

Pay Dirt

Composting in Maryland
to Reduce Waste, Create Jobs, & Protect the Bay

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Executive Summary

May 2013



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Local Self-Reliance

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Compost is the dark, crumbly, earthy-smelling material produced by the natural decomposition of organic materials. It is a valuable soil conditioner. Compost adds needed organic matter to soil, sequesters carbon in soil, improves plant growth, conserves water, reduces reliance on chemical pesticides and fertilizers, and helps prevent nutrient runoff and soil erosion. But it also reduces the volume of and recycles materials that might otherwise be disposed in landfills or trash incinerators such as leaves, grass clippings, brush, garden trimmings, wood, manure, and food scraps. Furthermore, unlike recycling, composting is inherently local and part of the natural ecosystem. Recovered organics cannot be shipped abroad to be made into compost; this happens locally with myriad benefits to the local economy and environment. It is a place-based industry, which cannot be outsourced abroad. Thus, advancing composting and compost use in Maryland is a key sustainability strategy to create jobs, protect the Chesapeake Bay watershed, reduce climate impacts, improve soil vitality, and build resilient local economies.

Pay Dirt: Composting in Maryland to Reduce Waste, Create Jobs, and Protect the Bay summarizes the current composting infrastructure in the state, compares the number of jobs sustained through composting versus disposal facilities, outlines the benefits of expanding composting and compost use, underscores the importance of a diverse composting infrastructure that includes backyard and community composting, and suggests policies to overcome obstacles to expansion.

It does not analyze the costs to the public or private sectors of developing source-separated food scrap collection programs. Collection program costs will in part depend on the location and type of composting infrastructure developed. With local capacity available, communities and businesses will likely be better positioned to develop cost-effective collection programs. More research is needed to assess costs and how comprehensive composting could reduce the state's waste disposal needs and put it

on a path to a zero waste economy. Additional research on the total jobs, economic output and wages that could be supported by expanding composting in the state is also warranted to corroborate the initial findings in this report.

Current Composting Infrastructure in Maryland

Most Maryland counties have a well-developed infrastructure for collecting and composting yard trimmings. In 2010, more than 780,000 tons of yard trimmings were composted, contributing to the state's reported 44.6% diversion level. Material composted represented more than a quarter of material recycled. However, many jurisdictions could capture more yard trimmings.

Several communities have or soon will pilot residential food scrap collection programs for composting, including Howard County, the Town of University Park, the City of Takoma Park, and Prince George's County. Howard County and Prince George's County are developing their own capacity to compost food scraps.

Many large food scrap generators such as the University of Maryland, supermarkets, and restaurants already have collection programs, but most of this material is transferred out of state to a large-scale state-of-the-art composting facility in Wilmington, Delaware. Few facilities accept food scraps for composting in the state. Chesapeake Compost Works, in Baltimore, is one new facility, but food scrap generators are still sending material out of state, despite the fact that this facility has excess capacity, charges competitive tipping rates and is open 7 days a week. However, even when the facility reaches capacity at 180 tons per week, it will only be able to handle a tiny fraction of the total tonnage of food scraps now disposed in the state.

One reason for the lack of more facilities accepting food scraps is an inadequate regulatory structure to facilitate the development of new operations. In our August 2012 survey of Maryland composters, regulations and permitting were the most frequently cited

challenges to facilities' financial viability and their opportunities for expansion. Another reason is the State's embrace of trash incineration and state policy that provides renewable energy credits to incineration, a technology that requires waste and wasting, and competes with the development of non-burn options such as composting, which are more environmentally benign.

Jobs: Composting Versus Disposal

Composting, mulching, and natural wood waste recycling operations in Maryland already sustain more total jobs than the state's three waste incinerators, which handle almost twice as much tonnage.

We identified 42 facilities that compost, mulch, or recycle natural wood waste. Half of these – 23 – participated in our survey in August 2012. These 23 operations process 358,230 tons and employ 147 full-time equivalent people, or 4.1 jobs per 10,000 tons per year.

Smaller facilities (under 5,000 tons per year) had a higher job-to-ton ratio than their medium sized (between 5,000 and 20,000 tons per year) and large sized (greater than 20,000 tons per year) counterparts. This indicates that the rollout of smaller facilities will create more jobs than the development of a handful of centralized facilities. A decentralized infrastructure will also reduce transportation costs, which are often the largest cost of any waste handling system.

In contrast to the state's organic material recycling operations, the state's three incinerators employ 160, while processing 1,329,530 tons per year (or 1.2 jobs per 10,000 tons per year).

The state has 22 landfills that accept municipal solid waste. Only six shared data on employment. These six employ 2.1 jobs per 10,000 tons per year landfilled.

Thus, on a per-ton basis, in Maryland composting (including mulching and natural wood waste recyclers) employs two times more workers than landfilling, and four times more workers than incineration.

Comparing the jobs sustained by composting operations to disposal facilities on a per capital dollar investment basis is even more striking.

On a dollar-per-capital-investment basis, composting operations sustain three times more jobs than landfills and 17 times more jobs than incineration facilities in Maryland. But with data from only two landfills, more research is warranted. Regardless, composting sites do not pose the same bond and debt obligations for host communities.

In addition to direct jobs at composting sites (such as skilled equipment operators for windrow turners, front-end loaders, grinders, and screeners), further jobs are supported in the use of compost, which also tends to take place regionally.

Compost has many applications: agricultural and horticultural, landscape and nursery,

Benefits of Composting & Compost Use

- ❖ Reduces Waste
- ❖ Improves Soil
 - Creates a rich nutrient-filled material, humus
 - Increases the nutrient content in soils
 - Helps soils retain moisture
 - Reduces or eliminate the need for chemical fertilizers
 - Suppresses plant diseases and pests
 - Promotes higher yields of agricultural crops
 - Helps regenerate poor soils
 - Has the ability to cleanup (remediate) contaminated soil
- ❖ Reduces Stormwater Runoff & Soil Erosion
- ❖ Protects the Climate
 - Cuts landfill methane emissions
 - Stores carbon
 - Improves soil's ability to store carbon
 - Substitutes for energy-intensive fertilizers, pesticides, and fungicides
 - Improves plant growth, and thus carbon sequestration
 - Reduces energy use for irrigation
- ❖ Creates Jobs & Supports Local Economies
 - Composting can be small-scale and local
 - Jobs are local
 - Composting linked to urban farm production
 - Composting can diversify farm products and increase farm income
 - Compost products tend to be used locally
 - Use of compost products sustains additional businesses and green jobs

Source: Institute for Local Self-Reliance, 2013.

vegetable and flower gardens, sod production and roadside projects, wetlands creation, soil remediation and land reclamation, sports fields and golf courses, and sediment and erosion control. Jobs are sustained in each phase of the organics recovery cycle. Markets for quality compost are growing thanks to the expansion of sustainable practices associated with green infrastructure such as stormwater management, green roofs, rain gardens, erosion and sediment control, and low-impact development. Growth in demand for compost can also be attributed to a strong green building movement helped along by the US Green Building Council and its LEED certification.

ILSR contacted 13 for-profit businesses that use compost for soil erosion control, stormwater management, and other green infrastructure to determine how many workers they employ and how much compost they use. Together these businesses, which span nine states from Maryland to California, employ 70 workers involved with compost use, while using approximately 38,000 tons per year of compost. That translates to 18 workers for every 10,000 tons per year of compost used.

If all Maryland’s compost were used within the state for similar purposes, on a per-ton basis, composting and compost use would sustain 5 times more jobs than landfilling and 9 times more jobs than incineration. See Table ES-1 below.

If the estimated 1 million tons of organic materials now disposed in Maryland were instead composted at a mix of small, medium, and large facilities and the resulting compost used within the state, almost 1,400 new full-time equivalent jobs could potentially be supported, paying wages ranging from \$23 million to \$57 million. In contrast, when disposed in the state’s landfills and incinerators, this tonnage only supports 120 to 220 jobs. See Table ES-2.

Watershed Benefits of Compost Use

When added to soil, compost can help manage erosion, sedimentation, and stormwater runoff problems, which have devastating impacts on the Chesapeake Bay. Adding organic matter to soil via compost improves soil’s ability to retain water. Because compost can hold up to 20 times its weight in water, when added to soil, it can

Table ES-1: Jobs, Composting Vs. Disposal in MD

Type of Operation	Jobs/ 10,000 TPY	FTE Jobs/\$10 Million Invested
Composting Sites ^a	4.1	21.4
Compost Use	6.2	n/a
Total Composting & Compost Use	10.3	
Disposal Facilities		
Landfilling	2.2	8.4
Burning (with energy recovery)	1.2	1.6

^a Includes mulching and natural wood waste recycling sites.

TPY = tons per year (of material composted)
FTE = full-time equivalent

Source: Institute for Local Self-Reliance, 2013. Incinerator data based on Eileen Berenyi, Governmental Advisory Assoc. Inc., *2012-2013 Municipal Waste to Energy in the United States Yearbook & Directory*. Westport, Connecticut. 2012.

Table ES-2: Potential New MD Jobs By Composting 1 Million Tons of Organics

Option	FTE Jobs
Burning	120
Landfilling	220
Composting	740
Compost Use	620
Total Composting	1,360

FTE = full-time equivalent

Composting jobs based on one-third tonnage composted at small facilities, one-third at medium-sized facilities, and one-third at large facilities. Compost use jobs based on data from 13 companies using compost for soil erosion control, stormwater management, and other green infrastructure applications.

Source: Institute for Local Self-Reliance, 2013.

prevent non-point source pollution, and help control erosion and sedimentation.

Compost can manage nutrient stormwater and agricultural runoff by serving as a filter and sponge. Its high porosity and permeability allow contaminated stormwater to infiltrate at much higher rates than most existing soils; especially those compacted via human development. Once in compost-amended soil, toxins and pollutants begin to break down. Compost immobilizes and degrades pollutants, improving water quality and has the ability to bind heavy metals, pesticides, herbicides, and other contaminants, reducing both their leachability and absorption by plants. When used as a filtering material, compost, reduces contamination of urban pollutants by an astounding 60 to 95%.

The Importance of a Diverse Composting Infrastructure

One important benefit of composting is its ability to function effectively in a wide range of scales and sizes: small backyard bins, onsite systems at schools and hospitals, farm-based operations, and large low-tech and high-tech regional facilities.

What is needed is a highly decentralized and diverse organics recovery infrastructure that first prioritizes food rescue, backyard composting, onsite institutional systems, community composting, and urban and rural on-farm composting before the development of centralized regional facilities. Communities embracing such an infrastructure will be more resilient and will better reap the economic and environmental benefits that organics recovery has to offer.

The benefits of onsite composting are avoided transportation costs and the ability to use finished compost onsite for landscaping and other uses. Onsite composting is truly closed loop recycling.

ECO City Farms, in Edmonston (Prince George's County), exemplifies the benefits of community-based composting. This urban farm takes residential food scraps and using different composting techniques, turns it into fertile soil to support the production of dozens of varieties of produce. The locally produced food is then

marketed to the local community, which includes local restaurants. ECO City operates a commercial kitchen and teaching space to demonstrate low-tech and low-cost solutions for urban farmers, enable value-added and farm-to-school food entrepreneurial ventures, and shares information in an open source design. ECO City directly involves the community at its operations, which reinforces a culture of composting and the connection of compost to healthy soils and food production.

Home-composting and community-based efforts may not be enough to reach high diversion levels for organic materials. Larger centralized facilities will likely be needed too. By developing a diverse infrastructure, Maryland can become a model for other states to emulate.

Policies Needed

Local and state government policies are needed to overcome lack of infrastructure and other obstacles to diverting organic materials from disposal.

There are many strategies local government can embrace, such as:

- Adopting a highest and best use hierarchy that prioritizes source reduction, food rescue, home-based composting, and community-based and on-farm composting over large centralized facilities,
- Starting an edible food donation program,
- Training Master Composters,
- Targeting a wide range of yard debris materials for year-round collection,
- Banning yard trimmings from disposal facilities, and
- Piloting food scrap collection programs.

The State has a critical role in supporting and encouraging composting at the local level. It can provide technical assistance to local jurisdictions, for instance, on best management practices, but it also needs to take a leadership role in facilitating the development of an expanded compost infrastructure. New rules are needed to clarify environmental requirements, exempt small facilities, and ensure all facilities

protect public health and the environment by meeting performance standards.

In 2012, a Statewide Composting Workgroup convened (in response to HB 817 from the 2011 legislative session entitled *Environment – Composting*) to study composting in the State; make recommendations on how to promote composting in the State, including any necessary programmatic, legislative, or regulatory changes; and to report findings and recommendations to The Maryland General Assembly.

The *Composting Workgroup Final Report* highlighted 15 core recommendations, from new compost site permitting regulations and financial assistance to support for creating markets for finished compost. (See Appendix A.) The two top recommendations were for The General Assembly to authorize MD Department of the Environment (MDE) to issue regulations for the design and operation of composting facilities and to exempt these sites from being subject to the same regulations as refuse disposal sites.

In the 2013 legislative session, The MD General Assembly did just this by passing HB 1440: Recycling-Composting Facilities (introduced by Del. Heather Mizeur). This bill will advance composting by allowing MDE to establish a permit system for composting facilities and exclude source-separated materials from being regulated as a solid waste. The bill paves the way for MDE to address the regulatory hurdles facing MD composters and to create a clear regulatory pathway for composting facilities.

The MD General Assembly should address all 15 recommendations of the Composting Workgroup and consider the many additional policies identified in this report (e.g., pay-as-you-throw trash systems, encouragement of a decentralized composting infrastructure, a moratorium on building new trash burners, implementation of a per-ton surcharge on all disposal facilities to fund recycling and composting initiatives, establishment of a 75% recycling goal by 2030, and compost-amended soil requirements).

Key Findings

Composting can divert significant materials from disposal

- Composting yard trimmings already diverts more than 780,000 tons per year of Maryland's waste from disposal, representing more than a quarter of material recycled.
- Expanding composting for food scraps will be important for counties to meet higher recycling levels.
- Almost one-half of typical household garbage set out at the curb is compostable. A pilot food scrap collection and composting program in Howard County indicates that food scraps alone make up one-quarter of residential material.
- Communities elsewhere, such as San Francisco, that have comprehensive composting programs including food scrap recovery, have surpassed 75% recycling levels.
- In Maryland, the potential to expand composting is enormous; more than 1 million tons of yard trimming and food scraps are estimated disposed each year.

Composting and using compost create jobs

- Composting (including mulching and natural wood waste recycling) operations in Maryland already sustain more total jobs than the state's three trash incinerators, which handle almost twice as much tonnage.
- Jobs are sustained in each stage of the organics recovery cycle: manufacturing compost as well as using compost.
- On a per-ton basis, composting in Maryland employs two times more workers than landfilling, and four times more than the state's trash incinerators.
- On a per-dollar-capital investment basis, for every \$10 million invested, composting facilities in Maryland support twice as many jobs as landfills and 17 more jobs than incinerators.

- Wages at composting facilities typically range from \$16 to \$20 per hour.
- In addition to manufacturing compost, *using* compost in “green infrastructure” and for stormwater and sediment control creates even more jobs. Green infrastructure represents low-impact development such as rain gardens, green roofs, bioswales, vegetated retaining walls, and compost blankets on steep highway embankments to control soil erosion.
- An entire new industry of contractors who use compost and compost-based products for green infrastructure has emerged, presenting an opportunity to establish a new made-in-America industrial sector.
- Utilizing 10,000 tons of finished compost annually in green infrastructure can sustain one new business. For every 10,000 tons of compost used annually by these businesses, 18 full-time equivalent job can be sustained.
- For every 1 million tons of organic material composted, followed by local use of the resulting compost in green infrastructure, almost 1,400 new full-time equivalent jobs could potentially be supported. These 1,400 jobs could pay wages from \$23 million to \$57 million each year.
- Composting and compost use represent place-based industries that cannot be outsourced abroad.

Compost can help protect the Chesapeake Bay watershed

- Healthy soils are essential for protecting the Chesapeake Bay and other watersheds
- Compost is the best way to add organic matter – which is vital to soil quality – to soils
- When added to soil, compost:
 1. Reduces non-point source pollution by binding pollutants and absorbing water, reducing erosion and sedimentation,

2. Improves the quality of soil, retaining moisture and reducing the need for fertilizers, pesticides, and fungicides.

- Compost helps reduce stormwater runoff because it can hold up to 20 times its weight in water.
- Compost helps manage nutrient-laden stormwater and agricultural runoff by serving as a filter and a sponge. Its high porosity and permeability allow contaminated stormwater to infiltrate at much higher rates than most existing soils, especially those compacted via human development. Once in compost-amended soil, toxins and pollutants begin to break down. Compost immobilizes and degrades pollutants, improving water quality. It has the ability to bind heavy metals, pesticides, herbicides, and other contaminants, reducing both their leachability and absorption by plants.
- Compost-based products are identified as best management practices for controlling erosion and sediment in construction activities and for post-construction stormwater management. Examples: compost socks to trap sediment and for slope stabilization, compost vegetated cover, compost engineered soil, compost vegetated filter strips, and compost bioswales.
- Compost-based products for erosion control and stormwater management have the ability to filter and remove up to 99% of bacteria, 73% of heavy metals, 92% of nutrients, and 99% of hydrocarbons from stormwater.
- Compost, when added to soil, can reduce contamination of urban pollutants by an astounding 60 to 95%.

A diverse and local composting infrastructure is needed

- Composting can take place effectively in a wide range of scale and sizes: small backyard bins, community gardens, onsite systems at schools and hospitals, rural and urban farm-based operations,

and large low-tech and high-tech regional facilities.

- Smaller composting facilities have a higher job-to-ton ratio. In Maryland, on a per-ton basis, small-scale composting facilities employ six times the number of jobs as landfills and eleven times more than incinerators.
- Several small-scale food scrap composting operations have opened in Maryland the last three years, demonstrating the viability of locally-based systems: ECO City Farms, an urban farm in Edmonston; Chesapeake Compost Works, a private enterprise in Curtis Bay, Baltimore; and a Howard County government site to process material from a residential pilot.
- Communities embracing a decentralized and diverse organics recovery infrastructure –one that first prioritizes food rescue, backyard composting, onsite institutional systems, community composting, and urban and rural on-farm composting before the development of centralized regional facilities – will be more resilient and will better reap the economic and environmental benefits that organics recovery has to offer.
- By developing a diverse infrastructure, Maryland can become a model for other states to emulate.

Policies are needed to expand composting and compost use in Maryland

- Local and state policies are needed to overcome lack of infrastructure and other obstacles to compost expansion, such as permitting restrictions. Permitting and regulations are top challenges to composting facilities’ financial viability and their opportunities for expansion. Maryland composters also point to financing and lack of demand for compost as obstacles to expansion.
- An emerging industry of companies that use compost and compost-based products for erosion control and

watershed protection is looking to expand in Maryland and the Mid-Atlantic region, and can benefit if policies that promote composting and compost use are implemented.

- The State has a critical role in supporting and encouraging composting at the local level. It can provide technical assistance to local jurisdictions, for instance, on best management practices, but it also needs to take a leadership role in facilitating the development of an expanded compost infrastructure. New rules are needed to clarify environmental requirements, exempt small facilities, and ensure all facilities protect public health and the environment by meeting performance standards.
- The MD General Assembly should address all 15 recommendations of a Statewide Composting Workgroup, convened in 2012 as a result of MD House Bill 817, and should consider many additional policies that would support expanding composting in Maryland (e.g., pay-as-you-throw trash systems, encouragement of a decentralized composting infrastructure, a moratorium on building new trash burners, implementation of a per-ton surcharge on all disposal facilities to fund recycling and composting initiatives, establishment of a 75% recycling goal by 2030, and compost-amended soil requirements).

Conclusion

Maryland is at a crossroads. Its recycling rate has stagnated at around 40% for more than a decade, and counties are only required to recycle 35% by 2015 (20% if they have populations under 150,000). With compostable material making up one-third to one-half of municipal solid waste, there is an enormous opportunity to achieve higher recycling levels with comprehensive composting. In addition to yard debris and food scraps, soiled paper such as pizza boxes and paper towels can be composted. Switching to compostable foodservice ware and

packaging would further help divert materials from disposal facilities. Increasing composting and compost use would benefit the state in other important ways too.

At the same time Maryland struggles to increase its recycling levels, the Chesapeake Bay watershed continues to suffer from excessive nitrogen and phosphorus levels due to nutrient-laden runoff pollution, despite decades of attention. Excess fertilizers from farms and suburban lawns, sewage from septic systems, and sediment from construction projects wash off the land and into our waterways every time it rains. When added to soil, compost can help manage these erosion, sedimentation, and stormwater runoff problems. Healthy soils are essential for protecting local watersheds. Naturally occurring (undisturbed) soil and vegetation provide important stormwater functions: water infiltration; nutrient, sediment, and pollutant adsorption; sediment and pollutant biofiltration; water interflow storage and transmission; and pollutant decomposition. These functions are largely lost when development strips away native soil and vegetation and replaces them with minimal topsoil and sod. Organic matter is vital to soil quality and amending soil with compost is the best way to increase the organic matter in soil, which improves soil's ability to retain water.

Expanding the use of compost for stormwater and erosion control and in green infrastructure such as green roofs and rain gardens will create a new business sector in Maryland. For every 10,000 tons of compost used per year, about 18 jobs are sustained. This is in addition to the jobs that could be created by expanding the manufacturing of compost at composting sites.

Maryland has numerous farmers who could potentially start composting if they were trained and could navigate zoning and other regulations. Expansion of backyard composting would reduce municipal government costs to collect and handle material and retain valuable organic matter in our neighborhood soils.

The creation of a comprehensive food recovery strategy would ensure that edible organics are diverted to those who need them most.

However, despite best intentions, composting and compost use will ultimately be limited if the State continues to approve new waste incinerators and pass policies that encourage trash burning.

Legislation passed in 2012 provides subsidies for burning trash under the guise of renewable energy credits. And an unsuccessful bill proposed by the incinerator company Covanta during the 2013 legislative session would have driven more trash to incinerators by establishing landfill diversion goals and penalties for landfill disposal but not for burning (SB799). Covanta is already working to get it reintroduced in 2014. Large trash burners are planned in Frederick County (1,500 ton-per-day capacity) and in the City of Baltimore (4,000 ton-per-day capacity), two communities that have yet to develop comprehensive programs to recover source-separated organics. Incinerators need waste to make good on bond obligations. While incinerators are presented as green, renewable, economical solutions to waste problems, in reality, these facilities drain financial resources, pollute, undermine waste reduction and economic development efforts, and compete with the introduction of comprehensive food scrap composting systems.

One major finding of this report is that the state's composting operations, on a per-ton and a per-dollar-capital-investment basis, sustain more jobs than its landfills or incinerators. For every 10,000 tons per year flowing to an incinerator, one job is sustained. Data from 6 of the state's 22 municipal solid waste landfills, indicate landfills sustain two jobs per 10,000 tons per year landfilled. In contrast, half of the state's composting operations sustain four jobs for every 10,000 tons per year they handle.

Hundreds of new jobs could be created if organic material was diverted from landfills and incinerators to composting facilities. The potential job creation would increase if a diverse composting infrastructure was developed, that included many small- and medium-sized operations.

Based on data gathered for this report, if the estimated 1 million tons of organic materials now disposed in Maryland were instead composted at a mix of small, medium, and large

facilities and the resulting compost used within the state, almost 1,400 new full-time equivalent jobs could potentially be supported, paying wages ranging from \$23 million to \$57 million. In contrast, when disposed in the state's landfills and incinerators, this tonnage only supports 120 to 220 jobs.

By establishing a moratorium on building new trash incinerators while the State puts in place new regulations and support for composting, Maryland will be better positioned to reap the rewards of expanded composting and compost use: jobs, better soil quality, a healthier Chesapeake Bay, reduced greenhouse gas emissions, and more resilient communities.

ILSR recommends a comprehensive composting strategy for Maryland: one that promotes home composting and small-scale farm and community sites as a priority, followed by onsite institutional systems and then development of commercial capacity for remaining organics. If implemented, such a strategy would make Maryland a national leader.