



# **Fertilizing with Pig Waste**

**A Guidebook for  
Pacific Island Farmers**

This book has been translated\* and adapted from *Easy ways to use and store pig waste in the Pacific Islands*, published by the Pohnpei Soil & Water Conservation District Board, P.O. Box 206 Pohnpei, FM 96941 Tel: + (691) 320.5893 Fax: + (691) 320.2086.

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\*Justina Hainrick, formerly of Kitti and now living in Yigo, Guam, translated the booklet from Pohnpeian to English so that others in the Pacific may benefit from the Pohnpei projects.

# Chapter 1: Why pig manure is good for your plants ...



Don't waste this 'waste'!

## Pig manure helps grow plants

There are three kinds of plant fertilizers: Nitrogen, Phosphorous, and Potassium (N, P, and K). The food or fertilizer that comes from pig waste works with the plants and vegetables.

## How much plant fertilizer is there in pig manure?

Fertilizer	pounds contained in 1,000 lb of waste	percentage in in solid waste	percentage in liquid waste (manure&water mix)
Nitrogen (N)	6.8 pounds	50%	50%
Phosphorus (P)	2.3 pounds	95%	5%
Potassium (K)	3.9 pounds	15%	85%

## Good health and how to protect yourself



There are many different kinds of diseases in pig manure and urine. Always use boots and gloves when you work with manure, because otherwise, you can get sick. Always use soap to clean yourself after working with manure. Always wash, and then cook the food that comes from the ground where you applied manure before you eat it.

You can work with pig manure when you are planting.

The banana plants on the right are fertilized with pig waste, but the ones on the left are not.



## How hungry are your plants?

Trees and plants need food like pigs do. Trees and plants use Nitrogen, Phosphorous, and Potassium. Pig manure is good food for plants. For example, you can fertilize 22 banana trees with the manure from 1,000 pounds of pigs.

Here is a chart of the amount of nutrients, in pounds, you need to fertilize 1,000 square feet of certain plants:

Trees/plants	Nitrogen	Phosphorous	Potassium
Cucumber	3.5	2.75	2.75
Bell pepper	3.7	3.0	2.3
Yam	1.4	2.3	2.3
Banana	13.3	3.0	9.2
Pineapple	6.9	6.9	6.9

## How much pig manure do you have?

The amount of pig manure depends on the amount of food pigs eat. A good rule of thumb is that 4 pigs weighing a total of 1,000 pounds will produce about 7.5 gallons or 52 lbs or 1 cu.foot of manure per day.

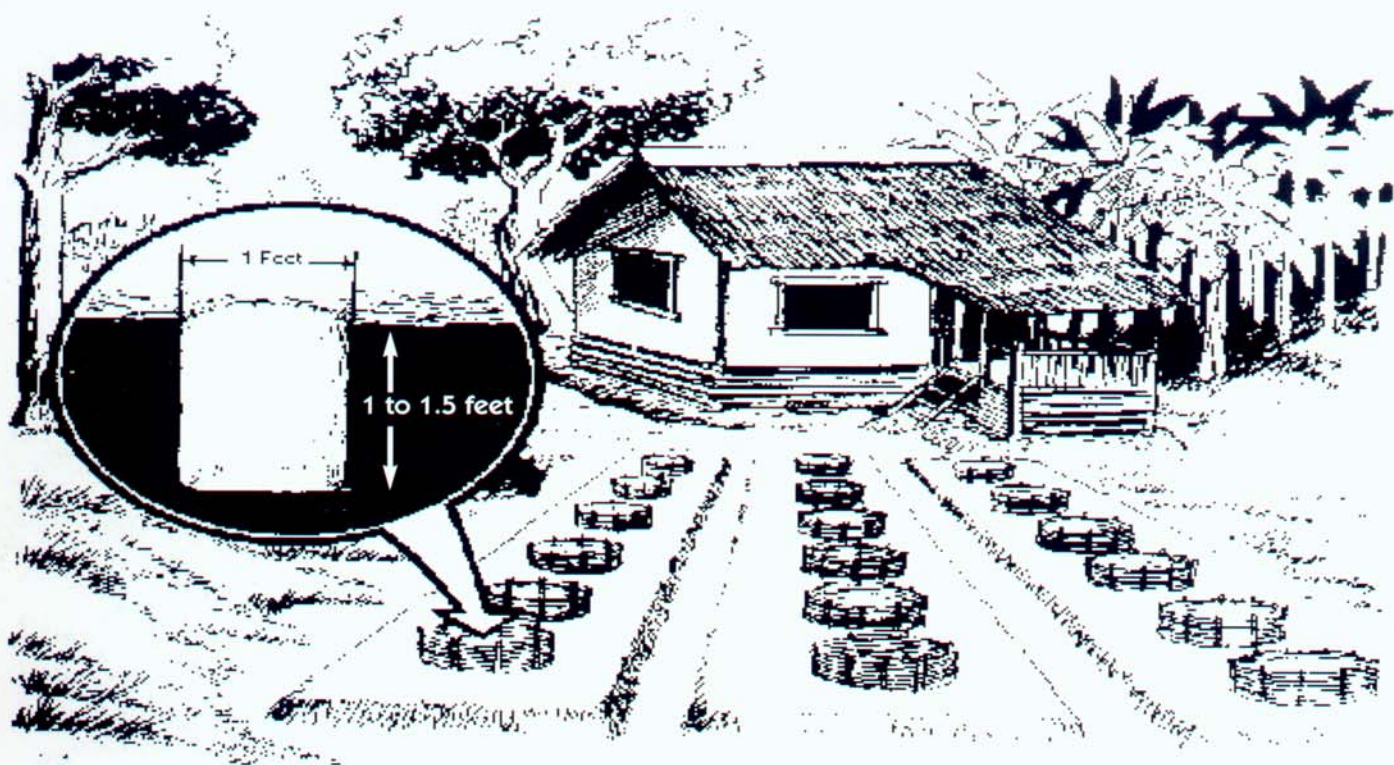
# Chapter 2: Using pig manure to fertilize your plants



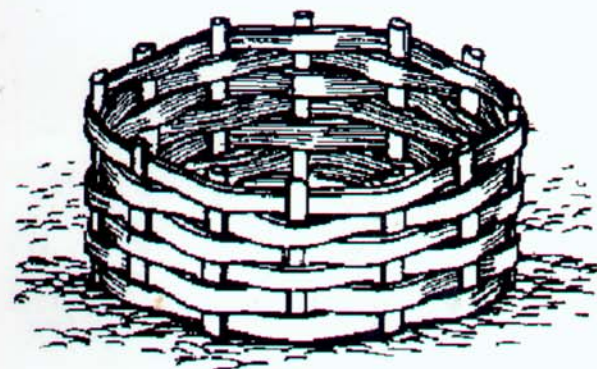
Let's work together!

## How to use pig manure to feed plants in a small garden

A good example of how fertilizer is made can be seen at the Mindanao Baptist Rural Life Center in the southern Philippines. This way of fertilizing is good for small gardens. How it works:



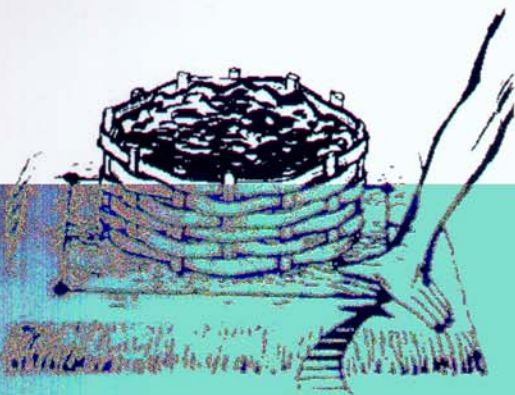
1. Dig a hole in the middle of your garden. It should be one foot wide and one to one-and-a half feet deep.



2. Make a little screen about one foot high around the hole, as pictured above. Use wood, leaves or plastic or wire mesh for the screen.



3. Shovel the pig manure into the screened circle, and add leaves and small chopped sticks or other plant matter to the manure. This helps turn the manure into good fertilizer.

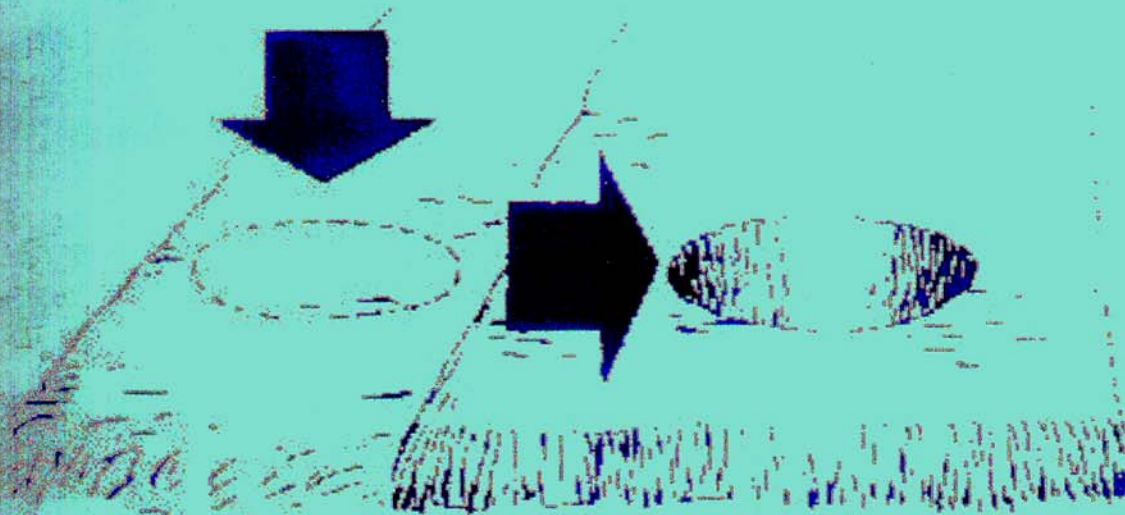


4. Plant 4 plants around the screen containing the manure. Place your plantings at a distance of about half the span of your hand from the manure (see picture).



5. Fill your fertilized area with water until you see your plants grow.

Water the fertilized area from time to time so that it can feed the roots and stems of the plants, and help them grow.



6. A year later, make other holes and fertilize them like you did before.

*Drawings courtesy of Central Visayas technology Guide on Hillyland Farming, Central Visayas Consortium for Integrated Regional Research and Development.*



Covering the pig manure and plant layers with a top layer of plant matter, will help the manure turn into compost and keep it from seeping away in the rain.

(See page 5 for more on composting.)

# How and where to make compost

Compost is a mixture of decaying manure and plants for fertilizing land. Composting kills harmful organisms in the pig manure by heating up the manure to temperatures the organisms (bugs, larvae, bacteria, etc.) cannot survive. If they aren't killed, the organisms can make people and pigs sick.

You can make compost in the ground as described on pages 6-7, or as follows:

Make a pile of pig manure, leaves and coconut husks. Layer the plant material in between layers of manure. Keep the pile covered from the rain, or else it will take too long to compost.

After you have made your pile, wait for about 30 days and when you see worms coming out of the compost pile, it is ready to be used as fertilizer.



Layer your compost, alternating layers of coconut husks, leaves and other plant matter with layers of pig manure.



Ava seedlings growing in composted soil.

## Important:

Nitrogen is one of the foods needed by plants and vegetables and it is found in pig manure. But the manure will lose its Nitrogen content if it is not covered with leaves. So always add a layer of leaves and plant material on top of your layers of manure.

## Flies, chickens, and termites

Keep your compost pile or bin covered from the rain. If it gets wet, it will attract flies and will smell bad, and will not compost properly. It is safe for chickens to eat the compost, but if it is not covered, they may scatter it. Make sure that you use plenty of grass and leaves to help absorb the water and smell. This will also help your plants grow well. Do not add any meat to your compost. Dogs will dig it up and ruin it.

# Here's a method that lets you feed your plants with both solid manure and wastewater

Raw pig manure that is mixed with water is also a good food for plants.

Use concrete floors in your pig pens.

Cover the stored pig manure to prevent it from washing away.



A covered concrete pad for your pig pens.



Pig wastewater flows downhill to a banana plantation.

A good way to fertilize with wastewater is to use plastic rain gutters to let it flow to your plants.

Build your pig pens uphill of your plants, so the fertilizer can flow down to them.

## How and where to drain the liquid waste

Once you've removed as much of the solid manure from the wastewater as you can, a cheap and easy way to get the nutrient-rich water to your crops is with plastic rain gutters.

A flat bottom concrete gutter at the down slope end of the pig pens works well to collect solid manure. It should be about the width of your flat bottom shovel.

This concrete collection gutter is then fitted with a rain gutter at the outlet.

Grass or coconut husks can be used to filter out remaining solids before the water flows to the rain gutters.



A concrete pig pen with a concrete gutter along its side. The wastewater flows into the gutter and from there to plastic rain gutters that fertilize the plants. Solids are filtered out (see below).



Grasses help filter out larger pieces of manure that would clog the holes in the rain gutters.

The rain gutters are used to carry water to your crops. Holes approximately 1/2 of an inch in diameter are drilled into the side (near to bottom) of the gutter to allow water to drain out. If the holes get plugged, you can clear them with a small stick or branch.

When you plan your irrigation system, make sure your field or orchard is downhill from the solid separator, and slope your gutters so the water will flow to all your trees. A 1% to 2% slope works the best. You want the liquid to flow easily but not too fast.

# How to build a liquid manure irrigation system



1. Attach a plastic gutter or pipe to the outlet of your pig pen's concrete waste gutter.

2. To control the slope and height of your irrigation gutters, attach short lengths of 1/2" diameter PVC pipe, 6" long. Cut the pipe to length and plug it tightly with a short piece of wood.





3. Screw through the bottom of the gutter into the wood plug to secure the pipe to the gutter every few feet as necessary. Use galvanized or stainless steel screws.

4. With the pipes attached, you can control the slope so that the water can flow all the way from the pig pen to the end of the irrigation gutter. A good slope is 2%, or 2-1/2 inches for every 10 feet.





5. Fit the bottom end of the pipes over a #3 rebar stuck in the ground. Vary the rebar lengths to control the slope. This also makes moving your gutters easier.

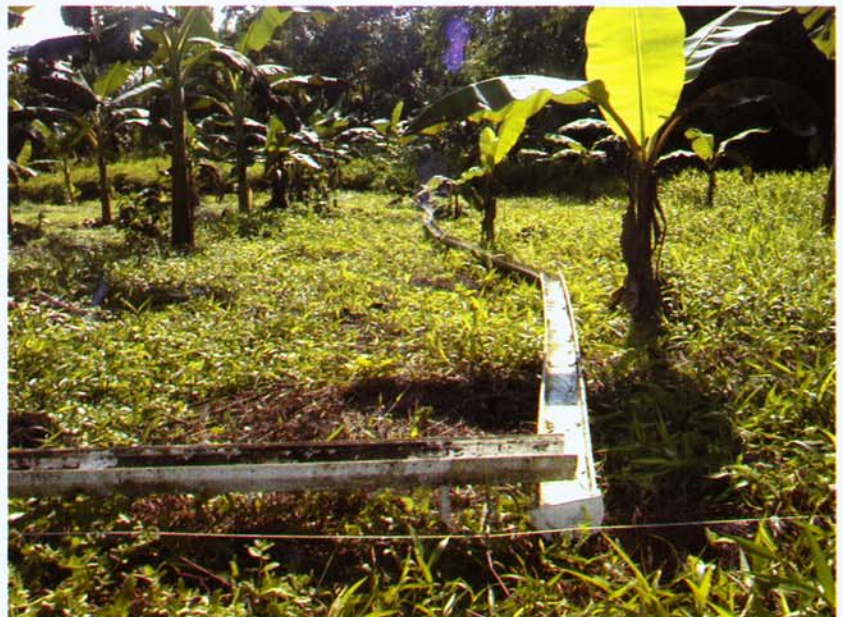
6. Connect your gutters so the fertilizer can flow to all areas of your field or orchard. Overlap the gutters for an easy straight connection.





7. For crossover connections, drill several holes for the wastewater to flow through.

8. A good connection for corners.





9. Drill drain holes into your gutters to irrigate and fertilize your crops. A good distance between holes is 2 feet. Use at least 100 feet of gutters so the liquid can feed a lot of plants.

10. These bananas are very strong and healthy because they are being fertilized with wastewater.





## **Tips on building pig pens**

### **Where to build your pig pens**

Build your pig pens uphill of the fields you want to fertilize. That way, the liquid waste can flow downhill to your plants. If your land is flat, raise up your pig pens. It will be hard work, but it will be worth it when you are ready to fertilize your garden.

### **Cleaning the pens**

Before you rinse out your pig pen, use a flat shovel to remove the manure to the compost pile you made to store it. Then, you can spray water with a hose or bucket to clean the pen. Do not turn on the water and leave it running in the pen. Bananas do not usually grow well in wet places or in mud.

### **The cost of the pig pen**

If you use local materials like sticks and rocks, the only items you need to buy are tin roofing, cement, plastic pipes, and screen. When the pig pen is finished, it will cost about US\$5 per square foot for the materials.

## **To recap**

- Liquid waste from 1,000 pounds of pigs can fertilize about 22 banana trees.
- Make sure your gutter is set at a two percent downward slope and use at least 100 feet of gutter so the liquid can drain properly and feed lots of plants.
- If local materials are used, you save money.

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