitimized by the partnerships … with the city and with public agencies … wanting to work with us and recognizing … our leverage in the community" (Implementer 10). Implementers noted they hope these partnerships will foster more collaboration in the future.

The Hub also strengthened the Farm's relationship with the community, supporting the Farm's mission to be a community resource for food and education (UC Gill Tract Community Farm, n.d.). Hub users who had not previously visited the Farm expressed interest in becoming involved. Almost half (44.9%) of user survey respondents indicated interest in receiving emails about Farm events, 13.5% donated to the Farm, and 10.9% indicated interested in volunteering. Additionally, interviewed users felt invited to explore the land, learn about plants, and shop at the farm stand—a donation-based market open during the Hub's operating hours that offers herbs, produce, and flowers grown at the Farm. A first-time visitor shared, "I'm gonna walk through … because I've never had the opportunity to come inside and see [the Farm]. … I'm just so glad that it's here so I could see different things that I might not have even thought about planting" (User 6).

Involving different types of partners also meant operating within and across different decision-making structures, which caused significant delays. Establishing the memorandum of understanding (MOU) that was required to create the Hub took 18–24 months and required extensive communication within and among all the stakeholder groups. One implementer noted that there was an email chain with over 400 emails that became difficult to follow. They also pointed out:

> Part of the challenge was we have three organizations that were all pretty different in their structure. You know, the UC Berkeley is just this vast … just a huge organization. They do a lot of things. This is a pretty small piece of a kind of overall pie, right? … And then we've got the farmers who have, you know, more of a really collaborative, small-scale organizational structure where it's a lot of, you know, everybody agreeing on things together, and large group meetings. … And then we have the city, which is like a smaller bureaucracy. So, kind of coordinating between those three different models was really interesting and kind of tricky, because things move at, like, really different speeds between them. And then you have like kind of different needs. … We have to like move the MOU up the ranks of hierarchy along the UC side, and then we also have to like, have a group meeting with all the farmers to talk about it, and then, you know, bring it to the [City] Council, and, like, have all—all of these different kinds of bodies agree on a format. (Implementer 2)

To streamline planning for future hubs, implementers recommended that all partners ensure they are on the same page by clearly communicating their goals and establishing clear channels of communication from the start.

Although the planning process was delayed, the program was ultimately a "win-win-win" with "it [working] in everybody's interests" (Implementers 9 and 5, respectively). For example, the program contributed to the city's SB-1383 procurement requirements, the Farm accessed free compost and strengthened relationships with the community, UC Berkeley engaged six students in the program's planning, implementation, and evaluation, and StopWaste facilitated stakeholder relationships. One implementer shared:

> Throughout all those organizations, everybody was really excited about the project and wanted to make it happen, and it was, like, really mutually beneficial for everyone. And so, when we were able to kind of all connect on the same vision, then it was, like, really powerful and really cool to make that happen. (Implementer 2)

Theme 2: Educating Hub users was a primary goal but fell short.

Implementers intended for the Compost Distribution Hub to also serve as an educational hub. They aimed to install signage and hold workshops and demonstrations to educate the community about compost use, at-home composting, waste sorting, waste diversion, and SB-1383. The Farm was primarily responsible for educational programming but received insufficient funds from the city to realize these goals. The only formal education incorporated into the Hub during the research period was StopWaste's educational pamphlet on making and using compost. The pamphlet, however, was rarely noticed and largely ignored, suggesting a need for more effective educational strategies, as exemplified by this response: "I have not paid any attention to [the pamphlet] because I was so excited about [the compost]" (User 6). Given budget constraints, implementers recommended future Hubs be designed as educational sites from the outset, with additional funding allocated to support educational efforts.

Some implementers also saw the Hub as an opportunity for the public to witness the results of curbside organic waste collection and waste sorting. They believed if residents saw the consequences of improper waste sorting, such as plastic or glass in the compost, it would motivate them to improve their at-home waste sorting practices. However, this was not achieved because the compost distributed was not made from municipal food waste, which is further discussed in Theme 5.

Although participants did not cite education as a reason for visiting the Hub, they expressed interest in learning about the compost's nutrient content, its inputs (particularly food waste), compost use, and the involvement of both the Farm and the city of Albany in the program. They recommended creating flyers and hosting workshops, with one user suggesting:

> One thing that would improve the Hub [was] if there was an explanation of the whole thing. I was curious to know, where did this compost come from? Am I paying for this with my tax dollars, you know, to the city? … And maybe there should be some kind of signage or something on the website that explains the whole thing, because I definitely felt more inclined to come back and get another load when I found out the city is paying for this, and anyone can take it. … It should be an educational experience. It needs to be more than just, "we get free dirt." (User 14)

Theme 3: The Hub was "easy to use" with room for minor improvements.

Users consistently highlighted the Hub's accessibility, citing its welcoming and helpful staff, ease of use, and location. The Hub was straightforward and "easy to use" (User 2) with minimal wait time and available parking: "I think it's very good, and I'm happy with the results, the product. And the people have been really nice so, can't say anything much more than that" (User 7).

However, users noted several challenges prior to their visits, including uncertainty in the process, concern about wait times and compost availability, and limited hours of operation: "If there was compost where you could just come anytime and pick it up, that would be easier because I bike here … a lot. And I see the compost, but I'm usually not here on the weekends [during the Hub's open hours]" (User 2). Implementers similarly want to increase the Hub's hours of operation, but the Farm is limited by volunteers available to staff the Hub:

> I would like to see us a little bit more organized in how we staff it. It would be cool to be able to have it open more often, though that doesn't seem really feasible right now. … Sometimes people will sign up to bottom-line things, and then they're unavailable, which is understandable, because this work is happening, like, at their own volition. There isn't a

> whole lot of incentives behind people showing up to do this work. So, when other things call on them in life, farm work is one of the first things to kind of fall to the wayside. (Implementer 10)

Theme 4: The Hub was perceived as a high-value program that contributed to SB-1383 procurement requirements and met consumer demand.

All compost distributed at the Hub, whether taken by the Farm for use on-site or by users for their personal use elsewhere, contributed to the city's SB-1383 procurement requirements and met consumer demand for compost. During the first 12 months of operation, the Hub distributed a total of 160 cubic yards of compost, equating to about 110 tons of organic waste product procurement.[4] This accounted for approximately 7% of Albany's annual SB-1383 procurement requirements, or the per-capita requirement for 600 of the estimated 19,000 Albany residents.[5]

The Hub was viewed as a low-input, high-value program compared to alternative compost distribution methods, such as annual compost giveaways, which can be time- and resource-intensive:

> Every year [the city of Albany has] a compost giveaway event where we get bagged compost, and there's a huge line of cars, and we have public works people load it into the cars and … it takes weeks to set up. We have to do all of this, you know, mailers about it. We have to staff it. It's like this huge thing. It's a ton of time, and we don't get rid of as much compost. (Implementer 2)

In contrast, the Hub required little time and city personnel beyond the planning stage, and yet it achieved social benefits in addition to SB-1383 goals, such as engaging the community with the Farm and fostering interdisciplinary stakeholder partnerships. Users also preferred the Hub over other local compost giveaway programs due to the former's accessibility and built-in support.

Implementers supported SB-1383 goals to divert organic waste from landfills, reduce GHG emissions, and distribute compost to the community. However, they experienced challenges achieving them, including a lack of composting infrastructure that made it difficult to find a compost vendor; the city's high-density population that caused a procurement requirement disproportionate to the amount of land to which compost can be applied; and a lack of state funding to fulfill the mandate. Albany ultimately funded the Hub via a countywide landfill tonnage tax established in 1990 known as Measure D. As of 2021, the county charges US$8.23/ton for all waste sent to the landfill. The revenue generated is allocated to StopWaste for countywide recycling efforts, including SB-1383-mandated organic waste recycling programs like the Hub (Alameda County Waste Management Authority, 1990, 2021). For implementers, working toward SB-1383 compliance was difficult but necessary:

> The spirit behind [SB-1383] is coming from a great place. Like this is what we should be doing. It's the right thing. I think the systems to achieve the desired outcomes of SB-1383 aren't quite there yet. There's still a lot of troubleshooting to do, a lot of figuring out to do. (Implementer 11)

Despite these challenges, implementers felt SB-1383 was valuable in that it mobilized the city to create community-based compost distribution programs—a model StopWaste had considered for over a decade.

Theme 5: The Hub did not close the loop in the circular food system but did reflect broader circular economy principles and aims.

During the research period, the Hub provided industrially produced compost processed from yard trimmings and certified by the Organics Material Review Institute (OMRI). The Farm selected this

[4] This conversion is based on the CalRecycle standard conversion of 1.45 cubic yards of compost equating to 1 ton of organic waste product (CalRecycle, n.d.)
[5] This percentage represents the compost distributed at the Albany Compost Distribution Hub from April 2023 to April 2024.

vendor and product based on the Farm's prior relationship with the vendor, its desire to support a local, people-of-color-led business, and the perceived quality of the product. When both the research team and implementers inquired about the source and content of the compost, however, the vendor was not forthcoming with accurate information. They provided conflicting and outdated information about the compost source and feedstock, which led to confusion and a desire for more transparency:

> This information [about compost inputs and feedstock] is really important for us to know. And I had wanted to know the same things at the get-go, and I was running into similar barriers, or it just seemed like it was kind of like shrouded purposely. But also not necessarily. … I think it would be a service to [the customers] to like, really push [the vendor] to provide this information, considering that, like across the state, people are becoming more aware of the products that they're using and like, they just need to have that information available. And just on our part to like to insist, because it's great to support a really local business and a minority-owned business, but at the same time, like there are certain things that we would like in exchange for that business. And transparency is one of them. (Implementer 10)

Ultimately, the compost producer informed the research team that the feedstock was 100% recycled yard trimmings from local landscaping and landscape supply companies. It did not include any food waste. Therefore, the Hub did not contribute to closing the food waste loop, but it did contribute more broadly to CE aims of recycling organic byproducts through their landfill diversion, processing, and distribution to the public.

Compost testing revealed a relatively consistent product across the study period. Table 2 compares the Hub's averaged samples with standard ranges of pH, moisture content, organic matter, and various nutrients for mature compost (Crohn, 2016; Sullivan et al., 2018; U.S. Composting Council, 2001b, as cited in Sullivan et al., 2018). Most nutrient levels fell within the standard ranges, indicating that it is a beneficial amendment for increasing soil organic matter and nutrient levels. However, average potassium levels and moisture content were slightly below the standard ranges. Furthermore, one sample exceeded both the California regulatory limit and EPA limit for arsenic (41 mg/kg) (Crohn, 2016; Maximum Metal Concentrations, 1995; U.S. EPA, 2024b) (see Table 3). Although two samples were well below the limit, the elevated sample exceeded it by more than 8 mg/kg. See Appendices D and E for the full compost testing results.

Table 2. Albany Compost Distribution Hub Compost Properties Compared to Standard Ranges for Mature Compost

Property	Albany Compost Distribution Hub average	Standard range for mature compost [a]
pH	7.71	6.0–8.5
Moisture (%)	32.27	40–60
Organic matter, % dry weight	51.77	25–65
C:N ratio	20.98	>20 [b]
Total Nitrogen, % dry weight	1.32	1.0–2.0
Phosphorous, % dry weight	0.75	0.3–0.9
Potassium, % dry weight	0.46	0.5–1.5
Calcium, % dry weight	3.21	1.5–3.5
Magnesium, % dry weight	0.64	0.25–0.7
Sodium, % dry weight	0.16	<0.6
Sulfur, % dry weight	0.30	0.25–0.8

[a] Crohn, 2016; Sullivan et al., 2018; U.S. Composting Council, 2001b, as cited in Sullivan et al., 2018
[b] The Standard C:N ratio range for woody composts was used since compost feedstock was landscape trimmings.

Discussion

In this qualitative case study, we examined the contribution of an urban, community-based compost distribution program to state-mandated organic waste recycling requirements and the circular food system. Our findings show the Albany Compost Distribution Hub made modest contributions to the city's SB-1383 procurement requirements and generated additional social co-benefits. Interdisciplinary partnerships and city funding were key to establishing a

Table 3. Albany Compost Distribution Hub Heavy Metal Analysis Compared to California Regulatory and EPA Limits

Element	Date Collected 6/18/2023	7/23/2023	8/16/2023	California Regulatory Limit (Crohn, 2016)	EPA Limit (U.S. EPA, 2024b)
Arsenic (mg/kg)	<2	<2	49.3	41	41
Cadmium (mg/kg)	<0.5	0.7	0.6	39	39
Chromium (mg/kg)	0.127	0.155	19.1	1200	-
Lead (mg/kg)	8.5	12.6	18.6	300	300

community-based Hub that was accessible and provided free compost to the public. However, the lack of funding for education and the distribution of compost sourced from yard trimmings, rather than food waste, prevented the program from realizing its full potential. It did not close the circular food system loop, but it did contribute to and highlight key principles, aims, and drivers of the circular economy more broadly.

Although systematic studies assessing different types of municipal compost distribution programs are lacking, such programs do exist throughout the U.S. Some cities have annual giveaways of bagged compost, but these events require significant time, effort, and resources to organize, often impose residency requirements, and are available on a limited basis (City of Albany, CA, n.d.; City of Hayward, n.d.; New York City, n.d.). There are also year-round distribution sites, but they are often not staffed, require patrons to bring their own tools to load compost, and are not based within a community farm, limiting the accessibility and social and educational benefits of the program (Albany, NY, n.d.; City of Berkeley, n.d.; City of Los Altos, n.d.). In contrast, the Albany Compost Distribution Hub's co-location at a community farm, staffing, regular open hours, and lack of a residential requirement sets it apart from others—a model both implementers and users preferred.

Hub users have the desire to learn, and implementers have the expertise to educate about program logistics, compost use and gardening, food waste sorting, and SB-1383. This match between community desires and implementer capabilities indicates high potential for educational impacts at the Hub. However, funding is necessary to realize this potential. Indeed, an SB-1383 analysis found that educating the public about the bill's goals and their importance, with support of state funding, is critical to the bill's success (Little Hoover Commission, 2023).

Our finding that implementers experienced challenges identifying compost vendors coincides with the well-documented lack of composting infrastructure in California (CalRecycle, 2020; Harrison et al., 2020; Little Hoover Commission, 2023; Mann, 2024). Of the 27 million tons of California's annual organic waste that must be diverted from landfills to meet SB-1383's 2025 goal, the state only has the capacity to process 10 million tons at existing organic waste processing facilities (CalRecycle, 2020). To fill this gap, California needs 75 to 100 more composting facilities (Harrison et al., 2020, 2024). Community compost distribution hubs like Albany's could incentivize infrastructure development by increasing public demand for the final product and guaranteeing an end-use destination as infrastructure and supply grows (CalRecycle, 2020). In fact, consumers are a key enabler of the CE, driving the demand-side of the supply chain (Kirchherr et al., 2017). The state, therefore, should coordinate these efforts with local jurisdictions to enhance compost procurement and grow the end-use market (CalEPA, 2018).

Given the public perception that municipal compost has a higher risk of contamination than other sources of compost, transparency around feedstock is vital in public compost distribution programs. Indeed, studies have shown that municipal organic waste can have high levels of contaminants, especially plastics and lead, that pose risks to human health and the environment (Farrell & Jones, 2009; Okori et al., 2024). Industrially produced compost processed from municipal organic waste has more contamination than smaller-scale composting systems due to lower degrees of quality control over the feedstock (Barboza et al., 2011; Barrena et al., 2014; Cattle et al., 2020; Farrell & Jones, 2009; O'Connor et al., 2022). The city of Berkeley's free compost distribution program provides a model of a CFS and source transparency, acknowledging the consumer as the most central enabler of circular business models (Gallaud & Laperche, 2016). The city publicly discloses the compost supplier and its content, which is a mixture of food and yard waste from Berkeley's curbside collection program. It also highlights several third-party quality assurance certifications attesting to the safety of their compost, thereby building public trust and encouraging usage (Zuniga, 2022). Public demand for contaminant-free compost and increased transparency, alongside the mandated procurement of final compost products, may improve contaminant removal at composting facilities (CalRecycle, 2020).

While the yard waste compost at the Hub had beneficial nutrient properties, it also had elevated levels of arsenic. Natural soils typically contain arsenic levels ranging from 1 to 40 mg/kg, but natural arsenic levels across California range from 0.6 to 11 mg/kg. This suggests the elevated arsenic content in the compost is likely not due to natural soils but rather from arsenic use in herbicides and the lumber industry (Agency for Toxic Substances and Disease Registry, 2007; Bradford et al., 1996; Chung et al., 2014). This arsenic contamination indicates that, despite the quality testing required to qualify as compliant with SB-1383, compost can still be a source of soil contamination. These results align with existing literature identifying green waste as a source of significant chemical contamination (Rainey et al., 2020).

Ultimately, the Hub contributed to several core aims of the circular economy, including enhanced environmental quality (e.g., end application of compost to urban farmland), economic prosperity (e.g., free compost for urban consumers and farm), and social equity (e.g., support of a minority-owned local business, free community access to compost, increased visibility and legitimacy of a social justice mission-driven community farm through strengthened relationships with the city and university). Recycling yard and landscape trimmings into compost also reflects the 4 Rs of Reduce, Reuse, Recycle, and Recover, a core principle of the CE. Furthermore, the Hub met consumer demand by providing an end-use destination for compost supply and benefitted current and future generations through the training of students, both of which are important but often excluded aspects of the CE (Kirchherr et al., 2017). However, it missed the mark in CFS.

To close the circular food system loop, the Hub would need to procure compost sourced from municipal food waste. SB-1383 currently allows compost to be sourced from either green or food waste (Green Material and Vegetative Food Material Processing Requirements, 2025). However, California could instead require compost facilities to source feedstock from municipal food waste only and not green waste, such as yard trimmings. This would ensure future Hubs only distribute food waste compost, thereby closing the CFS loop.

To further localize this process, community compost distribution programs could also collect residential food waste and compost it on-site. California's AB-2346 amendment, passed in September 2024, allows community- and on-farm-produced compost to count toward SB-1383 procurement requirements (Organic Waste Reduction Regulations, 2024). These changes promote community-based solutions, such as community composting, which is more cost-effective and has additional environmental, economic, and social benefits compared to industrial composting (Brown, 2023; Pai et al., 2019).

Limitations and Future Research

Our study has several limitations and suggestions for future research. First, the small sample size limits the scope of our findings. However, this was intentional and proportional to the limited number of potential study participants. Replicating this study with multiple program locations and a larger sample size would contribute more robust and generalizable findings on community compost distribution programs. Second, efforts to recruit linguistically diverse participants were unsuccessful, and participants were predominantly white and educated and had relatively high incomes. As a result, the generalizability of our findings is limited with regards to the social equity dimensions of a circular economy. Further research is needed on the socioeconomic, health, and environmental justice impacts of compost distribution programs.

Further studies on community-based compost distribution programs that incorporate municipal food waste as compost feedstock, along with public educational components, are also needed. These studies would provide valuable insights into how such components could contribute to closing the urban food system loop. Evaluations of such programs' impacts on long-term CFS goals, such as increasing home food production, soil carbon sequestration, and at-home food waste separation, would also help inform best practices for planning and implementing such programs. Furthermore, SB-1383 procurement requirements intend to create a circular system in which organic waste becomes a resource, but compost contamination levels, especially for currently unregulated contaminants like microplastics, are not yet clear and can hinder compost utilization. Therefore, additional research on the quality, public perception, and use of municipal organic waste compost is necessary.

Conclusions

This qualitative case study has identified the successes, challenges, and initial impacts of a community-based compost distribution hub in meeting California SB-1383 procurement requirements and contributing to a circular food system and a circular economy more broadly. Our findings indicate that compost distribution hubs co-located at urban community farms can be a low-maintenance, high-impact strategy for local jurisdictions to provide free resources to the public, support community organizations, and meet organic waste procurement requirements. Our case study illustrates the power of cross-sector partnerships in implementing climate mitigation efforts and the value of urban consumers as critical drivers of the circular economy. However, to more effectively achieve a circular food system and climate change mitigation goals, compost distribution programs must source compost made from municipal food waste. Coupling these programs with public investments in educational programming about gardening, compost use, and at-home food waste sorting would also contribute to a more robust circular food system.

Acknowledgments

The authors would like to acknowledge and thank all the interview participants for their time and input in the project, with special thanks to the UC Gill Tract Farm Coalition. The authors would also like to thank the four JAFSCD reviewers whose feedback helped develop this paper further.

References

Abbs, A. & Reul-Chen, C. (2018, August). *Composting in California: Addressing air quality permitting and regulatory issues for expanding infrastructure*. California Air Resources Board. https://californiacompostcoalition.org/mobius/wp-content/uploads/2022/01/CA-Compost-Comments-2018.pdf

Agency for Toxic Substances and Disease Registry. (2001). Landfill gas basics. In Agency for Toxic Substances and Disease Registry, *Landfill gas primer: An overview for environmental health professionals* (pp. 3–14). https://www.atsdr.cdc.gov/hac/landfill/html/ch2.html

Agency for Toxic Substances and Disease Registry. (2007). *Toxicological profile for arsenic.* https://www.atsdr.cdc.gov/toxprofiles/tp2.pdf

Alameda County Waste Management Authority. (n.d.). *About StopWaste*. Retrieved August 4, 2023, from https://www.stopwaste.org/about-stopwaste

Alameda County Waste Management Authority. (1990). *Alameda County Recycling Initiative: Measure D*. Alameda County Waste Management Authority. https://www.acgov.org/sustain/documents/measure_d.pdf

Alameda County Waste Management Authority. (2021). *Revisions to the reserve fund balance policy*. StopWaste. https://www.stopwaste.org/sites/default/files/2021-02%20RB%20Fund%20Balance%20Policy%20Revision.pdf

Albany, NY. (n.d.). *Albany Recycles compost facility*. Retrieved November 22, 2024, from http://www.albanynyrecycles.com/compost-facility/

Barboza, J. C., Morales, H., Barrantes, R. A., Moreno, A. S., & Lwanga, E. H. (2011). Perceptions and attitudes regarding organic waste: Feasibility of establishing an urban composting program in Chiapas, Mexico. *Journal of Agriculture, Food Systems, and Community Development*, *1*(3), 115–131. https://doi.org/10.5304/jafscd.2011.013.006

Barrena, R., Font, X., Gabarrell, X., & Sánchez, A. (2014). Home composting versus industrial composting: Influence of composting system on compost quality with focus on compost stability. *Waste Management*, *34*(7), 1109–1116. https://doi.org/10.1016/j.wasman.2014.02.008

Bradford, G. R., Change, A. C., Page, A. L., Bakhtar, D., Frampton, J. A., & Wright, H. (1996). *Background concentrations of trace and major elements in California soils*. Kearney Foundation of Soil, Science Division of Agriculture and Natural Resources, University of California. https://ucanr.edu/sites/poultry/files/297094.pdf

Brown, K. (2023, February 20). *Why community composting is critical to California's infrastructure*. BioCycle. https://www.biocycle.net/community-composting-california/

Buzby, J. C., Farah-Wells, H., & Hyman, J. (2014). *The estimated amount, value, and calories of postharvest food losses at the retail and consumer levels in the United States*. U.S. Department of Agriculture, Economic Research Service, EIB-121. https://doi.org/10.2139/ssrn.2501659

CalEPA. (2018). *Enhancing organic materials management by improving coordination, increasing incentives & expediting decision-making* (p. 29). California Environmental Protection Agency. https://calepa.ca.gov/wp-content/uploads/2018/11/CalEPA-Report-Enhancing-Organic-Materials-Management.pdf

California, State of. (n.d.). *Using recycled organics products*. CalRecycle Home Page. Retrieved August 4, 2023, from https://calrecycle.ca.gov/organics/slcp/procurement/

CalRecycle. (2020). *Analysis of the progress toward the SB 1383 organic waste reduction goals* (DRRR-2020-1693; p. 42). California Department of Resources Recycling and Recovery. https://www2.calrecycle.ca.gov/Publications/Details/1693

CalRecycle. (2024). *2021 Disposal facility-based waste characterization study*. https://calrecycle.ca.gov/wcs/dbstudy/

Cattle, S. R., Robinson, C., & Whatmuff, M. (2020). The character and distribution of physical contaminants found in soil previously treated with mixed waste organic outputs and garden waste compost. *Waste Management*, *101*, 94–105. https://doi.org/10.1016/j.wasman.2019.09.043

Choi, Y. J., Kim Lazcano, R., Yousefi, P., Trim, H., & Lee, L. S. (2019). Perfluoroalkyl acid characterization in U.S. municipal organic solid waste composts. *Environmental Science & Technology Letters*, *6*(6), 372–377. https://doi.org/10.1021/acs.estlett.9b00280

Chung, J.-Y., Yu, S.-D., & Hong, Y.-S. (2014). Environmental source of arsenic exposure. *Journal of Preventive Medicine and Public Health*, *47*(5), 253–257. https://doi.org/10.3961/jpmph.14.036

City of Albany, CA. (n.d.). *Compost in Albany*. Retrieved November 22, 2024, from https://www.albanyca.gov/Departments/Community-Development/Solid-Waste-Recycling/Compost-in-Albany#albanycomposthub

City of Berkeley. (n.d.). *Free compost program*. Retrieved November 22, 2024, from https://berkeleyca.gov/city-services/trash-recycling/free-compost-program

City of Hayward. (n.d.). *Compost giveaway*. Retrieved November 22, 2024, from https://www.hayward-ca.gov/services/city-services/compost-giveaway

City of Los Altos. (n.d.). *City of Los Altos introduces 7-day-a-week compost distribution program*. Retrieved November 22, 2024, from https://www.losaltosca.gov/publicworks/page/city-los-altos-introduces-7-day-week-compost-distribution-program

Concerning Organic Materials Management, Wash. House B. 1799 (2021-2022), Chapter 180 (Wash. Stats. 2022). https://lawfilesext.leg.wa.gov/biennium/2021-22/Pdf/Bills/House%20Passed%20Legislature/1799-S2.PL.pdf

Crohn, D. M. (2016). *Assessing compost quality for agriculture*. University of California, Agriculture and Natural Resources. https://doi.org/10.3733/ucanr.8514

Darling, T. (Director). (2014). *Occupy The Farm* [Video recording]. Ignite Channel. https://play.google.com/store/movies/details/Occupy_The_Farm?id=8Ol4JofbajM&hl=en&gl=US

Duren, R. M., Thorpe, A. K., Foster, K. T., Rafiq, T., Hopkins, F. M., Yadav, V., Bue, B. D., Thompson, D. R., Conley, S., Colombi, N. K., Frankenberg, C., McCubbin, I. B., Eastwood, M. L., Falk, M., Herner, J. D., Croes, B. E., Green, R. O., & Miller, C. E. (2019). California's methane super-emitters. *Nature*, *575*(7781), Article 7781. https://doi.org/10.1038/s41586-019-1720-3

Ellen MacArthur Foundation. (2013). *Circular economy introduction*. https://www.ellenmacarthurfoundation.org/topics/circular-economy-introduction/overview

Farrell, M., & Jones, D. L. (2009). Critical evaluation of municipal solid waste composting and potential compost markets. *Bioresource Technology*, *100*(19), 4301–4310. https://doi.org/10.1016/j.biortech.2009.04.029

Gallaud, D., & Laperche, B. (2016). *Circular economy, industrial ecology and short supply chain* (Vol. 4). Wiley-ISTE. https://www.wiley.com/en-us/Circular+Economy%2C+Industrial+Ecology+and+Short+Supply+Chain-p-9781119307471

Green Material and Vegetative Food Material Processing Requirements, 14 C.C.R. § 17868.5 (2025). https://govt.westlaw.com/calregs/Document/I99D0301C5B4D11EC976B000D3A7C4BC3?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)

Hall, S. M., Tikku, V., & Heiger-Bernays, W. J. (2023). Potential policy and community implications of equitable organic waste, compost, and urban agricultural systems in the United States. *Environmental Health Perspectives*, *131*(11), Article 115001. https://doi.org/10.1289/EHP12921

Harrison, B. P., Chopra, E., Ryals, R., & Campbell, J. E. (2020). Quantifying the farmland application of compost to help meet California's organic waste diversion law. *Environmental Science & Technology*, *54*(7), 4545–4553. https://doi.org/10.1021/acs.est.9b05377

Harrison, B. P., McNeil, W. H., Dai, T., Campbell, J. E., & Scown, C. D. (2024). Site suitability and air pollution impacts of composting infrastructure for California's organic waste diversion law. *Environmental Science & Technology*. https://doi.org/10.1021/acs.est.4c06371

Hood, E. (2006). The apple bites back: Claiming old orchards for residential development. *Environmental Health Perspectives*, *114*(8), A470–A476. https://doi.org/10.1289/ehp.114-a470

Intergovernmental Panel on Climate Change [IPCC]. (2023). Emissions trends and drivers. In *Climate Change 2022—Mitigation of Climate Change: Working Group III Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (pp. 215–294). Cambridge University Press. https://doi.org/10.1017/9781009157926.004

Jones, C. A. (2017). Will they build? Organics disposal bans and processing infrastructure. *BioCycle*, 5. https://www.biocycle.net/organics-disposal-bans-processing-infrastructure/

Kenny, S. (2021). *Emerging issues in food waste management: Persistent chemical contaminants* (Report No. EPA/600/R-21/115). U.S. EPA Office of Resource and Development. https://cfpub.epa.gov/si/si_public_record_Report.cfm?dirEntryId=353978&Lab=OSAPE

Kirchherr, J., Reike, D., & Hekkert, M. (2017). Conceptualizing the circular economy: An analysis of 114 definitions. *Resources, Conservation and Recycling*, *127*, 221–232. https://doi.org/10.1016/j.resconrec.2017.09.005

Little Hoover Commission. (2023). *Reducing California's landfill methane emissions: SB 1383 Implementation* (274). Milton Marks Commission on California State Government Organization and Economy. https://lhc.ca.gov/wp-content/uploads/Reports/274/Report-274.pdf

Mann, S. (2024, August 27). *Community organizing: Across California, jurisdictions work collaboratively to comply with regulations put in place by the state's food recovery legislation*. Waste Today. https://www.wastetodaymagazine.com/article/california-communities-work-collaboratively-to-come-into-compliance-with-sb-1383/

Maryland Code Annotated, Environment § 04-13 (2022). https://mde.maryland.gov/programs/land/RecyclingandOperationsprogram/Documents/COMAR%2026.04.13%20Food%20Residuals%20Recycling%20%26%20Diversion_Adopted.pdf

Maximum Metal Concentrations, 14 C.C.R. § 17868.2 (1995). https://govt.westlaw.com/calregs/Document/I99AC7B775B4D11EC976B000D3A7C4BC3?transitionType=Default&contextData=%28sc.Default%29

Muscat, A., de Olde, E. M., Ripoll-Bosch, R., van Zanten, H. H. E., Metze, T. A. P., Termeer, C. J. A. M., van Ittersum, M. K., & de Boer, I. J. M. (2021). Principles, drivers and opportunities of a circular bioeconomy. *Nature Food*, *2*(8), 561–566. https://doi.org/10.1038/s43016-021-00340-7

New York City. (n.d.). *Get compost*. NYC Department of Sanitation. Retrieved November 22, 2024, from https://www.nyc.gov/site/dsny/what-we-do/programs/compost-givebacks.page

O'Connor, J., Mickan, B. S., Siddique, K. H. M., Rinklebe, J., Kirkham, M. B., & Bolan, N. S. (2022). Physical, chemical, and microbial contaminants in food waste management for soil application: A review. *Environmental Pollution*, *300*, 118860. https://doi.org/10.1016/j.envpol.2022.118860

Okori, F., Lederer, J., Komakech, A. J., Schwarzböck, T., & Fellner, J. (2024). Plastics and other extraneous matter in municipal solid waste compost: A systematic review of sources, occurrence, implications, and fate in amended soils. *Environmental Advances*, *15*, Article 100494. https://doi.org/10.1016/j.envadv.2024.100494

Organic Waste Reduction Regulations, Cal. Assemb. B. 2346 (2023-2024), Chapter 712 (Cal. Stats. 2024). https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202320240AB2346

Otter. (2023). *Otter.ai* [Computer software]. https://otter.ai/

Pai, S., Ai, N., & Zheng, J. (2019). Decentralized community composting feasibility analysis for residential food waste: A Chicago case study. *Sustainable Cities and Society*, *50*, Article 101683. https://doi.org/10.1016/j.scs.2019.101683

Rainey, C., Egerer, M., Herrmann, D., & Bowles, T. (2020). Restoring soil and supporting food sovereignty across urban–rural landscapes: An interdisciplinary perspective. In *Urban Agroecology* (Chapter 4). CRC Press. https://doi.org/10.1201/9780429290992-4

Rampin, R., & Rampin, V. (2021). Taguette: Open-source qualitative data analysis. *Journal of Open Source Software*, *6*(68), Article 3522. https://doi.org/10.21105/joss.03522

Recovered Organic Waste Product Procurement Target, 14 C.C.R. § 18993.1 (2020). https://govt.westlaw.com/calregs/Document/IBB36734D5B4D11EC976B000D3A7C4BC3?transitionType=Default&contextData=%28sc.Default%29

Román, P., Martínez, M. M., & Pantoja, A. (2015). *Farmer's compost handbook: Experiences in Latin America*. Food and Agriculture Organization of the United Nations. https://openknowledge.fao.org/server/api/core/bitstreams/0658b4e0-53e3-4ed7-89d0-ff351bec1dff/content

Saldaña, J. (2009). *The coding manual for qualitative researchers*. Sage Publications Ltd.

Sandson, K., & Leib, E. B. (2019). *Bans and beyond: Designing and implementing organic waste bans and mandatory organics recycling laws*. Harvard Law School Food Law and Policy Clinic and the Center for EcoTechnology. https://chlpi.org/wp-content/uploads/2013/12/Organic-Waste-Bans_FINAL-compressed.pdf

Short-Lived Climate Pollutants, Cal. S. B. 1383 (2015-2016), Chapter 395 (Cal. Stats. 2016). https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB1383

Sullivan, D. M., Bary, A. I., Miller, R. O., & Brewer, L. J. (2018). *Interpreting compost analyses* (Publication EM 9217). Oregon State University Extension Service. https://extension.oregonstate.edu/sites/extd8/files/documents/em9217.pdf

UC Gill Tract Community Farm. (n.d.). *UC Gill Tract Community Farm*. Retrieved August 9, 2023, from https://www.gilltractfarm.org/

U.S. Census Bureau. (n.d.). *QuickFacts: Albany city, California*. Retrieved May 1, 2024, from https://www.census.gov/quickfacts/fact/table/albanycitycalifornia/PST045223

U.S. EPA. (2013, February 12). *Protect your family from sources of lead* [Overviews and Factsheets]. https://www.epa.gov/lead/protect-your-family-sources-lead

U.S. EPA. (2023). *Quantifying methane emissions from landfilled food waste* (EPA-600-R-23-064. U.S. Environmental Protection Agency. https://www.epa.gov/system/files/documents/2023-10/food-waste-landfill-methane-10-8-23-final_508-compliant.pdf

U.S. EPA. (2024a). *Inventory of U.S. greenhouse gas emissions and sinks: 1990-2022* (430-R-24–004). U.S. Environmental Protection Agency. https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2022

U.S. EPA. (2024b). *Pollutant limits, 40 CFR § 503.13*. https://www.ecfr.gov/current/title-40/chapter-I/subchapter-O/part-503/subpart-B/section-503.13

Vaismoradi, M., Jones, J., Turunen, H., & Snelgrove, S. (2016). Theme development in qualitative content analysis and thematic analysis. *Journal of Nursing Education and Practice*, *6*(5), 100–110. https://doi.org/10.5430/jnep.v6n5p100

van Zanten, H. H. E., Simon, W., van Selm, B., Wacker, J., Maindl, T. I., Frehner, A., Hijbeek, R., van Ittersum, M. K., & Herrero, M. (2023). Circularity in Europe strengthens the sustainability of the global food system. *Nature Food*, *4*(4), 320–330. https://doi.org/10.1038/s43016-023-00734-9

van Zanten, H. H. E., van Ittersum, M. K., & De Boer, I. J. M. (2019). The role of farm animals in a circular food system. *Global Food Security*, *21*, 18–22. https://doi.org/10.1016/j.gfs.2019.06.003

Zuniga, P. (2022, March 22). Berkeley's free compost closes the loop. *The Ecology Center Blog*. https://ecologycenter.org/blog/berkeleys-free-compost-closes-the-loop/

Appendices

Appendix A. Albany Compost Hub Check-in Survey and Responses

Albany Compost Hub Check-in Survey

Language?

a. English
b. Español
c. 普通話/國語
d. العربيَّةالعربيَّة

Please do this survey every time you take from the Compost Hub.

Thank you for participating in the Albany Compost Hub at Gill Tract! This hub is a partnership of the City of Albany, UC Berkeley, the Gill Tract Community Farm Coalition, and StopWaste.

What city do you live in?

a. Alameda
b. Albany
c. Berkeley
d. El Cerrito
e. Emeryville
f. Kensington
g. Oakland
h. Piedmont
i. Richmond
j. San Pablo
k. Other in Alameda County
l. Other outside of Alameda County

What is your zip code?
(free response)

Have you taken compost from this Compost Hub before?

a. Yes
b. No

How are you using the compost? (Multi-select)

a. Landscape plants, shrubs, and tree care
b. Grow fruits and vegetables
c. Container gardening
d. Compost tea
e. Sheet mulching
f. Topdressing
g. Digging in
h. Lawn Care
i. Other … (type-in)

How are you taking the compost with you? (Multi-select)

a. Buckets
b. Reusable bags
c. Borrowing container from Compost Hub
d. Tarps
e. Car
f. Public Transportation
g. Bike with wagon
h. Other… (type in)

How did you first hear about the Gill Tract Compost Hub?

a. Gill Tract Farm
b. UC Berkeley
c. City of Albany
d. StopWaste
e. Other Compost Hub Site
f. Friend or family
g. Other… (type-in)

Are you interested in any of the following ways to connect with the Farm? (multi-select)

a. Get email updates about events and workshops at the Farm
b. Volunteer at the Farm
c. None

If you checked any of the boxes above, please write your name and email so we can reach out.
(type-in)

Donations to Gill Tract in support of the compost hub are greatly appreciated and ensure its sustainability. We also want everyone who needs compost to take it, regardless of ability to donate!

A bag of organic compost sells for $7-45 retail. Donations can be made in cash at the Sunday farm stand 2:30-5pm, or online here: https://www.flipcause.com/secure/donate/Njg0NzI=

Will you be making a donation?

a. Yes
b. Not this time

Journal of Agriculture, Food Systems, and Community Development
ISSN: 2152-0801 online
https://foodsystemsjournal.org

Albany Compost Hub Check-in Survey Responses

	Number	Percentage
Language	*n* = 156	
English	152	97.44%
Spanish	3	1.92%
Chinese	1	0.64%
Arabic	0	0.00%
What city do you live in?	*n* = 156	
Alameda	1	0.64%
Albany	76	48.72%
Berkeley	22	14.10%
El Cerrito	8	5.13%
Emeryville	1	0.64%
Kensington	0	0.00%
Oakland	19	12.18%
Piedmont	0	0.00%
Richmond	16	10.26%
San Pablo	4	2.56%
Other in Alameda County	3	1.92%
Other outside of Alameda County	6	3.85%
Have you taken compost from this Compost Hub before?	*n* = 156	
Yes	47	30.13%
No	109	69.87%
How are you using the compost? [Multi-select]	*n* = 156	
Landscape plants, shrubs, and tree care	76	48.72%
Grow fruits and vegetables	100	64.10%
Container gardening	59	37.82%
Compost tea	4	2.56%
Sheet mulching	7	4.49%
Topdressing	17	10.90%
Digging in	10	6.41%
Lawn Care	6	3.85%

continued

continued	Number	Percentage
How are you taking the compost with you? [Multi-select]	*n* = 156	
Reusable bags	69	46.94%
Buckets	68	46.26%
Borrowing container from Compost Hub	23	15.65%
Wheelbarrow/wagon	6	4.08%
Tarps	3	2.04%
Car	41	82.00%
Walking	4	8.00%
Public Transportation	3	6.00%
Bike	2	4.00%
How did you first hear about the Gill Tract Compost Hub?	*n* = 156	
Gill Tract Farm	53	33.97%
Friend or family	35	22.44%
City of Albany	29	18.59%
Passing by	21	13.46%
Other	5	3.21%
Internet Search or Social Media	4	2.56%
Other Compost Hub Site	4	2.56%
StopWaste	4	2.56%
UC Berkeley	1	0.64%
Are you interested in any of the following ways to connect with the Farm? [Multi-select]	*n* = 156	
Get email updates about events and workshops at the Farm	70	44.87%
Volunteer at the Farm	17	10.90%
None/no answer	74	47.44%
Help us improve the compost hub by participating in a 30 minute phone interview about the hub and receive a $15 gift card.	20	12.82%
Will you be making a donation?	*n* = 156	
Yes	21	13.46%
Not this time	122	78.21%
N/A or Other	13	8.33%

Appendix B. Semi-Structured Interview Guides

Interview Guide: User

1. Introduction
    a. Have you been to the Compost Hub before? If yes, when did you start coming to the Hub?
    b. Before the Hub, had you been to Gill Tract before? If yes, in what capacity?
    c. How did you hear about the Compost Hub/Gill Tract?
    d. Have you composted before? If yes, what was that experience like?
        i. P: Where did you learn to compost? Where did you compost? For how long? For what purpose?
        ii. P: What did you learn from that experience?

2. Experiences with the Farm
    a. What have your experiences at the Farm been like?
        i. P: How do you feel at the farm?
    b. If you could change anything about Gill Tract (not the Compost Hub), what would it be? Why?

3. Experiences with the Compost Hub
    a. Why are you using the Compost Hub?
    b. What have your experiences with the Hub thus far been like?
        i. P: How is the process of getting here, parking, and loading the soil?
        ii. P: How accessible is it for you?
        iii. P: Are there enough tools?
    c. What do you think is working well at the Hub?
    d. What challenges do you have with the Compost Hub?
    e. What would you change about the Hub?
    f. Do you plan to come back to the Hub? Why or why not?

4. Soil use and quality
    a. Have you used soil from this Compost Hub before? (If yes, go to b., if no, go to c.)
    b. If yes:
        i. What did you use it for?
        ii. What did you think of the soil quality?
        iii. Did you mix it with anything else? Why or why not?
        iv. How does the compost from this Compost Hub compare with other compost you may have used (please name the other compost).
    c. If no:
        i. What do you plan to use this soil for?
        ii. Upon first look, what do you think of the soil quality?
        iii. Do you plan to mix it with anything else? Why or why not?

5. Education
    a. Have you utilized any educational materials at the Compost Hub? Why or why not?
    b. What have you learned about compost or composting systems since visiting the Compost Hub?
    c. Have you shared anything about the compost hub and what you've learned with others? If so, explain.

6. Wrap-up
    a. Is there anything else you would like to share about your experience with the Compost Hub?
    b. Is there anything you would like to ask me at this point?
    c. Would it be okay if I followed up with additional questions later? If yes, please share your contact information.
    d. Would you like me to share the recording and transcript of your interview? If yes, please share your contact information.

Interview Guide: Implementer

1. Introduction
   a. How long have you worked at/been involved with the Farm/UC Berkeley/StopWaste/City of Albany?
   b. What is your role with the Compost Hub, and why did you become involved with planning/implementing the Hub?
   c. What was your experience with composting before the Compost Hub?
      i. P: Where did you compost?
      ii. P: For how long?
      iii. P: For what purpose?
      iv. P: What did you learn from that experience?

2. Successes and Challenges
   a. What has your experience planning/implementing the Compost Hub been like?
      i. P: What have been some successes?
      ii. P: What were some challenges in the planning process?
      iii. P: What lessons did you learn?
   a. If you could change anything about the planning/implementation, what would it be and why?
   b. If you could change anything about the Compost Hub itself, what would it be and why?

3. Partnerships
   a. What were key partnerships that led to the creation of this compost hub, and why were they key? (Key can mean essential and/or helpful–however they interpret or define "key.")
   c. Are you aware of any other compost distribution sites? Please name. If so, what partnerships enabled them to happen?

4. Soil quality
   a. What do you think of the Hub's compost soil quality?
      i. P: Would you use it in your garden/farm? Why/Why not?
      ii. P: How would you recommend using it?
      iii. P: How does it compare to other compost you have used? (Please name other compost.)

5. SB 1383 Contributions
   a. How do you think the amount of compost distributed at the Hub compares to other compost distribution sites you have seen?
   b. Are you aware of Senate Bill 1383 at all? If yes, move on to c-f. If no, move to #6.
   c. What do you think of SB 1383?
   d. How does this Compost Hub contribute to Alameda County's SB 1383 procurement requirements?
   e. Do you think the Compost Hub (and similar programs) is a sustainable way to reach SB 1383 procurement goals? Why or why not?
   f. Do you think compost programs like this are a sustainable way to divert organic waste from landfills? Why or why not?

6. Wrap-up
   a. Is there anything else you would like to share about your experience with the Compost Hub?
   b. Is there anything you would like to ask me at this point?
   c. Would it be okay if I followed up with additional questions later? If yes, please share your contact information.
   d. Would you like me to share the recording and transcript of your interview? If yes, please share your contact information.
   e. Is there anyone else in your organization involved with the Compost Hub that you recommend I talk to? Please share their name and contact.

Appendix C. Demographic Questionnaire

1. What is your age?
    a. [Fill in the blank.]

2. With which gender identity/ies do you identify the most? Select all that apply.
    a. Male
    b. Female
    c. Non-binary/Genderqueer/Agender
    d. Cis-gender
    e. Trans-gender

3. With which racial/ethnic identity/ies do you identify the most? Select all that apply.
    a. Black
    b. Hispanic
    c. White
    d. Asian American
    e. Native American/Alaska Native

4. Education level
    a. Some high school
    b. High school graduate/GED
    c. Some college/associate degree
    d. Bachelor's degree
    e. Advanced degree (masters/PhD)

5. Which income level does your household fall under? [US$]
    a. <$24,999
    b. $25,000–49,999
    c. $50,000–74,999
    d. $75,000–99,999
    e. >$100,000

6. If you have residence, what is your zip code?
    a. [Fill in the blank.]

Appendix D. Compost Nutrient Analysis Results

Table A1. Compost Analysis Test Results: Nutrient Profile

Date Collected	6/18/2023	7/23/2023	8/16/2023	Range
pH	7.84	7.51	7.79	7.51–7.84
C/N Ratio	22.5	23.73	16.72	16.72–23.73
Soluble Salts (mmhos/cm)	1.11	1.47	0.91	0.91–1.47
Moisture (%)	36.37	34.05	26.39	26.39–36.37
Mineral Matter Dry (%)	47.26	54.78	42.66	42.66–54.78
Mineral Matter Wet (%)	30.07	36.13	31.4	30.07–36.13
Organic Matter Dry (%)	52.74	45.22	57.34	45.22–57.34
Organic Matter Wet (%)	33.56	29.82	42.21	29.82–42.21
Total Nitrogen Dry (%)	1.15	1.07	1.73	1.07–1.73
Total Nitrogen Wet (%)	0.73	0.71	1.27	0.708–1.27
Phosphorous Dry (%)	0.96	0.74	0.56	0.56–0.96
Phosphorous Wet (%)	0.61	0.49	0.41	0.414–0.614
Phosphorus as P2O5 Dry (%)	2.21	1.69	1.29	1.29–2.21
Phosphorus as P2O5 Wet (%)	1.41	1.12	0.95	0.949–1.407
Potassium Dry (%)	0.57	0.43	0.38	0.38–0.57
Potassium Wet (%)	0.36	0.29	0.28	0.283–0.36
Potassium as K2O Dry (%)	0.68	0.52	0.46	0.46–0.68
Potassium as K2O Wet (%)	0.43	0.34	0.34	0.341–0.434
Calcium Dry (%)	3.84	2.96	2.82	2.82–3.84
Calcium Wet (%)	2.45	1.95	2.08	1.954–2.445
Magnesium Dry (%)	0.68	0.69	0.54	0.54–0.69
Magnesium Wet (%)	0.43	0.46	0.39	0.394–0.456
Sodium Dry (%)	0.16	0.13	0.18	0.13–0.18
Sodium Wet (%)	0.1	0.09	0.13	0.088–0.13
Sulfur Dry (%)	0.3	0.35	0.24	0.24–0.35
Sulfur Wet (%)	0.19	0.23	0.18	0.178–0.231
Carbon Dry (%)	25.85	25.47	28.85	25.47–28.85
Carbon Wet (%)	16.45	16.8	21.24	16.45–21.24
Boron Dry (ppm)	38.25	28.86	37.62	28.86–38.25
Boron Wet (ppm)	24.34	19.03	27.69	19.03–27.69
Iron Dry (ppm)	13,066.09	16,436.89	9,835.33	9835.33–16436.89
Iron Wet (ppm)	8,313.95	10,840.10	7,239.79	7239.79–10840.1
Manganese Dry (ppm)	408.64	424.11	300.8	300.8–424.11
Manganese Wet (ppm)	260.02	279.7	221.42	221.42–279.7
Copper Dry (ppm)	116.41	97.94	67.72	67.72–116.41
Copper Wet (ppm)	74.07	64.59	49.85	49.85–74.07
Zinc (mg/kg)	301.34	239.95	211.32	211.32–301.34

Appendix E. Compost Data Sheets Provided by Vendor and Manufacturers

WALLACE LABORATORIES, LLC

365 Coral Circle
El Segundo, CA 90245
phone (310) 615-0116 fax (310) 640-6863

June 24, 2022

Conor Davis, conor@CaliforniaSoils.com
California Soils, Inc.
PO Box 345
Westley, CA 95387

RE: Sample received June 23, 2022
West Valley Compost, Our ID No. 22-175-09

Dear Conor,

The pH is moderately alkaline at 7.72.

Salinity is 6.75 millimho/cm. Chloride is 837 parts per million in the saturation extract. Soluble sulfur is high.

Nitrogen is low, about 50% of the soluble mineral nitrogen is nitrate nitrogen. Phosphorus, potassium, iron, manganese, zinc, copper, boron and magnesium are high. Sodium is modestly high. SAR (sodium adsorption ratio) is 3.0. The concentrations of common non-essential heavy metals are low.

Soil organic matter is 39.3% on a dry weight basis. The carbon:nitrogen ratio is 20.0.

The apparent cation exchange capacity is 60.2 milliequivalents per 100 grams. Exchangeable potassium is high. Exchangeable magnesium is good. Exchangeable calcium is good. Exchangeable sodium is moderate. Exchangeable hydrogen is low.

Sincerely,

Garn A. Wallace

Garn A. Wallace, Ph. D.
GAW:n

Paid $595.00, check No. 5148

Soil Analyses   Plant Analyses   Water Analyses

WALLACE LABS	**MEDIA REPORT**	Print Date	Jun. 24, 2022	Receive Date	6/23/22
365 Coral Circle	Location	California Soils, Inc.			
El Segundo, CA 90245	Requester	Conor Davis			
(310) 615-0116	graphic interpretation: * very low, ** low, *** moderate				
ammonium bicarbonate/DTPA		* * * * high, * * * * * very high			

extractable - mg/kg soil	**Sample ID Number**	22-175-09	
Interpretation of data	**Sample Description**	West Valley Compost	
low medium high	**elements**		graphic
0 - 12 16 - 28 32 - 44	**phosphorus**	440.08	*****
0-240 240-500 500-700	**potassium**	5,131.35	*****
0- 12 12- 20 over 20	**iron**	172.64	*****
0 - 2 3 - 4 over 5	**manganese**	134.41	*****
0 - 4 4 - 6 over 6	**zinc**	62.78	*****
0- 0.5 0.6 - 1 over 1	**copper**	23.70	*****
0 - 1 1 - 2 over 2	**boron**	6.80	*****
	calcium	2,219.37	****
	magnesium	857.86	*****
	sodium	968.32	****
	sulfur	2,381.28	****
	molybdenum	0.38	***
	nickel	2.10	*
The following trace	**aluminum**	n d	*
elements may be toxic	**arsenic**	1.03	*
The degree of toxicity	**barium**	3.09	*
depends upon the pH of	**cadmium**	0.19	*
the soil, soil texture,	**chromium**	0.31	*
organic matter, and the	**cobalt**	1.27	*
concentrations of the	**lead**	10.26	**
individual elements as well	**lithium**	1.30	*
as to their interactions	**mercury**	n d	*
	selenium	n d	*
The pH optimum depends	**silver**	n d	*
upon soil organic	**strontium**	7.96	*
matter and soil content-	**tin**	n d	*
	vanadium	2.77	*
under 5 may be too acidic			
6 to 7 may be good	**Saturation Extract**		
over 8.0 is too alkaline	**pH value**	7.72	****
The ECe is a measure of	**ECe (milli-**	6.72	*****
the media salinity:	**mho/cm)**		millieq/l
good at 200 ppm	**calcium**	489.3	24.5
good at 25 ppm	**magnesium**	163.3	13.5
	sodium	300.7	13.1
good at 25 ppm	**ammonium as N**	8.7	0.6
good at 150 ppm	**potassium**	1125.6	28.8
	cation sum		80.4
problems over 150 ppm	**chloride**	837	23.6
good at 100 ppm	**nitrate as N**	21.1	1.5
good at 40 ppm	**phosphorus as P**	2.9	0.1
toxic over 800	**sulfate as S**	777.0	48.6
	anion sum		73.7
toxic over 1 for many plants	**boron as B**	0.69	***
increasing problems start at 3	**SAR**	3.0	***
est. gypsum requirement-lbs/cubic yard		18.3	
	Total Nitrogen, dry weight basis	0.98%	
	Total Carbon, dry weight basis	19.64%	
	Carbon:Nitrogen Ratio	20.0	
	lime (calcium carbonate)	no	
	organic matter, dry weight basis	39.28%	
	moisture content of media	61.0%	
	half saturation percentage	112.4%	

ideal percentages of cations				% saturation
abt 5 %	potassium	millieq K	7.61	13%
< 3%	sodium	millieq Na	1.61	3%
abt 70%	calcium	millieq Ca	41.37	69%
10 - 15%	magnesium	millieq Mg	9.43	16%
5-10%	hydrogen	millieq H	0.16	0%
	total millieq/100 grams		60.18	

Elements are expressed as mg/kg dry soil or mg/l for saturation extract.
pH and ECe are measured in a saturation paste extract. nd means not detected.

Pacific Landscape Supply, Inc. P.O. Box 15809 San Luis Obispo, Ca 93406-5809

Office (209) 593-1199

January, 2023

Re: **Organic Compost**

To whom it may concern:

Organic Compost conditions the soil and improves aeration, drainage, water and nutrient-holding capacity. Organic Compost is a good addition for heavy clay soils particularly at new home sites and good pre-plant conditioner for new lawns and gardens. Organic Compost is produced from 100 percent recycled yard trimmings so it qualifies toward LEED certification points, and certified organic by the Organic Materials Review Institute (OMRI) so it may be used in organic farming applications. The compost complies with the Cal-Trans Standard Specification 20-2.03 Soil Amendment.

- **Compost is dark black in color**
- **The particle sizes range from 0 "- 3/8 "**
- **The average full load size is 45 cy**

Sincerely,

David Ray
Pacific Landscape Supply, Inc.

MODESTO ■ VERNALIS ■ STOCKTON ■ SAN LUIS OBISPO

Check us out on the web at: www.PacificLandscapeSupply.com

ANALYTICAL CHEMISTS and BACTERIOLOGISTS Approved by State of California

SOIL CONTROL LAB

42 HANGAR WAY WATSONVILLE CALIFORNIA 95076 USA

TEL: 831-724-5422
FAX: 831-724-3188
www.controllabs.com

Account #: 3020080-1/1-10216
Group: Feb23A #40
Reporting Date: February 15, 2023

California Soils, Inc.
P.O. Box 345
Westley, CA 95387
Attn: Conor Davis

Date Received: 03 Feb. 23
Sample Identification: West Valley Compost
Sample ID #: 3020080 - 1/1

Nutrients	Dry wt.	As Rcvd.	units
Total Nitrogen:	1.7	1.2	%
Ammonia (NH_4-N):	< 10	< 7.2	mg/kg
Nitrate (NO_3-N):	240	180	mg/kg
Org. Nitrogen (Org.-N):	1.7	1.2	%
Phosphorus (as P_2O_5):	1.6	1.1	%
Phosphorus (P):	6900	5000	mg/kg
Potassium (as K_2O):	0.80	0.58	%
Potassium (K):	6700	4800	mg/kg
Calcium (Ca):	3.3	2.4	%
Magnesium (Mg):	0.56	0.40	%
Sulfate (SO_4-S):	960	700	mg/kg
Boron (Total B):	36	26	mg/kg
Moisture:	0	27.6	%
Sodium (Na):	0.15	0.11	%
Chloride (Cl):	0.14	0.10	%
pH Value:	NA	7.28	unit
Bulk Density :	23	31	lb/cu ft
Carbonates ($CaCO_3$):	11	8.1	lb/ton
Conductivity (EC5):	3.3	NA	mmhos/cm
Organic Matter:	60.4	43.8	%
Organic Carbon:	29.0	21.0	%
Ash:	39.6	28.7	%
C/N Ratio	17	17	ratio
AgIndex	> 10	> 10	ratio

Metals	Dry wt.	EPA Limit	units
Aluminum (Al):	5800	-	mg/kg
Arsenic (As):	2.7	41	mg/kg
Cadmium (Cd):	< 1.0	39	mg/kg
Chromium (Cr):	19	-	mg/kg
Cobalt (Co)	3.9	-	mg/kg
Copper (Cu):	97	1500	mg/kg
Iron (Fe):	10000	-	mg/kg
Lead (Pb):	16	300	mg/kg
Manganese (Mn):	280	-	mg/kg
Mercury (Hg):	< 1.0	17	mg/kg
Molybdenum (Mo):	3.5	75	mg/kg
Nickel (Ni):	19	420	mg/kg
Selenium (Se):	< 1.0	100	mg/kg
Zinc (Zn):	180	2800	mg/kg

*Sample was received and handled in accordance with TMECC procedures.

Stability Indicator:

CO2 Evolution	Respirometery
mg CO_2-C/g OM/day	2.6
mg CO_2-C/g TS/day	1.6
Stability Rating	*stable*

Maturity Indicator: Cucumber Bioassay	
Compost:Vermiculite (v:v)	1:2
Emergence (%)	100
Seedling Vigor (%)	100
Description of Plants	*healthy*

Pathogens	Results	Units	Rating
Fecal Coliform	790	MPN/g	*pass*
Salmonella	< 3	MPN/4g	*pass*

Date Tested: 03 Feb. 23

Physical Contaminants**	% by dry wt
Total Plastic	< 0.1
Film Plastic	< 0.1
Glass	< 0.1
Metal	< 0.1
Sharps	ND
Total	< 0.5

Size Distribution

MM	% by weight
> 50	0.0
25 to 50	0.0
16 to 25	0.0
9.5 to 16	0.6
6.3 to 9.5	1.1
4.0 to 6.3	9.4
2.0 to 4.0	23.2
< 2.0	65.6

**Greater than 4mm in size (Sharps greater than 2mm)

Analyst: Assaf Sadeh