



How to a Complete Diet with Permaculture Principles: Tropical Subsistence Gardening. 24 part class series

Part 8 of 24 **Creating Garden Beds & Prepping Holes For Fruit Trees:**

Learn how to build a variety of styles of garden beds and easier methods for planting trees on rocky ground. Obtaining and balancing soil, hugelkultur, and amending included.

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Introduction: Depending on your site conditions there are many ways to create garden beds. Some of the determining factors may be, the existing soil (or lack thereof) on site materials for bed wall creation, what is going to be grown in the bed and more...

Sourcing and balancing Soil for garden beds:

In Puna soil is often shallow, rocky or non-existent. If you have soil it often needs balancing and amending. If soil is sticky or clay you may want to add black cinder to increase drainage. If your soil has very high drainage you may want to add clay. Adding compost and using mulch on the surface of the bed add organic matter to the soil which is almost always beneficial. In Hamukua deep clay soils can be **double dug** and compost and or black cinder can be added.

Berming up existing soil: if there is some soil, it can be dug from the areas which will become paths and heaped onto the beds to build them up.

Locate previous "push piles": if the land has been previously bulldozed where did they push the material? The piles are basically giant compost piles and may be rich soil by now. This soil may be moved around or used where it is. A metal digging bar (o'o) can help determine soil depth.

Importing Soil: if there is no soil on site, a "cinder soil macnut mix" can be purchased from local gravel yards, it is a mix of Hamukua clay soil, fine black cinder, and macadamia nut compost. This can then be amended (see previous handout, available at website below)

Bed building techniques:

Hugelkultur bed: rotting logs, coconut husks, branches, etc can be piled up to several ft. high and then buried with soil 6in to a ft deep. The buried organic material will feed the bed and act as a sponge making the bed drought resistant. In very dry areas coconuts can be cut in half and placed cup side up so they hold water then buried in soil, each deep watering fills the coconuts providing water for the bed.

Raised Beds: consist of mounded up soil from 1ft to 2ft deep, **walls for raised beds can be:** **Open:** the simplest form of a raised bed, soil is simply mounded. **Log borders:** are easy to use a string trimmer along, good barrier to keep out creeping weeds, eventually will rot adding organic material to the bed. **Rocks:** Are hard to use a trimmer along and may provide refuge for slugs and snails, may be hard to weed, but they will last virtually forever.

Lumber: best painted to protect and seal, clean look, good barrier for creeping weeds, can be costly.

Sheet metal or Wire and rebar covered and plastic woven weedmat can also be used can be long lived but most expensive to build. Where space is limited like in a greenhouse these may make more sense.

Flat beds: not mounded, generally only possible where a quantity of good soil exists. Easiest.

Siting Different Garden Types: Each type of garden below has certain different needs and interactions that we need to take into account, soil, sun, water, access, edges, maintenance, frequency of visits, etc.

Access: consider paths, truck access for bringing in compost or mulch.

Maintaining edges: A 4- 12 ft clear or mowed area surrounding garden on all sides deters slugs and snails. This can double as truck access road. Border plants and or logs around the perimeter help keep out creeping weeds and grass.

Kitchen garden: located as close as possible to kitchen while still getting enough sun, morning sun is preferable. Needs accessible water ideally a hose, at least a water barrel, and watering can, stock tank or small pond. Beds are often raised, 3-4 ft wide with 1.5-2 ft paths and 20 to 30 ft. long. Sides may be open, or supported by logs, rocks,

lumber, etc., Comfrey can make a **perimeter border** that helps exclude grass and creeping weeds. Some of the crops this garden will focus on are, perennial collards, turk's cap sweet pepper, eggplant, kale, leeks, daikon radish, fennel, cherry tomato, etc. Mulch sources nearby can be easily harvested and used in the garden, vetiver grass, croton, banana leaves, etc.

Herb garden: as close to the kitchen as possible while still getting as much sun as possible. A high spot with full sun and good drainage is ideal, large rocks can help shed water and store and radiate heat. Pots can also be used under a south facing eave for plants that desire hot and dry conditions.

Root crop garden: can be further from the kitchen, this garden needs pig protection, usually in the form of fencing. Gliricidia or other trees that can root from large woody cuttings, can be used as living fence posts that can later be coppice (cut) and used as mulch around crops. **Beds** are often flat or raised depending on soils, often without permanent borders, but sometimes log borders especially on outer perimeter. Root crops take a much larger area than the kitchen garden. Cassava, or dryland taro can be planted around 3-4 feet apart in rows 4-8 ft apart, if scant soil, scrape into mounds and plant their in.

Bed dimensions: 4ft wide is a common bed width, with wider beds you may not be able to reach the center for maintenance. If you are shorter in stature you may want 3 ft beds so that you can still reach the center. We want to avoid walking on the surface of the bed at all costs due to compaction.

Path dimensions: 2 ft wide is a common width, this allows for a wheelbarrow to maneuver easily.

Fruit tree hole prep:

Many of the same techniques for garden beds can be used. In areas with little soil and a rock slab under ground, it may be easier to build up soil rather than try to dig a hole. As the tree grows more soil and mulch can be added around the edges.

Siting fruit trees: In areas that do not drain well with sticky or clay soils choosing high spots to plant trees on should be considered. Amending soil with black cinder to increase drainage is also encouraged. Give trees ample spacing so full grown trees won't be crowded.

Using heavy machinery responsibly:

"Ripping" with a bulldozer is another option but may be cost prohibitive. Permaculture is not adverse to thoughtful and well planned use of heavy machinery, IF the outcome is something that is sustainable. Remember! Vegetation and "weed trees" will break down into soil. Do not push all your fertility off site. If clearing make sure push piles will be accessible in the future and ideally pushed where it will not have to be moved again. A backhoe or bobcat can often prep holes quickly if amendment materials are already on site. Consult a professional first, see website at bottom of page.

Further Reading:

The Many Benefits of Hugelkultur <https://www.permaculture.co.uk/articles/many-benefits-hugelkultur>
Building Healthy Garden Soil <https://www.ctahr.hawaii.edu/uhmg/news/V11-Cyr-HealthyGardenSoil.pdf>
Fruit Tree Planting and Care <http://plantithawaii.com/fruit-tree-care/>

Homework: Use the pointers above to make or renovate a small garden bed, near your kitchen even 4ft by 4ft can grow a lot of food.

Next week March 2nd class will be taught by a visiting instructor.

Next class in this series March 9 will be:

Part 9. Pruning & Fertilizing Fruit Trees: Learn how to prune for increased fruit tree health and ease of harvest. Find out what organic fertilizers you can use and when it's best to apply them.

Contact: Malama Aina Permaculture: Edible Landscape Design, Education & Nursery

We provide consultation, design, install, maintenance, edible plants & work-exchange.

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(Past class notes, registration and links to further educational materials available below)

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