



This initiative is supported by **PacWastePlus**-a 72 month project funded by the European Union (EU) and implemented by the Secretariat of the Pacific Regional Environment Programme (SPREP) to **sustainably and cost effectively improve regional management of waste and pollution.**

ORGANICS FACTSHEET

MULCH AND WOODCHIPS



Collection and processing suitable organic materials to use as mulch and / or animal bedding (primarily garden and woody organics)

December 2022

Garden and woody organics are comprised of branch litter, whole trees, stumps, and pruned clippings from hedges generated during household and community landscaping or land clearing projects. Woody organics can also include untreated wood materials from pallets or used in construction. Mulching and chipping is the process of shredding this material to a consistent particle size, usually <100mm.

Mulched and chipped material can be useful for a variety of applications in the Pacific including landscaping, weed cover in gardens, and animal bedding. Application of mulch in landscaping can assist with water retention, improve aeration of clay soil, and provide nutrients to sandy soil.

Pacific landfills currently receive a high portion of garden and woody organics. This material includes “high fibrous” material such as coconut fronds, pandanus, and banana leaves which can be very strong and stringy. Processing and using this material as mulch/woodchips may provide an effective management solution without the need for the construction of a specialist compost facility or training.

The high fibrous vegetation in the Pacific requires careful selection of the type of mulch/chipper equipment to purchase. Research suggests that “drum style” chippers are better for processing this vegetation compared to disc/flywheel style chippers. More information on selecting appropriate equipment is provided later in this factsheet.

An effective use for mulch/woodchips may be as bedding and/or lining of pig and chicken pens to absorb the animal manure.

This use provides multiple benefits:



Animal welfare

Animals have a more comfortable pen in comparison to concrete or mud flooring



Less water use / contamination run-off:

Mulch in the pens will absorb animal manure. To clean the animal pens, mulch can be simply swept up, therefore reducing the need for large washdowns



Composting:

Once the mulch has absorbed the animal manure, it can be added to a composting process – providing an effective way to increase the nitrogen balance and enhance composting processes.



This factsheet is for decision-makers and private sector entrepreneurs considering the management of organics through the production of **mulch or woodchips** and provides information on recommended conditions, design features, equipment, and an overview of typical operations.

This information is provided to enable an informed decision on whether this solution is appropriate.

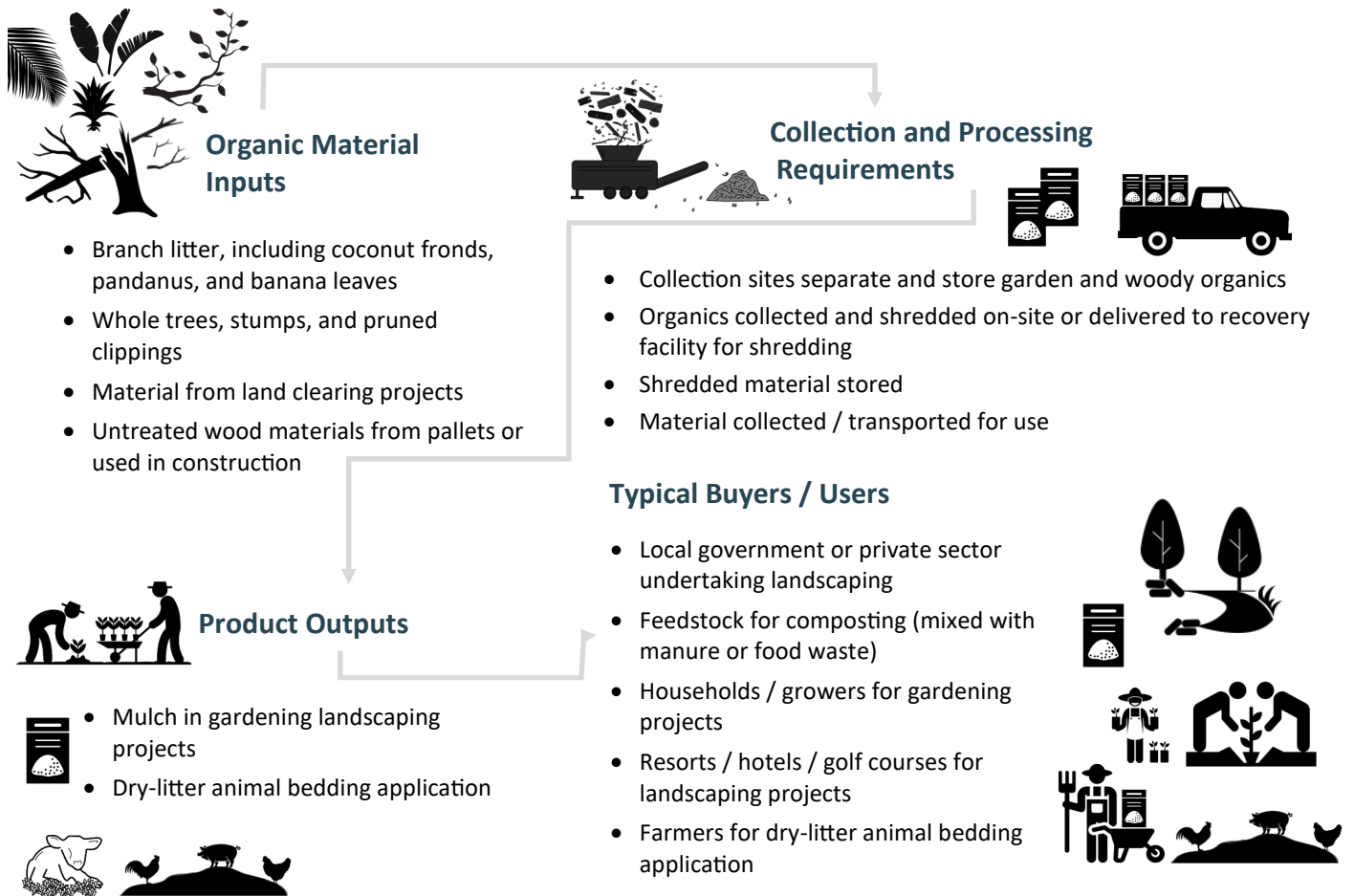


The production of mulch or woodchips is an organics management solution most suited to a situation where:

- Garden and woody organics makes up a large portion of waste being disposed, or this material is being burnt or otherwise discarded
- Garden and woody organics can be separated at specific sites (*i.e.*, households, communities, land-clearing projects, construction projects) and collected in designated bins or containers, with minimal contamination from plastic wrapping, nails / staples, or other waste items
- Suitable shredding / chipping equipment* is available to process the type, nature, and volume of the material expected e.g., woody materials, fibrous materials. This equipment can be located at one site (*recovery facility*) or be mobile.
- buyers or users of the much or woodchips are identified (*i.e.*, pig or chicken farmers for using the mulch, or landscapers / growers / households who may purchase the mulch), who are able to purchase / receive the amount of product expected.

*** High fibrous vegetation may be a large portion of the garden and woody organics material to be processed in the Pacific. Therefore, when selecting shredding / chipping equipment in the Pacific, it is recommended to ensure it is designed to process this material. As above, current research suggests that “drum style” chippers are better for processing this vegetation compared to disc/flywheel style chippers. Before selecting equipment, it is recommended to read operating manuals carefully and speak to suppliers and experts. If the manual only refers to wood as a suitable input or the manufacturer cannot supply evidence of the equipment managing high fibrous vegetation, further research may be required.**

Mulch and Woodchip System Overview



Process Overview

Suitable Organic Material Inputs	<ul style="list-style-type: none"> • Branch litter, whole trees, stumps, and pruned clippings • Untreated wood materials from pallets, fruit and vegetable crates, or used in construction 						
Unsuitable Organic Material Inputs	<ul style="list-style-type: none"> • Fresh food wastes, meat products, processed food, cooked foods • Lawn clippings and other small garden organics • Noxious weeds or plants with disease (use as much as may allow this material to spread) • Treated timber and other building materials • Nails and staples (<i>can harm animals if material used as dry-litter, or damage the shredder/chipper equipment</i>) 						
Product Output	<ul style="list-style-type: none"> • Mulch / woodchips • Dry-litter • Mulch / woodchips can be sold by trailer-load or in ~20l bags (<i>for sale at gardening supplies / hardware stores</i>) 						
Speed	<ul style="list-style-type: none"> • >1hr to 1 week 						
Difficulty	<ul style="list-style-type: none"> • Easy, specialist training only required for operation of shredder/chipper equipment 						
Typical Collection Sites	<ul style="list-style-type: none"> • Household and community landscaping • Land clearing projects • Construction sites 						
Processing throughput	<ul style="list-style-type: none"> • Depends on throughput of shredder/chipper equipment (<i>see its operations manual</i>), but generally more than 1 tonne / day is recommended to justify cost of equipment. Equipment recommended to be mobile to provide flexibility of operations. • Suitable scale (<i>for operation of one chipper</i>) = 10 tonne, or 200 wheelbarrows per day • Other limitations include estimated volume of organic material to be processed, availability of labour, availability of buyers. 						
Typical output production for 1 tonne / day input material	<ul style="list-style-type: none"> • 1 tonne / day or 20 wheelbarrows of garden and woody organics equals approximately 80m³. Processing this material into mulch does not reduce the total size in terms of biomass, but does reconfigure and reduce the bulk of the material. Once processed, 80m³ of garden and woody waste can be reduced to approximately 5-8m³ of mulch or woodchips available for sale / use. 						
Space requirement for processing 1 tonne / day input material	<ul style="list-style-type: none"> • For processing of 1 tonne, or 20 wheelbarrows (<i>approximately 80m³</i>) of garden and woody organics, a site footprint of approximately 90m² is required to process (<i>shred/chip</i>) and store one weeks' worth of product. • 10m² of this is recommended for the chipper / shredder set up and safe operation 						
Capital Cost \$US	<ul style="list-style-type: none"> • US\$>10,000 * <i>for purchase and construction of recommended equipment and facilities (discussed on the following page); excluding site purchase</i> 						
Typical operating costs US\$/tonne	<ul style="list-style-type: none"> • US\$<20 /tonne (<i>at preferred scale of 10 tonne, or 200 wheelbarrows per day</i>) 						
Key Equipment / Requirements	<table border="1"> <thead> <tr> <th>Recommended Elements</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>Suitable shredder / chipper</td> <td> <p>Shredder / chipper for use in the Pacific is recommended to be suitable for processing high proportions of fibrous vegetation (<i>recommended to choose "drum style" chippers over disc/flywheel style chippers</i>)</p> <p>Shredder / chipper can be fixed (located at a mulch processing site), or mobile, or both</p> </td> </tr> <tr> <td>Other equipment</td> <td> <p>Collection vehicle appropriate for towing chipper and/ or transporting expected quantity of processed or un-processed material. Collection vehicle suitable for road conditions and expected distances.</p> <p>Depending on expected scale of operation, additional equipment may be beneficial for assistance with handling and loading / unloading material e.g., front-end loader, skid steer</p> </td> </tr> </tbody> </table>	Recommended Elements	Description	Suitable shredder / chipper	<p>Shredder / chipper for use in the Pacific is recommended to be suitable for processing high proportions of fibrous vegetation (<i>recommended to choose "drum style" chippers over disc/flywheel style chippers</i>)</p> <p>Shredder / chipper can be fixed (located at a mulch processing site), or mobile, or both</p>	Other equipment	<p>Collection vehicle appropriate for towing chipper and/ or transporting expected quantity of processed or un-processed material. Collection vehicle suitable for road conditions and expected distances.</p> <p>Depending on expected scale of operation, additional equipment may be beneficial for assistance with handling and loading / unloading material e.g., front-end loader, skid steer</p>
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Process Overview (cont'd)

Key Equipment / Requirements	Recommended Elements	Description
	Collection sites	<p>Options for collection may include:</p> <ul style="list-style-type: none"> • Designated collection areas established at large producers of garden and wood organics (<i>i.e., households, communities, land-clearing projects, construction projects</i>). Depending on scale, a skip bin may be a suitable receptacle for collection of materials. • Local government, private sector operators, or households undertaking a lot of landscaping / land clearing educated to collect separated garden and wood organics and deliver to the mulch processing site. • Shredder / chipper may come to collection areas to process the material on-site, or unprocessed material can be transported to a fixed mulch processing site
	Mulch processing / storage site	<p>If a specific facility for processing mulch / woodchips is developed, features may include:</p> <ul style="list-style-type: none"> • Gatehouse • Designated storage area for incoming materials • Designated area for operating processing equipment <i>i.e.</i> shredder, front-end loader etc • Designated area for storage of outgoing products <i>e.g.</i>, bays / bunkers for storage of the mulch / woodchips prior to sale. Preferable to have product bays covered from the weather to reduce rainwater and material starting to break down or become mouldy. Mulch / woodchips can be sold by trailer-load or in ~20l bags (<i>for sale at gardening supplies / hardware stores</i>) <p>Mulch processing / storage site is recommended to be flat with good drainage. Site is recommended to be configured to separate pedestrians from working areas to enhance safety.</p> <p>Note: specific site for production of mulch/woodchips not necessarily required if shredder / chipper is mobile and system established to chip materials into a storage box and transported directly to final buyers / users</p>
	Signage	<ul style="list-style-type: none"> • Effective signage and delineation at collection sites to signify organic materials will be used for mulch / woodchips, ensuring contamination (<i>from plastic wrappers, nails and staples and other waste materials</i>) is kept to a minimum • Specific signage is recommended to ensure provide information on unsuitable materials (<i>i.e., noxious weeds, plants with disease, nails and staples</i>)
	Education materials	<ul style="list-style-type: none"> • Education materials (<i>flyers, posters, videos</i>) to educate households, landscaping companies etc on how to separate organics correctly. • Specific education is recommended to ensure understanding on unsuitable materials (<i>i.e., noxious weeds, plants with disease, nails and staples</i>) • Promotion materials for selling mulch / woodchips to local communities and farmers
	Staff	<ul style="list-style-type: none"> • Staff required for collection and transport of items, operation of equipment, selling mulch / woodchips
	Procedures and training	<ul style="list-style-type: none"> • Standard Operating Procedure for staff to comply with • Training required for operating equipment, collecting material, running site, delivering awareness messages

SWOT Analysis – Mulch and Woodchips

Strengths	Weaknesses
<ul style="list-style-type: none"> • Already a familiar practice in the Pacific • Low capital and operational costs Low requirements for space and training Very scalable • Demand for output product • Reduces demand for imported animal feedstock • High portion of waste from sites such as growers' markets and food processing facilities are fresh food organics and so behaviour change for stall holders etc to separate this material from remaining plastics may be easier than for other organics management solutions • Effective circular economy solution 	<ul style="list-style-type: none"> • If operated badly (food stored for too long becomes putrefied) it presents risk of spreading pathogens/disease Suitable only for a limited range of fresh food organics • Organics are suitable as stock feed for limited time before they putrefy, therefor collection sites must be relatively close to existing animal farms (<i>or refrigeration may be required</i>) • Collection sites (<i>growers' markets etc</i>) may experience increased odour or vermin if not managed and cleaned correctly
Opportunities	Threats
<ul style="list-style-type: none"> • Increases food security and climate resilience for local communities • Scalable and easy to replicate in any community where there are collection sites (<i>such as growers' markets etc</i>) and animal farms • Production of animal feed can be a possible organics management solution alongside other solution (<i>typically mulching (factsheet #2)</i>) to provide low-cost, non-specialist organics management solution. 	<ul style="list-style-type: none"> • An incident occurs where transfer of pathogens to animals or humans is linked to supplied animal feed • Local farmers do not need or not willing to pay for animal feed • Collection sites (<i>growers' markets etc</i>) suddenly seek to use the organics materials for their own uses – threat to animals (hunger) • Local farmers suddenly change their mind on receiving the animal feed – may have a large pile of putrescible material to dispose/discard safely • Farmers perceives high risk to animal health Generators of fresh food materials (<i>growers' markets, food processing facilities, households, restaurants</i>) do not have or are not willing to allocate space for separation and collection of materials, or do not separate material correctly



PacWastePlus Programme

The Pacific – European Union (EU) Waste Management Programme, PacWastePlus, is a 72-month programme funded by the EU and implemented by the Secretariat of the Pacific Regional Environment Programme (SPREP) to improve regional management of waste and pollution sustainably and cost-effectively.

About PacWastePlus

The impact of waste and pollution is taking its toll on the health of communities, degrading natural ecosystems, threatening food security, impeding resilience to climate change, and adversely impacting social and economic development of countries in the region. The PacWastePlus programme will generate improved economic, social, health, and environmental benefits by enhancing existing activities and building capacity and sustainability into waste management practices for all participating countries. Countries participating in the PacWastePlus programme are: *Cook Islands, Democratic Republic of Timor-Leste, Federated States of Micronesia, Fiji, Kiribati, Nauru, Niue, Palau, Papua New Guinea, Republic of Marshall Islands, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu.*

KEY OBJECTIVES

Outcomes & Key Result Areas

The overall objective of PacWastePlus is “to generate improved economic, social, health and environmental benefits arising from stronger regional economic integration and the sustainable management of natural resources and the environment”.

The specific objective is “to ensure the safe and sustainable management of waste with due regard for the conservation of biodiversity, health and wellbeing of Pacific Island communities and climate change mitigation and adaptation requirements”.

Key Result Areas

- **Improved data collection, information sharing, and education awareness**
- **Policy & Regulation** - Policies and regulatory frameworks developed and implemented.
- **Best Practices** - Enhanced private sector engagement and infrastructure development implemented
- **Human Capacity** - Enhanced human capacity

Our Regional Organics Project

Organic material is biodegradable matter such as kitchen scraps (food); garden cuttings, grass and branches; and paper. Combined data from 13 waste audits in the Pacific found that approximately 40% of waste disposal to our landfills and dumps is organics. When processed correctly (in an “aerobic” or oxygen-filled environment), organic materials can produce valuable nutrient rich products, such as compost, suitable for soil enhancement and food cultivation. However, when intermingled with other waste and disposed in a landfill or dump (an “anaerobic” environment), organic material can release toxic leachate and generate methane gas.

The purpose of this regional project is for Pacific stakeholders, now and into the future, to have practical and resources and decision-support needed to design and implement their own effective organics management solutions, appropriate for their own context and communities. Fiji, FSM, RMI, and the Solomon Islands have chosen organics as a priority or secondary priority of their PacWastePlus country project. The Organics regional project will review existing Organic facilities from the region, undertake technical research, and adopt findings and resources from Country Projects to develop:

- a “Minimum Standard” technical framework for countries to have as a resource when designing and operating their own organics processing facility
- a “decision guidance resource/tool” – to guide informed decision making around processing system design/ technologies, size and equipment requirements, operational processes, etc to suit any context and scale
- on-line training package to guide the application of “decision guidance resource/tool”
- resources to communicate with and empower communities to convert their organic “waste” to a valuable “resource” using appropriate solutions available (i.e., backyard, on-farm, community-level, or national-level organics processing).

Learn more about our regional organics management programme by visiting

<https://pacwasteplus.org/regional-project/organics-management/>

For more information please contact:



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Disclaimer

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