



Applying knowledge to improve water quality

Southwest States & Pacific Islands Regional Water Program

A Partnership of USDA CSREES
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Small Scale Animal Waste Management

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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 US are not appropriate for the small scale and limited resources of Pacific Island farms.

Coordinated activities to solve these problems are supported by the Southwest States and Pacific Islands Regional Water Program. Our objectives are to protect stream, coastal and groundwater resources through promotion of waste management practices which 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 without treatment. These wastes can leach to groundwater on porous soils (such as in the Northern Marianas Islands) or contaminate streams through direct discharge.



Pig effluent discharge into a stream in American Samoa.

Portable Pen

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



Portable dry litter pen.

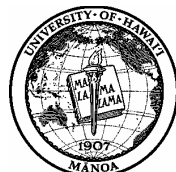
ADVANTAGES

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

DISADVANTAGES

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

University of Guam • American Samoa Community College • College of the Marshall Islands



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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 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.

Effluent Irrigation

A simple effluent irrigation system was developed by the Pohnpei Soil and Water Conservation District, with assistance from the Pacific Basin office of the USDA Natural Resources Conservation Service. 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 may contain pathogens which require precautions in crop selection and direct contact



Effluent irrigation system.

Education/Outreach

Water quality education and outreach throughout the region promotes these practices with community members as well as universities, government agencies, and youth groups. A series of workshops during July 2004 in Guam and CNMI involved over 120 participants from all over the Western Pacific to learn about improved waste management. This was followed by workshops and conference presentations at the EPA Pacific Islands Environment Conference in June 2005 in Guam, through which successful animal waste management practices were extended to participants from around the Pacific.

More Information

Additional information about these practices can be found online at:

<http://www.ctahr.hawaii.edu/pigsinparadise>

<http://www.ctahr.hawaii.edu/sustainag/Projects/DryLitter.asp>

http://www2.ctahr.hawaii.edu/rwq/resource_materials/animalwaste.htm

or by contacting Dr. Carl Evensen at evensen@hawaii.edu or Glen Fukumoto at gfkumot@hawaii.edu.



Community workshop in Rota, CNMI