

# Small Scale Livestock Waste Management Practices for Pacific Islands

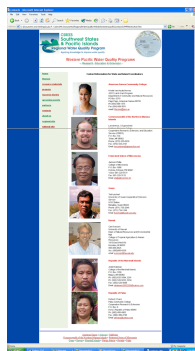
Glen Fukumoto<sup>1</sup>, Carl Evensen<sup>1</sup>, Lawrence Duponcheel<sup>2</sup>, Allan Sabaldica<sup>2</sup>, and Luisa Castro<sup>1</sup>

<sup>1</sup>University of Hawaii, <sup>2</sup>Northern Marianas College

## CURRENT CONDITIONS

Management of livestock wastes is a serious concern for the American-affiliated Pacific Islands due to limited land for disposal and the need to protect fragile environments from contamination by nutrients and pathogens. Most animal waste management practices in the continental U.S. are not appropriate to the small scale and limited resources of Pacific Island farms.

Coordinated activities to solve these problems are supported by the CSREES Region IX Water Quality Program. Our objectives are to protect stream, coastal, and groundwater resources through promotion of waste management practices that are culturally acceptable and economically feasible. Water Quality Coordinators in each of the Islands support research and extension to develop and promote promising practices.



## PROBLEMS

Serious contamination of surface and groundwater with pig waste occurs throughout the American Pacific Islands. Often manures are discharged directly into the ground or streams without treatment.



Pig effluent into a stream in American Samoa



Pig manure leaching into the ground in Tinian, CNMI



Pig pens built over a coastal mangrove lagoon in Pohnpei, FSM

## PORTABLE PEN

An example of a practice being promoted is a portable dry-litter system that eliminates discharges into waterways and integrates composting. A pen is constructed of 8-foot lengths of fence panels, filled with about 6 inches of bedding material, and holds up to 4 weaned pigs for 4 to 6 months. New bedding is added weekly.

### ADVANTAGES

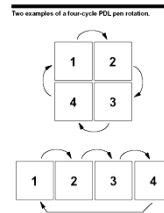
- No pen washdown or discharge of effluent
- Low level of management to operate
- Low capital and operating costs
- Organic fertilizer by-product
- Small "footprint" or land area required

### DISADVANTAGES

- Consistent supply of carbon is required
- Applicable for very small scale operations
- Requires relocation every 6 months
- Cannot be used on steep or rough terrain
- Not used over groundwater recharge areas



Portable Dry Litter Pen in American Samoa



## EFFLUENT IRRIGATION

A simple effluent irrigation system was developed by the Pohnpei Soil and Water Conservation District, with assistance from the USDA Natural Resources Conservation Service Pac-Basin. The system directly applies effluent to crop land. The simple gravity flow system takes nutrient-rich effluent from the piggery to crop land.

### ADVANTAGES

- Low-cost and easy to install
- Simple to operate and maintain
- Nutrients enhance crop production

### DISADVANTAGES

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



Effluent irrigation system in American Samoa



## EDUCATION / OUTREACH

Water quality education and outreach throughout the region reaches community members at universities, government agencies, youth groups, on farms and in homes to promote these practices. A recent series of workshops (July 2004) in Guam and CNMI involved over 120 participants from all over the Western Pacific to learn about improved waste management.



Community workshop in Rota, CNMI

## COMPOSTING

Composting and dry litter systems are being introduced throughout the islands. Farmers like their simplicity, lower water use, and the nutrient-rich fertilizer produced. Advantages and disadvantages are similar to the Portable Pens (above), except that the structures are not moved.



Composting bins in American Samoa

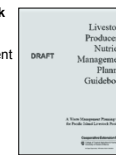
Composting involves combining manure and carbon materials in bins or piles. The piles can be turned, but are usually left static for up to 6 months. Dry litter composting systems are being adapted in the Pacific Islands to include sloping floors (to allow slow compost movement out of the pens) and locally available carbon sources, such as coconut husks.



Mr. Gilbert Macaranas converted from flushing to dry litter composting in Tinian, CNMI

### Producer Guidebook

At these workshops, a Nutrient Management Planning Guide was developed and piloted for future distribution and use throughout the Pacific Islands.



Island visits provide opportunities for knowledge exchange