



9. Organic Waste

9.1 Purpose

This chapter is about the handling and management of organic matter, otherwise called composting. Humans have been purposely composting since forming civil societies and little has changed for 2,000 years. The process has advanced technologically only within the last few decades.

The purpose of this chapter is to provide a brief review of composting processes, legislation, Maui activities and alternatives for the County. Those readers familiar with this background may wish to move directly to Section 9.3 which provides examples of how other jurisdictions handle their organic matter. Section 9.4 summarizes pertinent legislation. Section 9.5 summarizes the findings of the 1994 ISWMP. Section 9.6 summarizes organic waste operations, both public and private, occurring in the County. Section 9.7 summarizes a university's finding on the amount of animal manure production in Maui. Section 9.8 provides tonnage figures for organic waste, projected out to 2030. In Section 9.9, alternatives and recommendations are provided for the handling of organic waste on all three islands.

9.2 Background

Compost is the product of a controlled biological decomposition of organic material that generates enough heat to kill pathogens. Roger Haug defines the compost process as:

“The biological decomposition and stabilization of organic substrates under conditions that allow development of thermophilic temperatures as a result of biologically produced heat, to produce a final product that is stable, free of pathogens and plant seeds, and can be beneficially applied to land.”¹

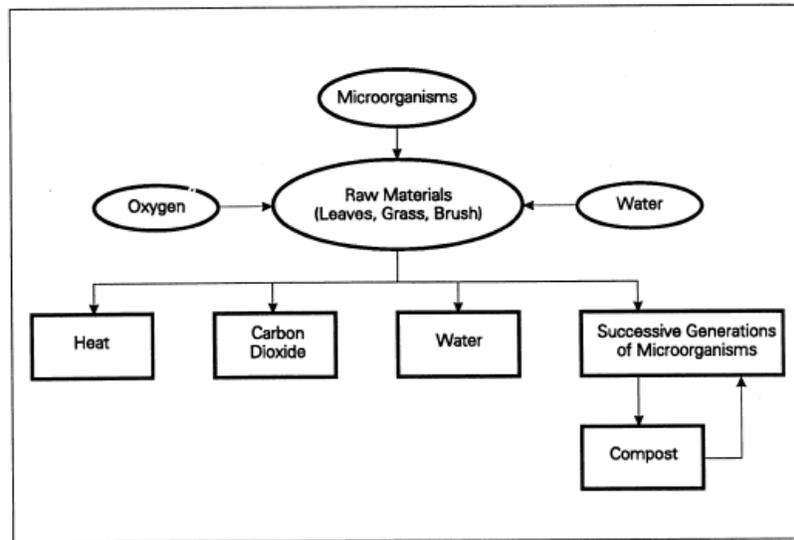
Bioconversion, however, is essentially the same process, but its product, or one of them, is energy. Bioconversion tends to be technologically advanced and is discussed in Chapter 12, along with other technologically oriented disposal/processing options for the County.

The aerobic (with air) composting process takes a mix of feedstock that is high in carbon (e.g., dry leaves, paper, wood chips), high in nitrogen (e.g., sewage sludge, wet grass, food waste), and applies moisture and oxygen to these materials to generate consistent heat of 140 degrees F. for a duration of time to kill pathogens and seeds. Microorganisms (e.g., bacteria, fungi, actinomycets) break down the organic matter and produce humus known as compost. Figure 9-1 is a diagram illustrating this aerobic composting process.

¹ Roger T. Haug, [The Practical Handbook of Compost Engineering](#) CRC , 1993; also see USEPA website for information on composting: <http://www.epa.gov/epaoswer/non-hw/composting/basic.htm#org>



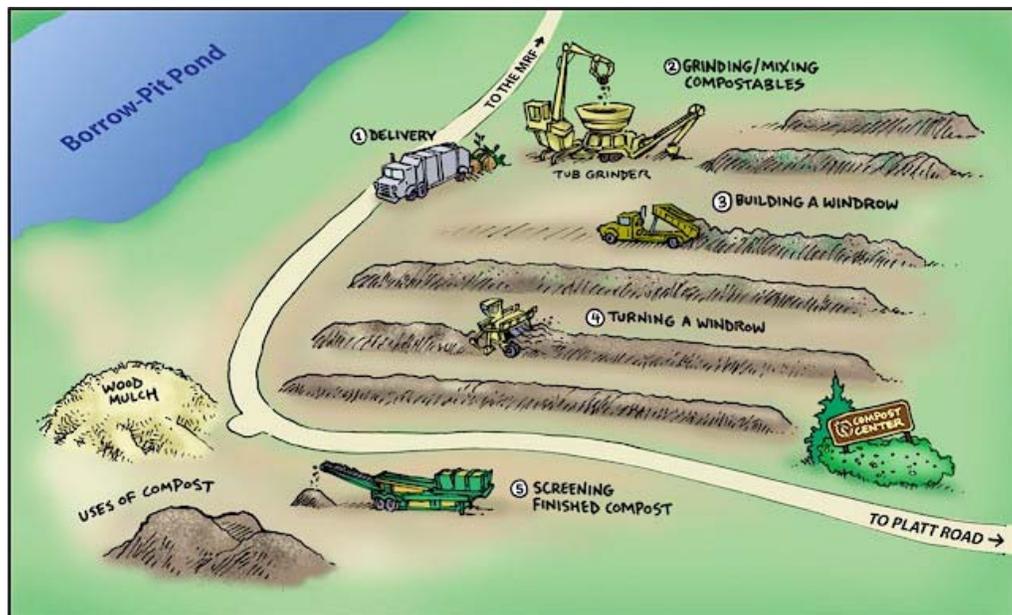
Figure 9-1 - Aerobic Composting Process



Compost is also created by biological decomposition that eliminates oxygen (anaerobic). Advanced anaerobic processes digest the green waste in tanks, capturing the biogas made from methane and carbon dioxide. This biogas can be used as a substitute for petroleum-based fuel. The remaining physical material, compost, can be used as a soil supplement. This bioconversion process is discussed in Chapter 12.

Compost processes can be either high tech in-vessel, or low tech, in piles or rows. Figure 9-2 shows a large-scale composting facility that does not use in-vessel techniques; rather, outdoor open windrows, long narrow rows of green waste, are used to cure the green waste into compost.

Figure 9-2 - Windrow Operation





The following explains the numbered activities in more detail.

1. The green waste is delivered in a rear-load collection vehicle.
2. The fresh green waste is placed in a tub grinder and then mixed with other material to balance carbon and nitrogen-containing materials.
3. A dump truck takes this mixed batch and spreads into a straight row, or windrow.
4. A specialized piece of equipment, windrow turner, straddles the windrow and, moving forward, turns and mixes the material so that oxygen adequately gets to all material.
5. After the windrow material has cured for the desired length of time to meet quality standards of the operation, the contents of the rows are processed through a screen to separate compost from non-compostable items such as rocks.

The windrow process takes up a significant amount of acreage and often is placed on pavement, thereby increasing the site development costs substantially. In-vessel processes take less space, shorten the curing time and are capital intensive.

In-vessel composting processes grind and mix the material, as is done in the windrow process noted above, before the material is placed into a vessel. Some jurisdictions have chosen to use an agricultural bag, Photo 9-1, which is made of thick plastic, and stuff its ground and mixed green waste into it. A system of blowers is connected to the sealed bag so that air circulates through the material. These bags cannot be reused and become a waste product after the curing process is completed.



Photo 9-1. Example of Ag-Bag

Some jurisdictions cure the compostable material in containers similar to those used for shipping that provide the manager with the ability to move them around as needed. Photo 9-2 shows a row of such containers each in different stages of curing. This is a modular system that can be expanded by adding containers.



Photo 9-2. Modular compact container system

In-vessel composting machines shortens the curing time to

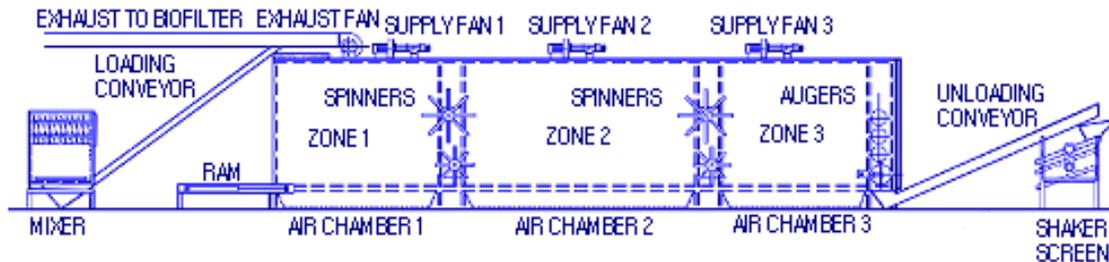


approximately a month. Figure 9-3 shows a schematic for a modular system consisting of a series of connected metal boxes with a ram, or tray conveyer, propelling the material from one box to the next. Each box, or zone as it is called in the schematic, has a mechanism that spins the material to increase air flow and generate heat. Each zone has its own air supply and a biofilter exhaust fan to minimize odor. The configuration of airflow and temperatures kills the pathogens in a 14-day cycle and the material then comes out of the machine. The product must then be stockpiled to cure for another 30 to 90 days, depending upon the quality of compost desired. Photo 9-3 is of the modular system located at the Virginia Powhatan Correctional Institute, which started operation in 2000 and processes two tons of food waste a day.



Photo 9-3. Self-Contained Machine in Virginia

Figure 9-3 – Self Contained System



9.3 What Other Communities Have Done

In 2006, 12.9 percent of the total MSW generated in the U.S. was yard waste. Of that total, 62 percent was collected and recycled.² Jurisdictions vary as to how they collect green waste. Some receive it at drop-off sites and have it transported to a facility where it is ground and used as an aggregate in a composting operation and/or provided to the public as mulch.

The timing of the collection varies based on budget and climate. Jurisdictions, such as Fairfax County, Virginia, collect green waste bundled at the curb each month. Nashville, Tennessee collects it at the curb five times a year with a knuckle-boom grapple hook vehicle. The City of Los Angeles collects green waste in carts on a weekly basis, while other jurisdictions collect on an appointment basis.

² "Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2006," USEPA, 2007. pp. 3 and 6.



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When the material gets to the location where it is ground for mulch or processed for composting, the processor wants minimal to no time spent sifting through the green waste to remove contaminants. The material goes through a grinding process, and contaminants will be shredded, also. This expands the number of contaminated particles through a greater volume of the material and lowers the value of the product.



Photo 9-4. Green carts for food waste, blue for recycling, and black for trash

SWRAC toured San Francisco's Fantastic 3 collection program. This system collects trash in one cart, dry recyclables in a second cart, and food and green wastes in a third. Photo 9-4 shows the Fantastic 3 carts set out in front of Macy's Department Store in San Francisco's fashionable Union Square. The SWRAC followed the food and green waste to Vacaville, California, where workers grind, mix, and place the material into windrows (Photo 9-5). Originally, Ag-bags were used, but recently, the operation switched to a reusable Gore-Tex-covered tarp.



Photo 9-5. Windrows of food and yard waste from San Francisco

The SWRAC also visited Portland, Oregon, where food waste is collected and shipped from the transfer station to a private processor in King County, Washington. Portland, as does the City of Seattle, attempts to quantify the tons diverted by residential backyard composting. It does this by tracking the number of backyard compost bins it provides to households, assumes how many pounds of food waste are placed in them each day and then multiplies that number by 365 days a year. This total is made a part of the diversion rate for the jurisdiction.

Monterey, California, another stop on the SWRAC tour, is similar to the County of Maui in land size, resident population, and division between tourism and agriculture. It takes in green waste and chips the material into mulch for citizens to use. Photo 9-6 shows the green waste before and after it is ground. The green waste is placed in the conveyer (photo background) to be fed to the grinder.



Photo 9-6. Monterey, California Mulch Grinding



9.4 Green Waste in Hawaiian Counties

Hawaiian Counties differ in their policies toward green waste. The following reviews



Photo 9-7. A citizen unloading green waste into the MSW transfer station at Puako



Photo 9-8. EKO grinding at the Hilo Landfill

their collection and processing strategies.

County of Hawaii: The County contracts with EKO Compost (EKO) to grind the green waste brought into the landfill. Citizens can take the green waste to the landfill and separate it so that it can be ground (Photos 9-7 and 9-8).

Once ground, citizens can load up and take the chipped green waste for free. If the citizen does not choose to take it to the landfill, the citizen can mix it in with the MSW at the transfer stations around the island. The County does not perform any curbside collection, and there is no private separate yard waste collection on the island. The County's transfer stations do not handle yard waste separately. Citizens place their green waste into MSW transfer trailers, and the County buries it into a Subtitle D landfill.

County of Kauai: In 2005, Kauai County recycled 11,648 tons of green waste from the landfill, achieving an overall green waste diversion of 69 percent. The County provides 5 locations for residents and businesses to drop off green wastes at no charge. The County contracts with two private firms to grind the material and produce mulch. The mulch is made available to the public free of charge.

City and County of Honolulu (Oahu): The jurisdiction generates 200,000 tons of green waste annually and collects 80,000 to 85,000 TPY of this green waste which is recycled. The jurisdiction collects green waste from 150,000 homes twice per month, allowing the customer to set out green waste in bags or 35-gallon containers for collection or, as Photo 9-9 illustrates, leave the green waste at the curb to be collected by a rear-load truck. This service has been available to households for years. Also, trees and branches are cut to three-foot lengths and bundled. Bundles must weigh less than 50 lbs.



Photo 9-9. City and County of Honolulu's curbside collection of green waste



In 2007, the City began a new automated green waste collection system, providing carts to the customer. The jurisdiction's goal is to expand the green waste cart system islandwide over the next two years and increase greencycling by an additional 65,000 tons.

9.5 Legislation

9.5.1 Federal

There are no U.S. federal regulations that apply to bioconversion of MSW or a fraction of MSW, such as yard waste. However, there are regulations that apply to biosolids (sewage sludge). The Clean Water Act (40 CFR Parts 122, 123, and 503) outline requirements that apply to composting of biosolids. A co-composting facility, like the EKO facility on Maui, must comply with these regulations. When composting of green waste or mixed MSW, however, most operators and state and local regulators rely on these federal requirements as guidance and best practices for biosolids. The USEPA and the U.S. Department of Agriculture have developed guidelines for quality, content, and acceptable levels of contaminants. The RCRA Subtitle D Landfill Criteria promulgated by USEPA bans bulk liquid wastes from landfills. These regulations apply to liquid organic wastes which are biodegradable. Composting in conjunction with shredded green waste provides an alternative method of disposing of and recycling these materials which is acceptable to the USEPA. Many jurisdictions apply the biosolid standards to composting of yard waste and/or MSW.

9.5.2 State of Hawaii

Bioconversion programs are covered by HRS Chapter 342H with associated administrative rules contained in HAR Ch. 11-58.1 and Ch. 11-62. A permit is required, as specified by Title 11 of the Administrative Rules, for composting and other bioconversion facilities which are issued by the Department of Health. The permit requirements include: a site analysis, specific design requirements and an operations plan. Such permitted requirements are not required for single-family and duplex residences for green and vegetative waste generated on their premises.

9.5.3 County of Maui

The County of Maui Code, Chapter 15-108, provides rules for refuse collection. These rules allow the mixing of yard waste in the general category of "Rubbish." The rules provide for bundles of branches, tree trunks, and similar materials, including wooden boxes and cardboard.

9.6 Review of 1994 ISWMP

The 1994 ISWMP called for the County to advance composting for green waste and biosolids. Recommendations from the 1994 ISWMP include:

- Recommendation 4-5: Continue landfill diversion research and demonstration projects.



- Expand composting/recycling projects including co-composting with biosolids.
- Implement full line of testing.
- Develop new landfill diversion projects as feasible.
- Recommendation 4-6: Develop green waste satellite collection program.
 - Develop locations (Wailuku, Makawao-Pukalani, and Kihei) in addition to Olowalu.
 - Collect green waste five days per week.
- Recommendation 4-9: Continually investigate local markets.

9.7 Implementation of 1994 ISWMP

Since 1993 and before the 1994 ISWMP recommendations were made, the County had established a comprehensive program to dispose of biosolids (sewage sludge or the solid materials removed in treating wastewater) from County wastewater treatment plants as a way of reducing the amount of materials going into the County landfill.

Co-composting, which involves treating sludge in a natural decomposition process with green wastes, was cleared by the state Department of Health after a 1994 pilot project established that the process eliminated pathogens that may be in the sludge.

After a pilot project of co-composting, the County entered into a contract with EKO for full-scale co-composting of biosolids and green waste on land at the Central Maui Landfill. In 2004, this relationship won the Solid Waste Association of North America's Gold award for Excellence for its "commitment to achieving the highest standards in the solid waste industry." Nearly 50 percent of the Central Maui Landfill's diversion is the direct result of this public-private partnership.

Figure 9-4 - Gold Medal Winner



9.8 Maui's Current Programs

9.8.1 EKO Partnership

The County of Maui and EKO entered into a contract in 1995 where the County agreed to pay EKO on a per ton basis to receive and process the biosolids with green waste. EKO



Photo 9-13. Composting operation at Central Maui Landfill



does not charge the County for accepting green waste. The County provides a site for EKO at the Central Maui Landfill for co-composting. EKO is responsible for the marketing of the resulting products (Photo 9-13).

Central Maui Landfill is located on the isthmus between West Maui and Haleakala, approximately 14,000 feet southeast of the Kahului Airport. The Tax Key Map identification for the site is TMK (2) 3-8-03:4, 19, 25. The facility is currently at capacity, and if green waste recycling is to be increased by the County and processed by EKO, the County will need to help EKO expand the size of its facility by allowing it to expand by approximately 20 acres.

EKO began in June 1977 and has developed markets in the Pacific Northwest and Hawaiian Island areas. It has facilities on Maui and Hawaii Islands. EKO processes approximately 25,000 tons of biosolids and other wastewater products a year at its facility located at the County's Central Maui Landfill. The 22,000 tons of biosolids are delivered to the facility and mixed with approximately 30,000 tons of shredded yard waste and wood pallets to biodegrade into compost.³ Citizens and commercial entities bring their green waste to the landfill and are directed to a location managed by EKO. This green waste is unloaded by the customer, and EKO personnel process the waste by placing it into a tub grinder where it is ground into smaller sized particles. These particles are then mixed with the biosolids and composted (Photo 9-14).

The resulting compost is screened to remove large particles and sold as soil conditioner. Residential self-haul yard waste is not weighed.

Each batch of compost is tested by an independent laboratory as required by the USEPA 40 CFR 503 Guidelines, and EKO is a participant in the U.S. Composting Council's Seal of Testing Assurance Program.

EKO markets the finished product in both bulk and bagged form through Pacific Agricultural Sales & Service and Hawaii Grower Products. A variety of products are produced depending on application and blending, including compost, lawn topdressing and mulch. Bagged compost costs \$7.00 for a 1.5 cubic foot bag. The County receives, as part of its contract, a certain amount of compost each year at no additional cost.



Photo 9-14. Close-up of EKO compost piles and equipment

9.8.2 Pacific Biodiesel

Pacific Biodiesel builds scalable plants to process fats, oil and grease (FOG) into biofuel. In 1995, the company entered into a contract with EKO and established a plant at the Central Maui Landfill. It has a facility to take FOG and convert approximately 5,000 tons into 200,000 gallons of fuel for diesel engines. On February 23, 2006, the USEPA Administrator and other officials toured the facility because of

³ EKO Annual Report for the period July 2005 – June 2006.



Pacific Biodiesel's product and the interest that the nation is now paying toward alternative fuels.⁴

9.8.3 Islands of Lanai and Molokai

Nothing similar to the activities on the Island of Maui occurs on the Islands of Lanai and Molokai. Lanai currently buries its green waste in the landfill; however, the County and the Lanai Company are exploring establishing a composting program. Molokai separates green waste at the landfill, grinds it, and makes it available for citizens to take for free.

9.8.4 Backyard Composting

In 1997, the County awarded a grant to the Maui Recycling Group (MRG) to purchase and distribute residential compost bins and to do home composting workshops, thereby establishing the Home Composting Education Project. The County provided a second grant to develop a home composting manual and to continue providing workshops for the community.

The County has provided compost demonstration projects at public locations, such as the Maui Community College, where citizens can view a range of home composting bins and chippers. In 2003, the County worked with MRG to initiate vermi-composting (worms) workshops where citizens were educated on vermi-composting and provided the opportunity to purchase a home system called "Joy of Worms."

The County currently contracts with a former MRG officer to conduct composting and vermi-composting workshops throughout the community and schools.

9.8.5 Private-sector Operations

Maui Earth Compost (MEC) has two facilities on the Island of Maui. One is located on the corner of Hansen Road and Pulehu Road in Puunene, and the second is in central Kihei, off Piilani Highway behind the County wastewater treatment facility. The Puunene facility is open Monday through Saturday from 7:30 am to 4:00 pm. The Kihei facility is open Monday through Friday from 7:30 am to 4:00 pm, and Saturday and Sunday from 8:00 am to 12:00 noon. A typical windrow operated by MEC is pictured in Photo 9-15.



Photo 9-15. Windrows at Maui Earth Compost

Customers can buy either bagged products, such as worm castings for \$45 per fifty pounds, or bulk products priced by the cubic yard on a sliding scale. The more bulk purchased, the less the price is per cubic yard. Compost ranges from \$47 to \$57 per cubic yard; mulch from \$36 to \$39; compost blended with sand fluctuates between \$45 and \$55 per cubic yard; and compost blended with soil falls within \$43



Photo 9-16. Compost product

⁴ <http://www.biodiesel.com/News%20Archives/EPAvisit.doc> regarding the USEPA's tour.



and \$48 per cubic yard. Photo 9-16 shows finished, high-quality compost product for sale at Maui Earth Compost.

9.8.6 Food Waste

Much of the commercial food waste on the Island of Maui has been diverted from the landfill by using it as feed for hogs in hog farms. The economic incentive to the hog farmer has been the avoidance of a \$60 per day grain cost per hog. Also, the generator of the food waste avoids the landfill disposal fee. The impact of this alternative food waste disposal system was seen in November 2007, when a hog farm was closed because it was evicted by the landowner. Companies that had depended upon the farm as a disposal point were left with tons of food waste to be disposed. One company, Puaa Foodwaste Service, was forced to take between two to four tons a day to the landfill due to this temporary closure. This amounted to 730 to 1,460 tons a year that normally would have been reused as food for the hogs. The Division worked with the Puaa family to find a solution to this problem. It provided a grant of \$125,000 to expand a family hog farming business. The commercial waste was diverted away from the landfill and to this hog farm.

Currently, much of the commercial food waste in Lahaina and a portion of it in Kihei are collected and taken to these hog farms. The hog business appears to be stable and growing in Maui. Tourism has increased to its pre 9/11 numbers which supports the Luau performances that are significant clients to the hog businesses.

The Islands of Lanai and Molokai have no formal food waste collection and processing operations.

The County is considering formal food waste collection to divert additional material from the landfill. In addition some of the commercial waste, once food is removed, can be processed in the MRF to recover additional recyclable materials.

9.8.7 Animal Manure

As part of HRS Chapter 342G-26 C-3 requirement, animal manure must be considered as a viable waste stream for possible bioconversion. The University of Hawaii's School of Ocean and Earth Sciences and Technology prepared a study for the State quantifying the animal manure generated in the State. Table 9-1 summarizes these biomass resources in the State, generally, and in Maui, specifically.⁵

⁵ "Biomass and Bioenergy Resource Assessment: State of Hawaii" by State of Hawaii Department of Business, Economic Development and Tourism, December 2002, p. 1.



Table 9-1 - Summary of Biomass Resources

Summary of biomass resources and their degree of utilization in the State of Hawaii by County.

	tons yr ⁻¹	Hawaii	Maui	Kauai	Honolulu
Swine Manure	dry	410	540	180	1,560
Dairy Manure	dry				8,300
Poultry	dry	1,520 ¹			4,830
Bagasse Fiber	dry		275,000 (275,000) ²	74,000 (56,000) ²	
Molasses	as-received		80,000	15,000	
Cane Trash	dry		137,000	37,000	
Pineapple Processing Waste	dry		7,500 (7500) ²		
Macadamia Nut Shells	dry	19,000 (18,000) ²			
Municipal Solid Waste	as-received	110,000	96,000	56,000	668,000 (600,000) ^{2,3}
Food Waste ^{4,5}	as-received	24,000	15,000	5,800	90,000
Sewage Sludge ⁵	dry	183	3,352 (3,352) ^{2,3}	246	16,576 (891) ^{2,3}
Fats/Oil/Grease ⁶	dry	1,850	1,850	800	10,000

¹ combined poultry waste estimate for Hawaii, Maui, and Kauai.
² amount currently used.
³ tipping fee associated with utilization.
⁴ amount entering landfills.
⁵ included in municipal solid waste value.
⁶ processed grease, contains minimal moisture

Maui has no known problem in handling its current manure generation.

9.8.8 Green Waste Projections

In 2006, the amount of compostable material received into the County's solid waste system totaled 56,998 tons, as shown in Table 9-2. This included 21,705 tons of biosolids, as well as pallets, other wood and Christmas trees received at the Central Maui Landfill. The material received at the Olowalu Convenience Center was transferred to EKO at the Central Maui Landfill for processing.

Table 9-2 – Compostable Materials by Location, FY2006

Recycled Materials	Hana	Lanai	Molokai	Maui	Olowalu	Total
Compostable	75	0	2,670	51,927	2,326	56,998

Maui's organic waste will grow by an estimated 37 percent between 2005 and 2030. As Table 9-3 shows, green and food waste, along with biosolids, make up the material in these projections. Biosolids stay constant, while food waste jumps 41 percent, and green waste increases by 52 percent between 2005 and 2030.



Table 9-3 - Projected Organic Materials

	2005	2010	2015	2020	2025	2030
Green Waste	39,642	44,022	47,447	51,613	55,970	60,309
Biosolids	22,511	23,172	23,387	23,394	23,394	23,387
Food Waste	34,709	37,630	40,134	42,991	45,976	49,004
Total	96,862	104,824	110,968	117,998	125,340	132,700

9.9 Options for the County

Options for County collection include expansion of the current collection of green waste and other biomass. Currently, residents and businesses are able to self-haul green waste to several County facilities, including the landfills. These facilities can be expanded. In Chapter 5, there are recommendations for every-other-week collection of green waste using carts, bags and bundles. Bundles are addressed in the current Maui collection rules, and green waste is allowed in with rubbish. If the County adopts universal collection, including green waste, it should also consider a ban on the inclusion of green waste in with the rubbish.

9.10 SWRAC Recommendation

The SWRAC advised the Division to provide universal curbside collection for all residences served by streets and roads meeting County standards and that these services include yard and large green waste collected in cans, paper bags, or bundled, called in by route drivers if within volume and size restrictions and collected every other week.

9.10.1 Island of Maui

9.10.1.1 Green Waste Collection

There are several options available to achieve SWRAC’s recommendation. One variation has been discussed in Chapter 5 with Bulky Waste and White Goods. Discussed here is the concept where the customer can set out green waste material on the appointed day. The normal refuse collector will spot the green waste material at the address and note the location either by a Global Positioning System (GPS) on the truck or by communicating the address back to base by way of radio, phone, or email. A GPS, however, works more efficiently and is becoming a less expensive and more efficient manner by which to designate pickups.

A second option is to provide a cart to each household and run specified routes every other week with an automated side-loader (ASL) which the County currently uses to collect curbside trash from many of its customers.

A third option is to have customers call in to the Customer Call Center and make an appointment for the green waste collection. The service area could be sectorized into general routes. After the appointments are made, point-to-point routes will be



created for collection. The benefit of this type of route is that it is a minimal capital expense in comparison to the second option and similar in expense to the first.

9.10.1.2 Green Waste Processing

Currently, green waste is processed at EKO's facility adjacent to the Central Maui Landfill. If more green waste is to be processed at this site and composted with biosolids, then EKO will need to reduce the time it takes to process the biosolids by accelerating the process and/or expanding the land it uses by a projected amount of 20 acres.

9.10.1.3 Composting

The Division should continue to encourage backyard composting and vermi-composting. It should also develop pilot projects to study what a typical household would compost in a year's time and provide an estimate of tons composted, as the City of Seattle does, and apply it to the County's diversion rate.

A key element to successful backyard composting is to educate school-age children in composting and provide, at reduced cost, backyard composters to citizens who complete a composting class. The Division should continue to provide workshops and education to schools and help these schools implement composting operations on site. Many jurisdictions provide backyard composting units free or at reduced rates as an incentive to residents.

9.10.1.4 Food Waste

The Division has a valuable business solution to commercial food waste with the hog farms. The Division should continue to foster the growth of this approach to handle more of the food waste generated. The recent redirection of food waste to the landfills gave the Division a sense as to what is being diverted, but it should implement a once-a-year audit of this waste going to the hog farms and extrapolate an annual estimate from these results. This estimate should be applied to the County's diversion rate. Additional separate collection of food waste should be investigated.

9.10.2 Hana Region

9.10.2.1 Green Waste

To comply with the SWRAC's recommendation, the County can do any one of the following:

1. Have the rear-loader collection vehicle and crew described in Chapter 5 make a collection run every other week to collect green waste.
2. Have an appointment collection system set up in the same manner as discussed for the more densely populated parts of the Island of Maui.
3. Evaluate providing green waste drop-off at the Hana Landfill facility. Alternatives to be considered are (1) periodic grinding to mulch for local use



and (2) truck the material back to CML for processing, bulking with sludge, and/or providing to citizens for mulch.

The population in the Hana region, however, does not warrant collection by an ASL.

9.10.2.2 Composting

Compost education, as described in Section 9.8.2, should also be implemented in the Hana region.

9.10.2.3 Food Waste

At this time, there does not appear to be enough of a supply of commercial food waste to warrant the development of a separate collection and processing of this waste stream.

9.10.3 Island of Molokai

9.10.3.1 Green Waste

1. Continue the current resident drop-off of green waste at the landfill.
2. Have the rear-loader collection vehicle and crew described in Chapter 5 make a collection run every other week to collect green waste.
3. Have an appointment collection system set up in the same manner as discussed for the more densely populated parts of the Island of Maui.

9.10.3.2 Composting

Compost education, as described in Section 9.8.2, should also be implemented on Molokai.

9.10.3.3 Food Waste

At this time, there does not appear to be enough of a supply of commercial food waste to warrant the development of a separate collection and processing of this waste stream.

9.10.4 Island of Lanai

9.10.4.1 Green Waste

The collection of trash on Lanai is currently performed with an ASL. To implement the SWRAC's recommendation, a second cart should be provided to the residents and another route for the collection of green waste should be initiated. Also, containers for green waste drop-off should be provided at the facility at the Lanai Landfill.



9.10.4.2 Composting

Compost education, as described in Section 9.8.2, should also be implemented on Molokai.

9.10.4.3 Food Waste

The Division can implement a pilot program for food waste collection in Maui County on the Island of Lanai. The Lanai Company, which owns a grinder, has shown interest in providing its equipment and services in grinding food waste that the Division employee would collect, in an ASL, once every other week and deposit at the landfill or an alternative site. The material would be ground, placed in windrows, and screened for compost. This would be a low-cost pilot program to gauge the set-out amount, the processing time, and the demand for the product at minimal cost to the County.

9.11 Plan Recommendations

9.11.1 Goals and Strategies

The Division's goal is to build upon its strategy of handling organic waste in a pragmatic and cost-efficient manner. Its use of composting biosolids has been environmentally applauded and a financially beneficial activity for over sixteen years.

9.11.2 Island of Maui

- The Division will continue to support the composting of its biosolids with green waste;
- It will develop and implement pilot collection programs of green waste to see the viability of collecting on a full time basis;
- Backyard composting program will be enhanced with a class provided by composters and backyard composting machines provided, at cost, to graduates of the class. This program will be evaluated for inclusion into the recycling rate of the County; and
- Commercial food waste collection shall continue to be supported through the Division's grant programs for the purposes of reusing the material as food for hogs.

9.11.2.1 Hana Region

- The Division will gauge the demand and need for green waste collection in the Hana Region and develop collection pilot programs for those needs; and
- Backyard composting program will be enhanced with class provided by composters and backyard composting machines provided, at cost, to graduates of the class. This program will be evaluated for inclusion into the recycling rate of the County.



9.11.3 Island of Molokai

- The Division will continue to have a drop-off location for green waste and have it ground and provided back to the public; and
- Backyard composting program will be enhanced with class provided by composters and backyard composting machines provided, at cost, to graduates of the class. This program will be evaluated for inclusion into the recycling rate of the County.

9.11.4 Island of Lanai

- The Division will develop and implement pilot collection programs of green waste to see the viability of collecting on a full-time basis; and
- It will also look into a pilot program where it co-collects green waste and food waste and processes it on the island as compost. The hope is to partner with a private entity where the public sector provides the collection, and the private sector grinds the material and processes it into compost.

9.12 Implementation

9.12.1 Short-term

The pilot programs for green waste collection will occur when a processing outlet becomes available. The education of backyard composting will take four months from the time of initiating the plan to implementation. This will involve coordinating with compost vessel vendors, developing a course outline, and securing locations to hold the class(es). Additional food waste collection and processing will be added in areas where feasible.

9.12.2 Long-term

The Division will work with its contract processor of green waste to secure an additional 15 to 20 acres of land for processing. Any pilot program for the collection of green waste must be done in conjunction with a processor to handle the material.