



Livestock Waste Management Practices for Pacific Islands

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Animal Waste Management Strategies
EPA PIEC Pre-Conference Working Session
June 21, 2005 Guam

In Pacific Island Cultures the pig is very important!



Birth

First Birthday

Graduation

Marriage

Death

Water

measure of wealth in island culture (“wai wai”)

the universal solvent

is the medium and carrier of nutrients.

this carrier causes potential pollution of our water resources (surface, ground, coastal).

Clean water is a valuable resource, why waste it?



Current Management Practices Observed in Many Small Piggeries

- Water based
- Direct discharge
- Cesspool
- Septic systems
- Uncontrolled flow





Alternative Manure Management Practices are needed ...

- to avoid environmental degradation of our water resources
- to avoid possible human health problems
- to take advantage of the nutrients or “fertilizer” value for growing crops

Considerations in Selecting a Best Management Practice

- Manure production
- Location
- Technical viability
- Available resources
- Cost and economic feasibility
- Operational maintenance and effort

Keep in mind ...

- There is no “free” system.
- In other words, there is no system that:
 - requires no inputs (labor, time, etc.)
 - requires no costs to maintain
 - will make manure “disappear”
- There are no “Perfect Systems”
- There are no “Silver Bullets”

Sharing of ideas

Use some the upcoming ideas and concepts and adapt them to your situation.

Work closely with your local technical, funding agencies who are working hard to improve the local conditions for the community.

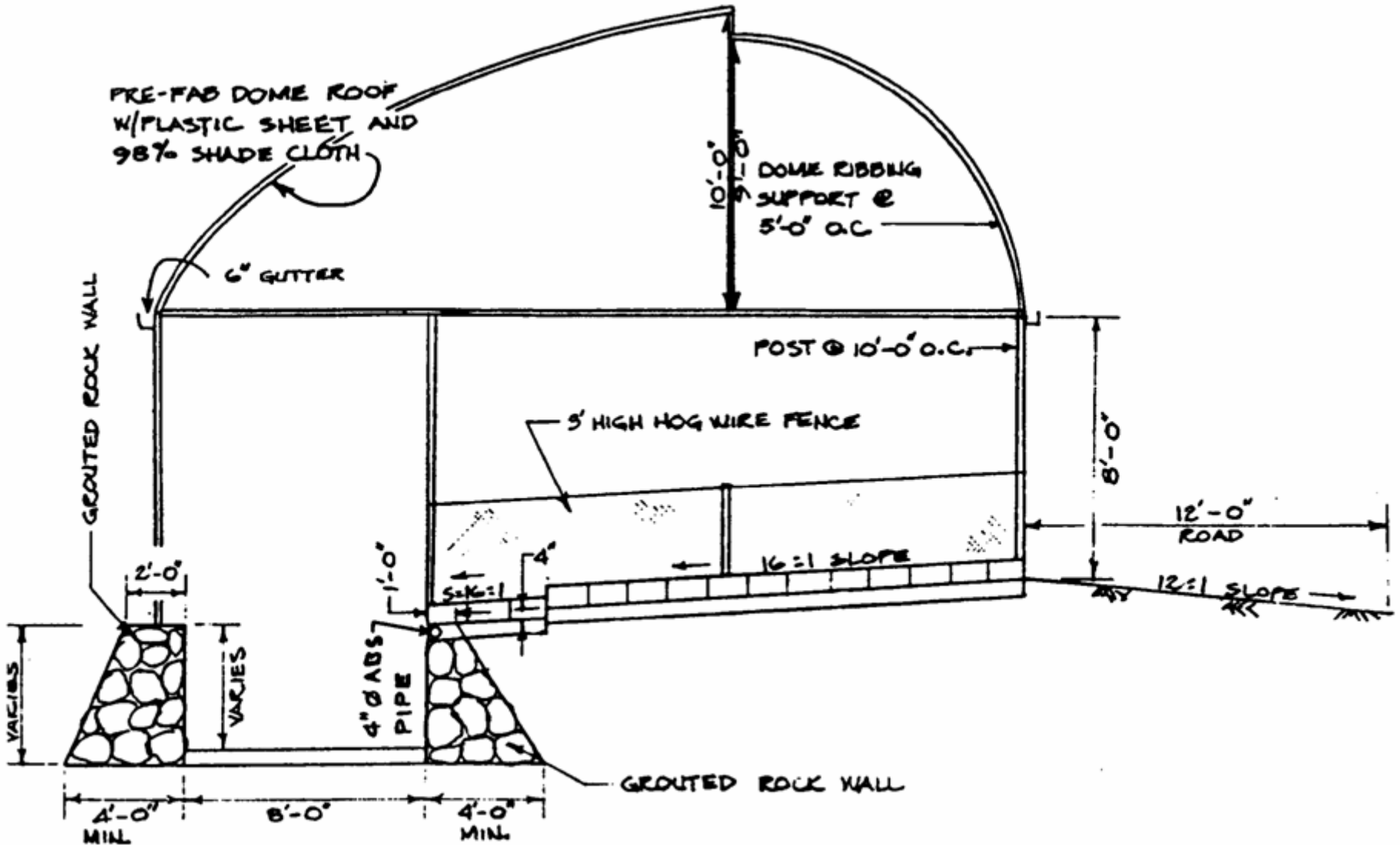
Hawaiian Modified Dry Litter Waste Management System

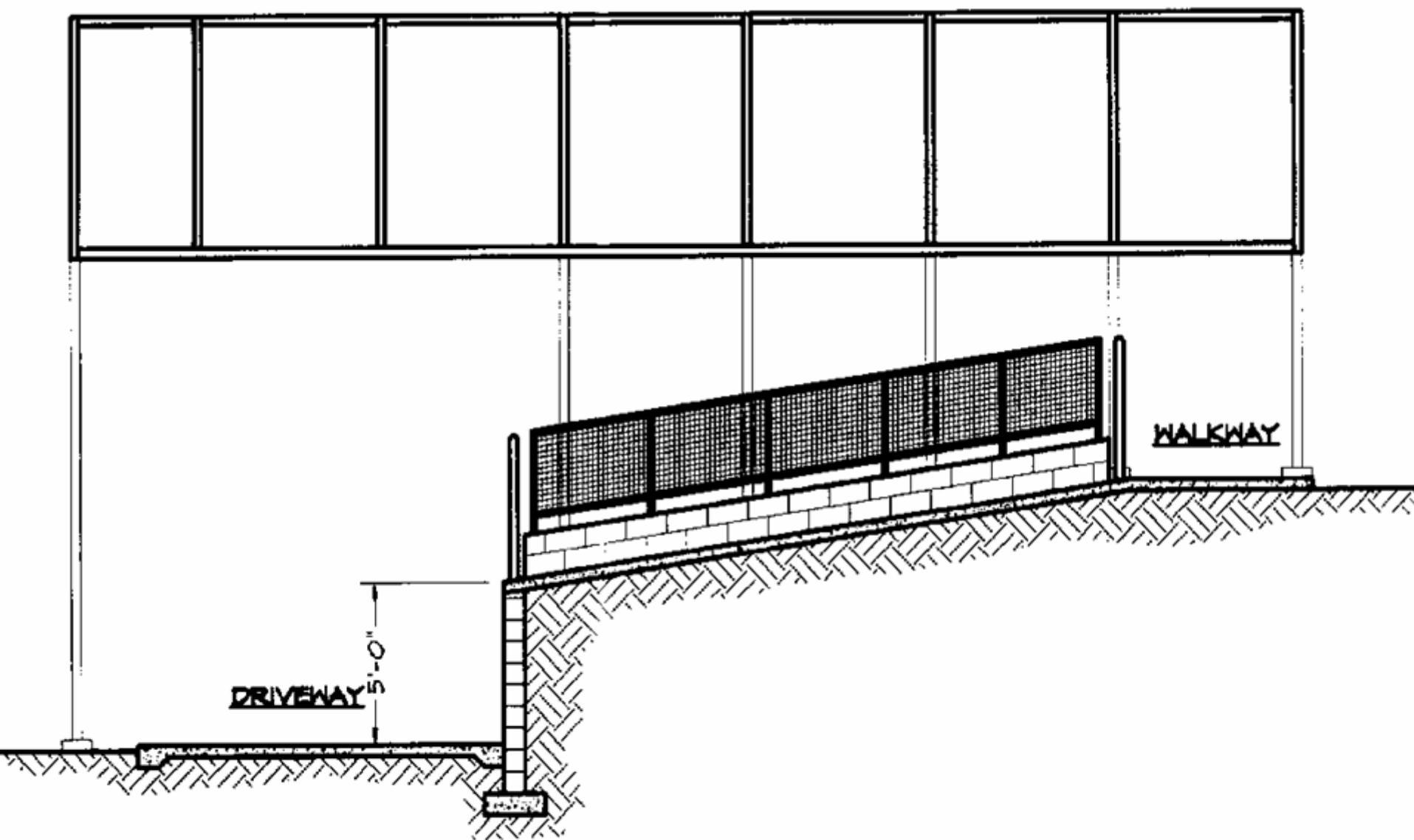
What if ...

- a system that was low tech,
- the system was practical,
- use no water for pen clean up,
- creates no offensive odors,
- reduce fly breeding,
- creates a new product off the farm,
- makes the regulators happy ...

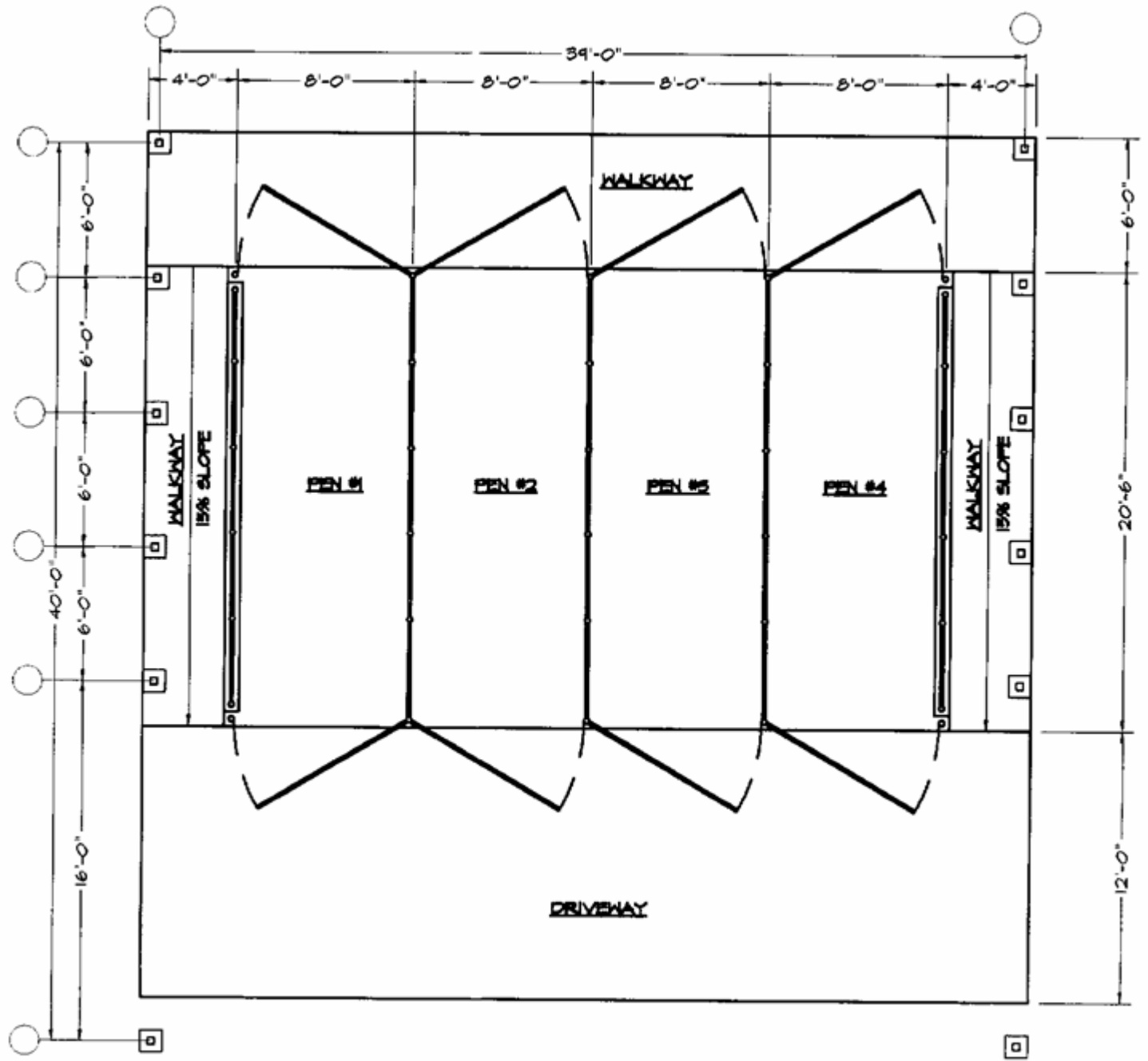


Modified Dry Litter System

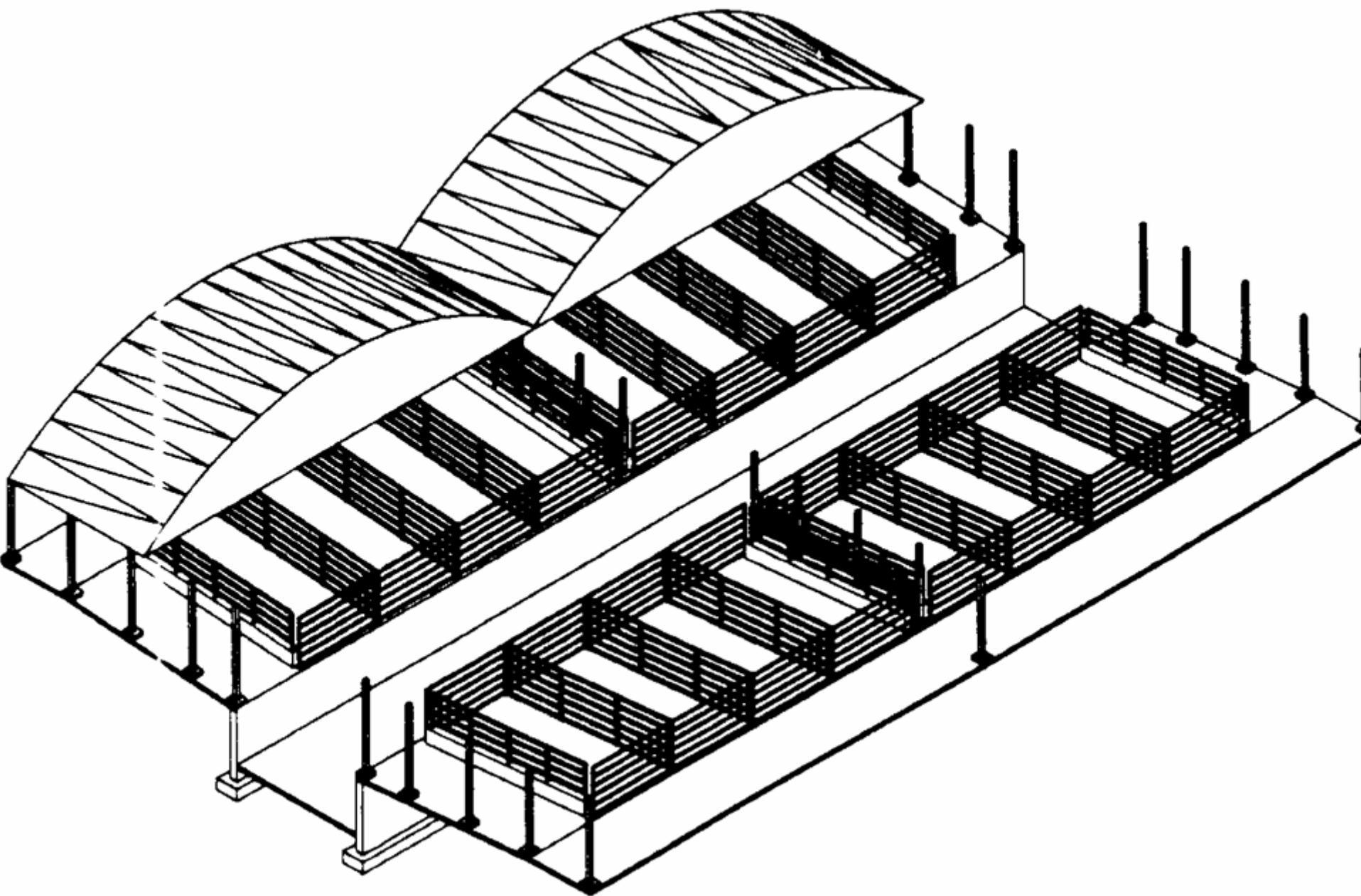




RIGHT SIDE ELEVATION



ONE MODULE PEN PLAN







THE PRODUCTION PROJECT
This project is designed to demonstrate the principles of sustainable agriculture and the importance of responsible production practices. The goal is to provide a hands-on learning experience for students and the community, focusing on the following areas:

- **Animal Welfare:** Ensuring the health and well-being of all animals raised on the farm.
- **Environmental Stewardship:** Implementing practices that protect the land, water, and air.
- **Economic Viability:** Producing high-quality products that are profitable and sustainable.
- **Community Engagement:** Sharing knowledge and resources with the local community.

For more information, please contact the project manager at [contact information].

Pen Slope Descriptions

Horizontal: Vertical Ratio	Percent	Degree
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40:1	2.5	1.43
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20:1	5.0	2.86
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13:1	7.7	4.40
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10:1	10.1	5.71
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Effects of Slopes

40:1 slope (2.5%)

20:1 slope (5 %)

10:1 slope (10 %)



Carbon Materials

- Macadamia nut husk
- Commercial tree trimmings
- Hay, Panicum maximum

- Corn cobs
- Combinations
- Paper, Coconut husk?





4-15-2027

Animal Performance

**5 Trials, 7 week run, 204 Nursery pigs
4 Slopes, 3 Carbon materials**

Start weight- 25 lbs; End weight 95 lbs.

Average Daily Gain = 1.30 – 1.32

Feed Conversion Ratio = 1.63 –1.85







Odor, Hydrogen sulfide

Pen Slopes	40:1	20:1	10:1	Conventional
Production	44-53	28-46	11-18	30 - 54
Storage	6-20	2-11	5-6	66 - 98
Transport				112 - 144

Compost Product

RAW MATERIAL	pH	OC	N	C:N	P	K
MNH	6.2	41	1.2	34	-	-
TT	6.0	48	1.3	31	-	-
COMPOST						
MNH	6.0	38	2.8	13	0.6	2.9
TT	7.0	38	1.6	23	-	-

Utilization ... Key Component



Advantages

- No water is used in pen washdown
- No discharge of effluent from the pen
- Carbon interaction with nitrogen in the co-composting process reduces odors.
- Low to moderate level of management to operate. The pigs do the work.
- Organic fertilizer by-product for crop use or sold as compost at favorable returns

Disadvantages

- Consistent supply of carbon is required adding effort in acquisition, transportation and storage.
- Cannot be adapted to existing piggeries with flat floors.
- Composting of resultant litter will require additional management

Benefits to the Watershed

- Water conservation.
- Protection of surface, ground and coastal waters.
- Nuisance vectors are minimized.
- Odors drastically reduced.
- Recycling of greenwastes, other carbon and organic material.

**Composting:
On-Farm Projects in Hawaii
and American Samoa
Beneficial Utilization**

“Organa Grow”
On-farm Composting at
Hawaiian Fresh Egg Farm
(Composting started ‘90’s, New system since 2003)







[Video](#)



On Farm Composting at Mountain View Dairy

(Since late 1990's)



American Samoa Project

- **Composting**























Small Scale Composting Bins

- Minimum size is about one cubic yard.
- Constructed from various materials
- Be creative

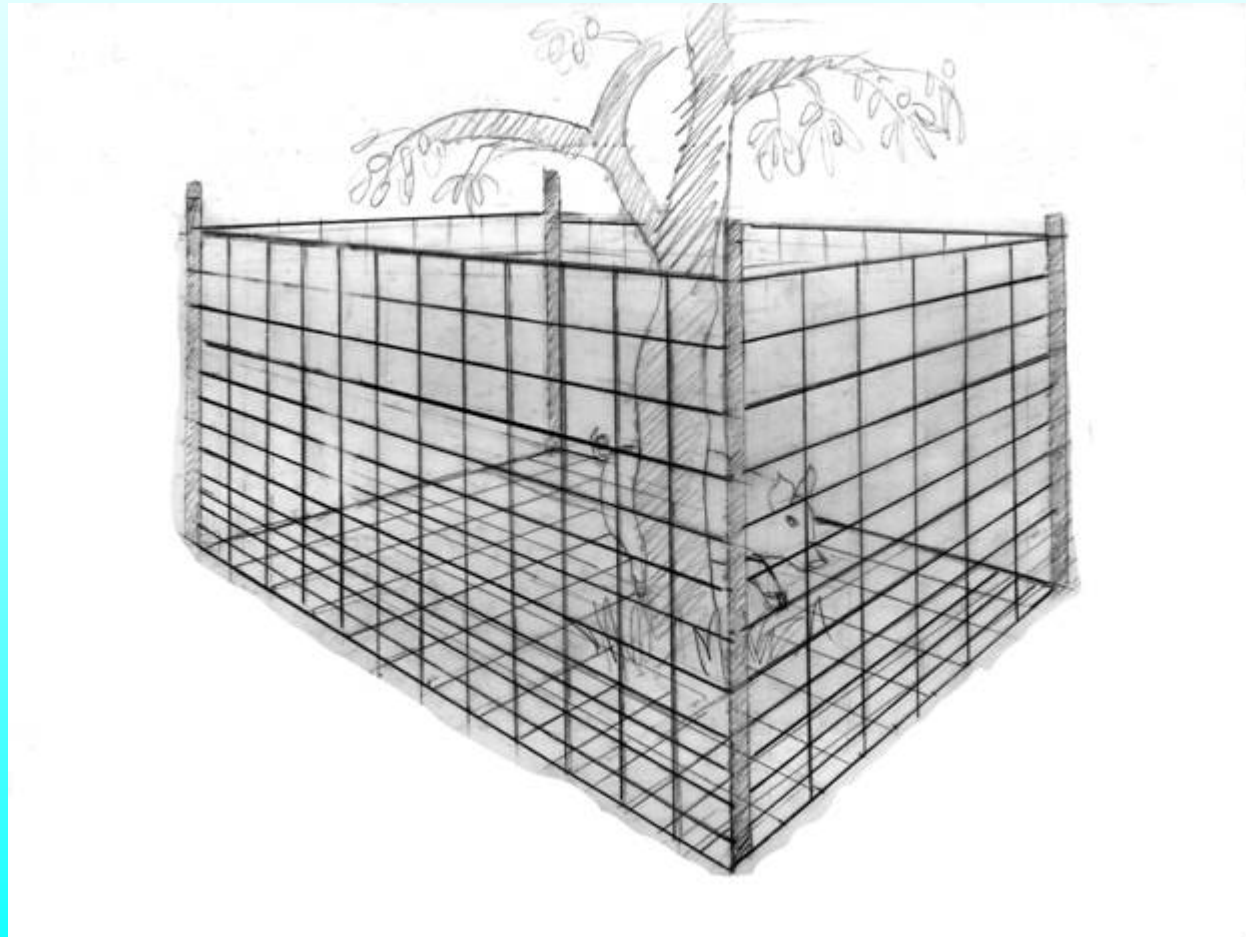
Home Composting Bins







Portable Dry Litter Pen





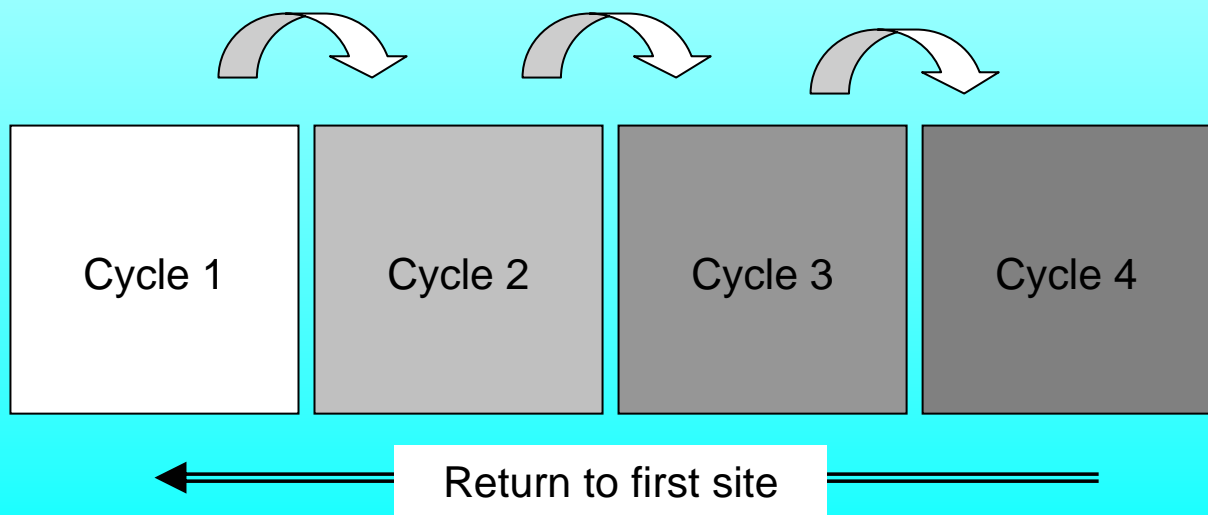
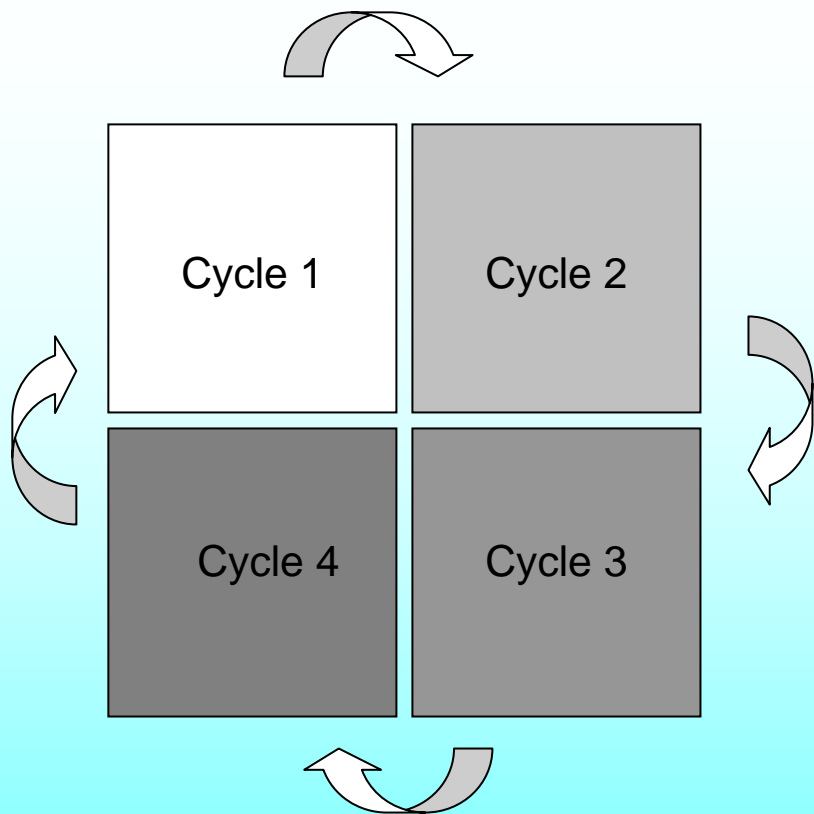


Advantages

- No water is used in pen washdown
- No discharge of effluent from the pen
- Low level of management to operate
- Low capital and operating cost
- Organic fertilizer by-product
- Requires a small “footprint” or land area

Disadvantages

- Consistent supply of carbon is required
- Applicable for very small scale operations
- Requires rotation/relocation every 4-5 months
- Cannot be used on steep or rough terrain
- Should not be used over critical water groundwater recharge areas





Dry Litter Portable Pen





Effluent Irrigation

Effluent Drip Irrigation

- This system was developed in Pohnpei, USDA NRCS Pac-Basin.
- The system is a way of directly applying effluent water to crop land
- The simple gravity flow system takes nutrients from the up gradient piggery to the down gradient crop land

Effluent Irrigation







Advantages

- Excellent management option for liquid material
- The gravity flow system is low-cost and easy to install
- Low level of management to operate and easy to maintain
- Nutrients in the effluent provide an organic fertilizer to enhance crop production

Disadvantages

- A solid separator is required to separate out the solids and pig hair in order for the drip system to be effective
- Consistent effort is required to manage the system (keeping drip holes unplugged)
- The effluent contains pathogens which would require precautions in crop selection and direct contact

A tropical sunset over the ocean. The sun is low on the horizon, partially obscured by clouds, casting a golden glow across the sky and water. A palm frond is visible in the upper left corner, silhouetted against the sky. The ocean is dark blue with white foam from waves breaking in the foreground.

<http://www.pigsinparadise.info>

2003 Environmental Award from U.S. E.P.A. Region 9

Talofa !!



Grazing Cage

Pastured Poultry Popularized by Joel Salatin



Integrates rotational grazing concepts for
small scale sustainable systems



Advantages

- Manure is distributed in controlled area
- Recycles nutrients to plants
- Adjustable up to 150 square feet.
- Low cost & Easy to operate
- Can be used for layers and broilers
- Saves feed costs
- Weed control
- Health forage-based eggs or meat

Disadvantages

- Dry season forage growth is reduced, slow down rotation to allow longer rest periods
- Pen must be rotated, depending on the number of animals; more animals = faster rotation





Highlight Notes

- Three layers
- 30'x50' area within fruit tree planting
- Forage: Perennial peanut (*Arachis pintoii*)
- Rotation 60-75 days in 35-40 moves
- 25-30% feed savings due to forage supply
- Nutrient cycling
- Weed control
- **FRESH EGGS**







Dankulu Na Si Yuus Maase

Mahalo