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

SMALL-SCALE COMPOSTING

Controlled aerobic decomposition of organic materials in small piles at households and communities, turned manually

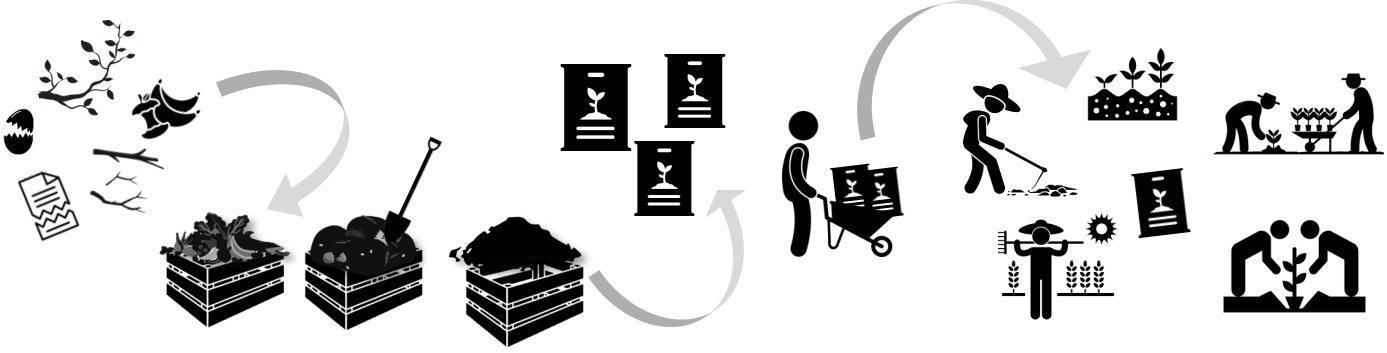
December 2022

Composting is the natural process of recycling organic materials, such as food and garden organics, into a product that can enrich soil and crop yield, reduce greenhouse gas emissions, increase water retention, and enhance climate resilience.

Anything that grows decomposes eventually; composting simply speeds up the process by providing an ideal environment for bacteria, fungi, and other microbes to do their work.

Small-scale household/community composting bins can be made from various new or second-hand materials, such as wood or plastic pallets, timber boards and poles, corrugated iron, wire mesh, concrete or cinder blocks, rocks.

In the Pacific, a three-bin system is a common and effective practise.



This factsheet is intended for households, communities, or small-scale fruit and vegetable growers in the Pacific who seek to compost small quantities of organic materials (*less than 100 kg or 2 wheelbarrows per week*) in their own backyard, at a school, or in a shared community decentralised **small-scale composting facility** using simple tools and volunteer manual labour.

This publication provides information on recommended conditions, design features, equipment, and an overview of typical operations to enable an informed decision on whether this solution is appropriate.



A decentralised small-scale composting facility is an organics management solution most suited to a situation where:

- Small quantities of organic material (*less than 100 kg or 2 wheelbarrows per week*) are available and is currently being disposed, burnt, or otherwise discarded
- A use for the finished compost in local yards and gardens has been identified
- Approximately 10-30m^2 area of space is available, preferably at a community facility
- Materials are available for construction of a compost bin, such as wood or plastic pallets, timber boards and poles, corrugated iron, wire mesh, concrete or cinder blocks, and rocks, to keep compost protected from scavenging animals and rain
- Water supply is available, preferably collected rainwater
- People are available and willing to perform the tasks required for composting (*specified below*)
- Several houses or small businesses can cooperate to bring their organic materials to one place (*preferred*)
- The community has an ability to cut large organic materials – i.e., has access to a shared mobile shredder (*preferred*), or people available to cut large organic items (*coconut fronds etc*) with a machete into pieces 5-10cm (*less than the size of a loaf of bread*)*****

*** Note:** *If you cannot cut the material, an option may be to put them aside in a pile to slowly degrade and add to the compost later when they are easy to cut with a machete*

Decentralised Small-Scale Composting System Overview

Organic Material Inputs

- Vegetation and garden organics, hedge clippings, branches and small untreated wood materials
- Food organics (*note: fish, meat, and dairy may attract vermin*)
- Paper and cardboard (*torn or shredded*)
- Manure from herbivore animals (*pigs, chickens, cows*)

Collection and Processing Requirements

- Households and communities separate food and garden organics and bring them to the compost facility
- Larger items are shredded or cut to size
- Organic materials is added to the first bin, either pre mixed or in layers of nitrogen (*food, fresh garden organics, manure*) and carbon (*old garden organics, shredded paper/cardboard*)
- Each month materials are turned - i.e., into the next bin
- Water is added as needed
- Composting process takes 3-6 months

Product Outputs

- Composted soil conditioners and mulches
- Compost is ready when it is dark brown and crumbly and has an earthy smell.

Typical Buyers / Users

- Compost for local households or at shared community facilities
- Small scale fruit and vegetable production
- Fine compost can be used as component in seed raising and growing media (*e.g. in planter boxes*)

Process Overview

Suitable Organic Material Inputs	• Food organics (*note: fish, meat, and dairy may attract vermin*) • Lawn clippings and other small garden organics • Manure from herbivore animals (*pigs, chickens, cows*) • Paper and cardboard (*torn or shredded*) • Vegetation and garden organics, hedge clippings, branches and small untreated wood materials • Mulch and woodchips
Unsuitable Organic Material Inputs	• Noxious weeds or plants with disease • Treated timber and other building materials • Plastics and other household waste • Manure from carnivore animals (*dogs, cats*)
Product Output	• Compost for local households and school gardening projects • Fine compost can be used as component in seed raising and growing media (*e.g., in planter boxes*).
Speed	• 3-6 months
Difficulty	• Medium, no specialist training required but understanding of composting processing beneficial
Typical Collection Sites	• Household, schools, community facilities
Processing throughput	• Less than 100 kg or 2 wheelbarrows per week • Preferred scale kg/day is less than 50 kg or 1 wheelbarrow per week (*equating to 200kg or approximately 1m^3 / month*). • Limited by availability of labour / volunteers
Typical output production for processing preferred scale	• A 3-bin composting system can typically process 1m^3 of organics per month (*4 wheelbarrow loads*).
Space requirement for processing for processing preferred scale	• Composting bins are recommended to have a footprint of about 1m^2 and 1m high. A 3-bin composting system, including an area for storage/screening of organic inputs and finished compost, would require an area of approximately 8m x 4m (32m^2). The land area required depends on factors such as: – The expected volume of organic materials and how many composting bins will be utilised – The duration of the composting process – The need for storing raw materials and finished compost and any supplementary activities, such as shredding
Capital Cost $US	• US$<1,000 ***** *for purchase of recommended equipment and facilities (discussed on the following page); excluding site purchase)*
Typical operating costs US$/tonne	• US$<20 /tonne (*with voluntary labour*)

Key Equipment / Requirements

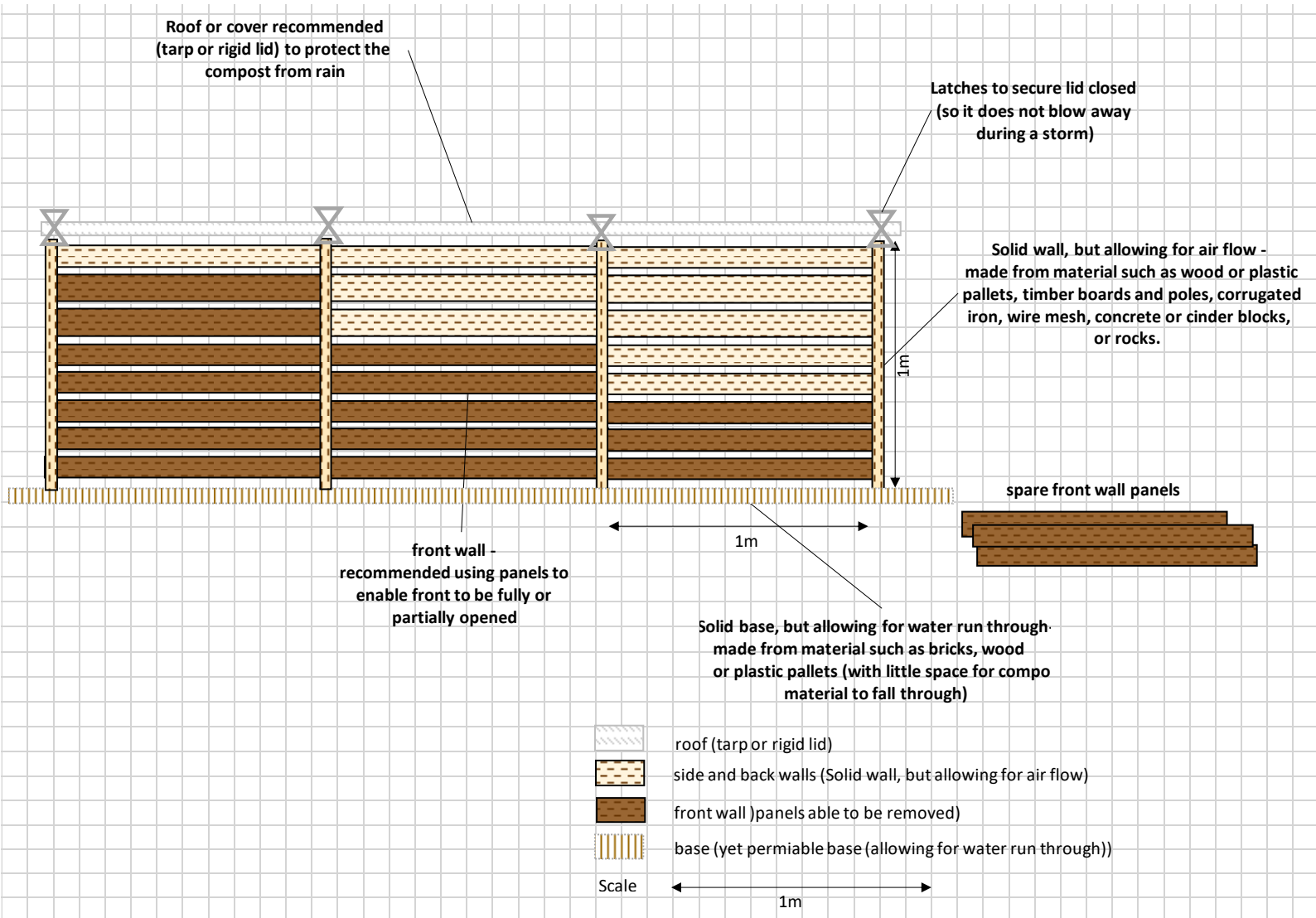
Recommended Elements	Description
Compost bins	• Composting bins can be made from various new or second-hand materials, such as wood or plastic pallets, timber boards, poles, corrugated iron, wire mesh, concrete or cinder blocks, and rocks. • ***Note****: ferrous metal will rust and timber will rot over time in the composting environment. Therefore, it is advantageous to use galvanised corrugated iron and hardwood timber.* • It is advantageous to have a solid, yet permeable base for the bins, particularly if throughput is high with frequent turning. The base can be made out of bricks, hardwood planks or (*plastic*) pallets with little space for composted material to fall through. The base is recommended to be level, so shovelling is not impeded • To facilitate turning of the compost and moving it from one bin to the next, it is helpful if the front walls of the compost bin can be opened fully or partially • A roof or cover is preferred (*tarp or rigid lid*). If a rigid structure is used to protect the bin from rain, it is recommended to be secured so it does not blow away during a storm. If a hinged lid is used, it is recommended that it can be opened easily, and can be secured when open to avoid the risk of it falling onto somebody.
Other equipment	• Shovel or garden fork, preferably with wide tines • Water supply, preferably collected rainwater and watering can or hose
Optional	• Aeration of the composted material can be improved by inserting perforated plastic pipes either horizontally at the base or vertically in the centre of the bin. This is usually not necessary for composting garden organics but can be helpful if high proportions of wet food organics or pig manure are composted. • Temperature probe (*important if attempting to pasteurise organic materials*) • Home-made screen • Wheelbarrow to transport input materials and finished product
Signage	• Effective signage at compost facility to illustrate the process and requirements
Education materials	• Education materials (*flyers, posters*) to educate households and community facilities etc on how to separate organics correctly, and how to use the locally produced compost
Staff	• Volunteers to receive and screen materials and compete composting process
Procedures and training	• Brief Standard Operating Procedure for volunteers to understand process

SWOT Analysis – Small-scale Composting

Strengths	Weaknesses
• Community-led initiative • Low capital and operational costs • Low requirements for space and formal training • Users can see a direct link between separation, processing, and use of product, resulting in minimal contamination • No transport costs • Use of voluntary labour	• Many people may need to be educated on compost operation, but only some will volunteer their labour • Ongoing education and outreach may be needed • Landfill diversion outcomes usually limited and hard to measure • Will not process fibrous inputs well unless chipper or shredder available
Opportunities	**Threats**
• Compost programme can be provided in association with community scale gardening initiative or messaging • Opportunity for communities to negotiate an arrangement for shared equipment	• There may be cultural barriers to acceptance of a community compost facility • Voluntary effort can reduce over time without continued education and support • Equipment provided is not used, or is put to other uses of materials, or do not separate material correctly

Indicative Design Drawings

Editable Facility Design Drawings are provided to assist with the general design and layout of a household/community-scale bay composting facility. Tailer these drawings to match the expected throughput and specific site conditions.



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:

The PacWastePlus team on pwp@sprep.org

Or visit - www.pacwasteplus.org

(post project please email-sprep@sprep.org)

Disclaimer

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