**FRAMEWORK**

**Standard Operating Procedure – Small Scale Community Bay/Pile Composting**

**[your facility] Organics Processing Facility**

**Date of last revision: \_\_\_\_\_\_\_\_\_\_\_\_\_\_**

# Acknowledgement

Gratitude is expressed to the Secretariat of the Pacific Regional Environment Programme (SPREP) implemented and European Union funded, Pacific Waste Management (PacWaste Plus) programme for the continued guidance to the 15 participating countries to improve organic management in the region.

**Learn more about the PacWaste Plus programme:**

[wwwpacwasteplus.org](http://www.pacwasteplus.org)

**Introduction**

This Standard Operating Procedure (SOP) guides the effective operation of a small-scale 3-bay / small pile composting facility, to ensure the efficient recycling of organic waste into compost for soil enrichment.

The SOP is for use by households, communities, and small-scale fruit and vegetable growers seeking to establish a compost site to handle less than 100 kg (approximately two wheelbarrows) of organic material per week, using simple tools and manual labour.

**Site Overview**

|  |  |
| --- | --- |
| Detail | Description |
| Current as at | Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  (When information changes, update the SOP) |
| Site Location | (Location / Address of Site) |
| Composting Coordinator | **(person)** |
| Composting Process | Decentralised small-scale composting |
| Community Members | **(persons)** |
| Equipment | List equipment used to operate at the site: |
| * 3-bay compost bin (constructed from wood, plastic pallets, wire mesh, concrete blocks, or corrugated iron) (or space for 3 piles) * Garden fork or shovel * Water supply (rainwater preferred) * Wheelbarrow * Education materials for community awareness * Signage for waste sorting * Machete * Drag fork / pitchfork * Gloves (cut resistant) * Face masks (P2) * Optional: Perforated plastic pipes for aeration, temperature probe, homemade screen |
| Site Selection | Identify a suitable area of 10-30m² in a household, school, or community facility.  Ensure accessibility to space for 3-bay/pile composting and water supply.  Construct compost bays (if using) using available materials ensuring:   * Good air circulation * Secure structure to prevent scavenging animals e.g. fenced * Roof or cover to protect from rain |
| Process Summary | Households or businesses/groups bring food and garden organics to the compost facility on a daily basis.  *Common input material is …………… (supply details – for example: Yard Organics (### cubic meter/yards / week).*  Other input material includes …………… (supply details – for example: *coconut fronds and paper / cardboard (carbon) and grass clippings, food scraps, copra, and fish-by product (nitrogen)*)*.*  Larger items, such as branches and coconut fronds, are shredded or cut into smaller pieces (approximately 5-10 cm).  Add organic materials to Bay/Pile 1 as they are received, generally layered in even amounts of carbon-rich materials (old garden organics, shredded paper, and cardboard) and nitrogen-rich materials (grass clippings, food scraps, fresh garden organics, and manure).  The compost is turned every month by shifting materials from Bay/Pile 1 to Bay/Pile 2 and so on, (with the outside material from the first Bay/Pile going into the middle of the next Bay/Pile).  Water is added as needed, ensuring the compost is damp but not soggy. A simple test is to squeeze a handful of compost—if a few drops of water appear, it has the right moisture level.  The temperature is tracked using a temperature probe or by inserting a clean machete or shovel into the pile for one minute. If the blade is hot to touch (but does not burn), the compost will be around 130°F – 150°F / 55-65°C (which will aid in pasteurisation and breakdown of pathogens).  The compost is ready after about 3-6 months, when it is dark brown, crumbly, and has an earthy smell.  Use the compost in gardens, community landscaping or for small-scale farming. |

## Site Layout

Road

Sketch the Site Layout:

## Stages of Composting and Key Activities

The following table summarise the recommended activities to be undertaken at each stage of composting at the [location name] Composting Site.

| Stage of Composting | Description |
| --- | --- |
| Receive:  Material Receival & Sorting | * Receive organic materials such as:   + Vegetation, grass clippings, and garden organics   + Food scraps   + Manure from herbivore (vegetarian) animals (e.g., pigs, chickens, cows)   + Non-glossy paper and cardboard (shredded or torn) * Visually inspect and remove unacceptable materials (and place in a bin for landfill) including:   + Plastics, treated timber, and other non-biodegradable waste   + Manure from carnivore animals (e.g., from dogs and cats)   + Diseased plants or weeds covered in pesticides * Store excess material (that cannot be processed on the day of delivery) for 24 hours - covering with damp cardboard if available. * If weeds are received, use care to ensure seeds are composted and are not spread around the site * Record data on type and volume of organic material received a logbook and on site plaque |
| Processing:  Shred / Size Reduce | * Train volunteers in safe use and handling of tools * Shred or cut larger organic items, such as branches and coconut fronds, into smaller pieces (approximately 5-10 cm) using machetes and hand tools to facilitate decomposition * Clean hand tools after each use with a brush to remove plant residue and inspect for weeds * Store tools in a dry, secure area to prevent rust and damage. |
| Formation:  Form Compost Bay/Piles  4 weeks | * Add material to form a compost batch in Bay/Pile 1, ensuring:   + Food balance – Layer equal amounts of carbon-rich (dry leaves, shredded paper) and nitrogen-rich (food scraps, fresh organics) materials. If the main input is yard organics, layering may not be necessary as it contains both carbon and nitrogen   + Airflow – Ensure a mix of large and small particles to allow aeration. Turning or the addition of dry material may be required if an odour is detected   + Moisture – Add water to maintain a damp consistency (not too wet or dry) * Add material daily material:   + Build up the compost Bay / Pile gradually until the peak reaches # m / # ft high (typically 4 weeks) * Record data on type and volume of organic material added to Bay/Pile 1 in a logbook and on site plaque * Cover Bay/Pile 1 with damp cardboard after adding new material each day * When Bay/Pile 1 is full (after approximately 4 weeks), turn the compost to Bay/Pile 2 (and from Bay/Pile 2 to Bay/Pile 3) (with the outside material from the first Bay/Pile going into the middle of the next Bay/Pile). |
| Composting:  8 weeks | * Conduct daily “Air, Water, Food” checks to monitor composting progress * Water the Bays/Piles using a hose to maintain at least 50% moisture content – small quantities daily is best. When watering, ensure material is not overwatered or water is allowed to overflow the drain to reduce soil / water contamination * Track the temperature of the batch using a temperature probe or by inserting a clean machete or shovel into the pile for one minute. If the blade is hot to touch (but does not burn), the compost will be around 130°F – 150°F / 55-65°C. Ensuring material heats up to over 55°C / 130°F for at least 3 days will kill any weeds or pathogens. * Record results from Air, Water, Food check in a logbook and on site plaque * Cover Bay/Pile with damp cardboard at the end of each day * Turn the compost from Bay/Pile 2 to Bay/Pile 3 (and from Bay/Pile 3 to the maturation area) every 4 weeks |
| Maturation  12 weeks | * The compost can mature in a maturation area for an additional 12 weeks * Conduct daily “Air, Water, Food” checks to monitor maturation progress * Record results from Air, Water, Food check in a logbook and on site plaque * The compost ready for screening and use when:   + It has a dark, earthy appearance   + The temperature remains stable and cool (below 40°C / 100°F) after turning |
| Storage | * Place finished compost in storage piles inside a shed or under a cover * Inspect storage piles weekly, checking for smoke and conduct Air, Water, Food checks * Temperature should remain cool and stable. If the compost starts getting hot, it indicates it has not finished maturing. |
| Dispatch:  Bag, and Dispatch | * If fine material is required (i.e., for seed raising / potting mix), screen compost through half inch (1-2 cm) sieve. Larger particles captured by the sieve can be used as mulch or returned back to Bay / Pile 1. * Bag compost (if necessary) and provide for use in gardens, community landscaping, or plantations * Record amount of compost dispatched in a logbook and on site plaque |

## Daily Tasks

The following table summarises the recommended daily tasks to be undertaken.

| Image | Actions |
| --- | --- |
|  | * Inspect new organic material, remove contaminations\* and separate/sort by size |
|  | * Complete daily “Air, Water, Food” checks on all Bays and Piles – complete identified actions |
|  | * Add new material to Bay /Pile 1, ensuring correct balance of Air, Water, Food |
|  | * Cover Bays/Piles at the end of day with damp cardboard (if available) |
| Tool box and equipment icon maintenance Royalty Free Vector | * Clean tools and machinery, undertake machinery maintenance as needed |
| Housekeeping Icon | * Sweep and clean the site, paying particular attention to weeds or seeds |
| Vector illustration of data record icon in dark color and white background  26703361 Vector Art at Vecteezy | * Record data on logbook and on site plaque |

|  |
| --- |
| \* Note: “Contamination” in a compost system can be three different factors:   * Items that will not degrade in the compost system – e.g., plastics, metal, glass * Items that will inhibit the compost processing – e.g., rocks, soil, large branches (more than 4 inches in diameter), tree stumps and trunks, * Items that make the compost unsafe to humans – e.g., chemicals, human sludge   As much contamination as possible are recommended to be removed in the early stages of the compost process, before they become small pieces spread through the material. |

## Weekly Tasks

The following table summarises the recommended weekly tasks to be undertaken.

|  |  |
| --- | --- |
| Image | Actions |
|  | * Identify any Bays/Piles needing turning |
|  | * Screen and bag finished compost (if necessary) |
| Tool box and equipment icon maintenance Royalty Free Vector | * Clean tools and machinery, undertake machinery maintenance as needed * Check and remove weeds around the compost Bay/Piles |

|  |
| --- |
| \*\* Note: The spreading of weeds through compost can occur if temperatures of the compost pile do not reach 130°F / 55 °C or more for 3 days (and turned to make sure all material is exposed to the high temperatures at the centre of the pile). Effective weed management within the site can also reduce the risk of spreading unwanted plant species to agricultural or landscaping sites. |

## Daily “Air, Water, Food” Checks

Complete daily “Air, Water, and Food” on compost piles to monitor the performance of your compost and identify any issues. Keep particular note of presence of smoke, charred compost, or very hot temperatures.

If any issues are identified with the balance of “Air, Water, and Food”, complete the recommended actions as specified.

When completing the smell check, first smell the whole area carefully as you approach the pile. If foul odour is detected, do not handle or closely smell materials. If there is no foul odour in the wider area, continue with smell check – i.e., collect a handful of material and smell carefully. (waft first then if smell faint, get closer to it).

Wear mask, gloves, work boots, and dust resistant eye protection when completing the daily “Air, Water, and Food” checks.

|  | **Air** | **Water** | **Food** |
| --- | --- | --- | --- |
|  | Air Icons – Download for Free in PNG and SVG | 553,447 Water Icon Illustrations & Clip Art - iStock | 4,637,371 Food Icon Images, Stock Photos & Vectors | Shutterstock |
|  | To assess Air: | To assess Water: | To assess Food |
| **Look:**  Vision icon design Royalty Free Vector Image - VectorStock  Check the look of the material… | …if material looks (and feels) dry and crispy, it may indicate the pile has too much air  …if material looks stuck/clumped together or there is not a mix of large and small items, it may indicate not enough air  …if material looks loose and moist and has a mix of large and small items, the airflow is about right | …if material looks dry and rigid it may indicate not enough moisture  …if material looks soggy or have a blueish / greenish tint, it may indicate too much moisture  …if material looks loose and moist, moisture content is about right | …if material looks wet and soggy it may indicate too much nitrogen (due to an excess of nitrates)  …if material looks dry and rigid it may indicate not enough nitrogen  …if material looks loose and moist (and feel damp and smells “good”), the food balance is about right |
| **Feel:**  The Hand Icon Above is Facing Down with the Position or Expression Wanting  To Pick Something Stock Vector - Illustration of isolated, pictogram:  227668247  Collect a handful of material from about 10cm below the surface and squeeze… |  | …if material feels dry and crispy and no water drops are released, it may mean the pile is too dry  …if the material feels wet and soaking, it may mean the pile is too wet  …if a just few drops of water are released the moisture content is about right |  |
| **Temperature:**  413,400+ Temperature Icon Illustrations, Royalty-Free Vector ...  measure with a thermometer, or place a clean machete or shovel into the pile for one minute |  |  | …if pile is <40°C / 100°F) or cool to touch, may indicate too much carbon  … if pile is >65°C / 150°F or too hot to touch, may indicate too much nitrogen  … if pile is ~130°F / 55°C or warm to touch, the food balance is about right |
| **Smell:**  Nose and Smell Icon - Vector EPS file. Perfect use for print media, web,  stock images, commercial use or any kind of design project Stock Vector  Image & Art - Alamy  smell the area carefully as you approach bay. If no foul odour experienced, collect a handful of material and smell carefully.  Do not smell close to pile/compost without a mask on. | …if material smells like nothing (and feels dry), it may indicate the pile contains too many large items providing too much airflow  …if material smells “bad” (like rotten egg), it may indicate a lack of airflow  …if material smells “good” (like earthy), it likely means the airflow is about right | …if material smells like nothing (and feels dry), it may indicate the pile needs water  …if material smells “bad” (like rotten egg), it may indicate too much moisture  …if material smells “good” (like earthy), it likely means the moisture is about right | …if it smells like nothing (and feels dry), it may indicate too much carbon  …if it smells “bad” (like rotten egg), it may indicate too much nitrogen  … if it smells “good” (like earthy), it likely means the food balance is about right |
| **Actions**  Action - Free business and finance icons | To remedy lack of airflow (i.e., if there is a foul odour and/or the compost material is clumped together), turn the pile.  For the next batch add additional items that are “Helpful for Aeration” (i.e., shredded woody materials) | To remedy lack of moisture (i.e., compost is too dry, and feels old, rigid, and dry), add water Add water slowly and sprinkle over the whole pile.  To remedy too much moisture (i.e., if there is a foul odour and/or it looks soggy and/or there is a blueish / greenish tint), turn the pile and avoid adding more water. For the next batch, add additional dry items that are “Helpful for Aeration” (i.e., shredded woody materials) | To remedy if too much nitrogen (i.e., there is a foul odour and/or temperatures consistently over 70°C), turn the pile and add additional items that are “High Carbon” (i.e., shredded woody materials, cardboard)  To remedy too much carbon (i.e., if the compost is cool and there is a surplus of old, rigid, and dry materials), turn the pile and add additional items that are “High Nitrogen” (i.e., fish by-product or grass clipping) |

## Principals of Composting

**Introduction to Composting**

Compost is a nutrient-rich, soil-like material that enhances plant growth, crop yields, and water retention. It forms through a controlled aerobic decomposition process, where microbes break down organic matter. These microbes require a balance of Air, Water, and Food to thrive.

**Food: Carbon & Nitrogen**

Microbes need a balanced diet of carbon (energy source) and nitrogen (for cell structure). The ideal C:N ratio for composting is 30:1—30 parts carbon to 1 part nitrogen. Too much carbon slows decomposition, while excess nitrogen leads to odour issues.

* Carbon sources (dry, rigid materials): wood chips, straw, dry leaves
* Nitrogen sources (fresh, moist materials): fish waste, food scraps, grass clippings, manure

Mixing the right proportions ensures efficient composting. The PacWastePlus Composting Handbook provides guidance on calculating and adjusting C:N ratios.

**Balancing Air, Water, and Food**

Composting is an ecosystem where material properties affect air circulation, moisture retention, and microbial activity. Operators can create compost "recipes" by balancing materials—for instance, combining palm fronds (high carbon, improves airflow) with fish by-products (high nitrogen, retains moisture).

**Phases of Composting**

* Initiation Phase: Microbes begin breaking down food, generating heat (temperature rises rapidly).
* Thermophilic Phase: Heat stabilizes; microbes further break down materials, killing weeds/pathogens (must reach 130°F (55 °C) for 3+ days). Regular monitoring prevents overheating. This phase lasts ~12 weeks.
* Maturation Phase: Microbes finalize decomposition. Once heat stops rising, compost is ready.

**Resources**

* Composting Common Organic Materials Handbook
* Composting Guidelines & Standards for Pacific
* Organics Factsheet: Small-Scale Composting+

## Health & Safety Risks and Mitigations

Health and safety are key considerations in everything we do to ensure that we all go home to our families at the end of the day, happy, safe, and healthy. Below is a table that identifies the key potential risks to health and safety at the Site and what you can do to avoid those risks.

| Risk | Description | Management |
| --- | --- | --- |
| Exposure to pathogens and bioaerosols (i.e., viruses, bacteria, parasites)  water contamination Icon - Free PNG & SVG 2531863 - Noun Project | Adverse reactions to the viruses, bacteria and/or parasites that can be living in compost.  Exposure may occur during handling or screening. It may cause skin irritations, eye infection or respiratory illness. People with a weakened immune system, asthma or a punctured eardrum are at greater risk. | * Prevent people with a weakened immune system, asthma or a punctured eardrum from being involved in composting activities * Avoid breathing dusts or mists - wear a P2 mask * Wear gloves, work boots, dust resistant eye protection * Wash hands after handling new materials and compost * Wash work clothing regularly * Screen incoming materials and reject material with risk, such as human sanitation waste (sludge) |
| Legionnaires disease  1,547 Legionella Images, Stock Photos, 3D objects, & Vectors ... | Disease of the lungs that is caused by a bacteria that may live in compost. | * Wear a P2 face mask when handling, turning or watering composting material * Do not get too close when smelling composting materials * Wear gloves when handling composting material * Wash hands before eating |
| Injury from physical work Workplace Shoulder Injury Icon Stock Illustration - Download Image Now - Physical  Injury, Employee, One Person - iStock | Injury due to handling heavy materials, or repeated movements such as turning organic materials with a fork or shovel | * Use correct lifting and shovelling technique * When lifting bend your knees not your back, keep your stance wide and back straight. * When digging or shovelling, keep your back straight, feet wide and facing the shovel and bend at the hips * Use assistance (people or tools) for large loads |
| Foreign objects in material | Foreign objects in the material that could cause a wound or health risk.  Examples: broken glass, needles, faeces, toxic chemicals | * If found/seen stop work immediately. Safely collect items using appropriate PPE and careful handling technique and divert to landfill. * Use tools (shovels etc) when handling material where possible * Use gloves and face masks |
| Health Risk from sun/heat exposure  Sun heat icon Royalty Free Vector Image - VectorStock | Hard physical work in the sun and heat can cause dehydration, sunburn, heat exhaustion or heat stroke | * Drink water * Work in the shade during hottest part of the day * Take breaks * Work in teams * Wear sun protection |
| Fire in the composting material  Fire - Free nature icons | Fires can self-ignite in a compost pile, burning workers and damaging the equipment facility. Fires can be smouldering internally in the piles so can pose an unexpected threat.  Fires risk is higher in large, unturned, old piles, as well as piles with high quantities of cooking oil or grease. | * Monitor compost daily though “air, food and water” checks * Train volunteers on how to use fire equipment and handle fire * If very hot temperatures or a small amount of smoke in a compost pile is observed:   + Open the pile with a metal tool (spade/loader)   + Spread pile out   + Spray water on it   + Re-Mix pile |