Farm Structures
FACTSHEET

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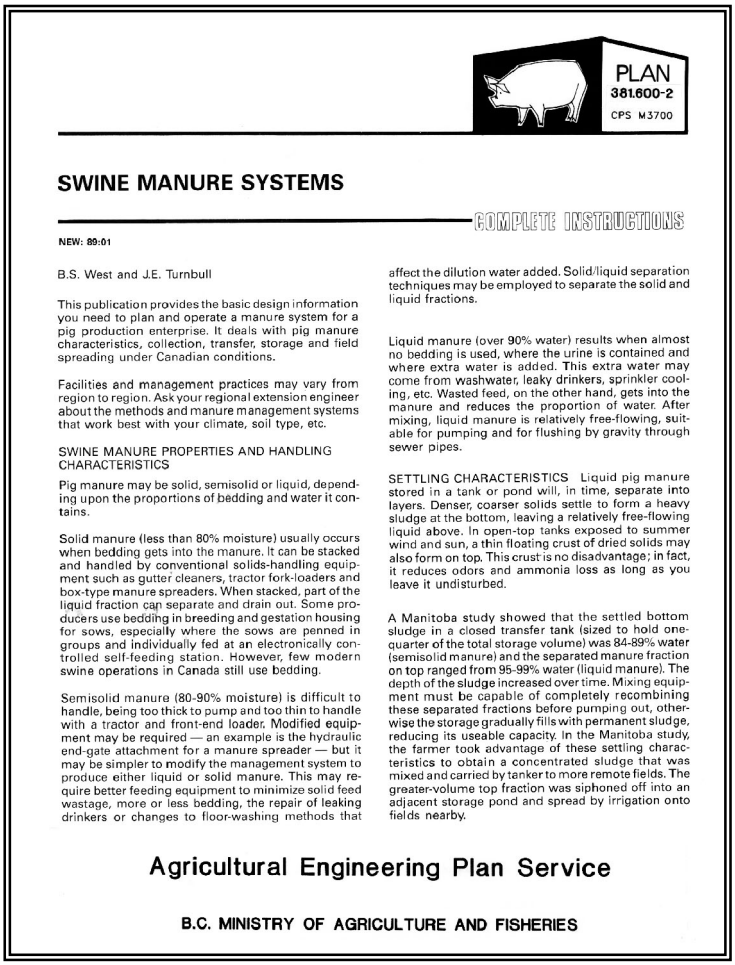
Swine Manure Systems



PLAN
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SWINE MANURE SYSTEMS

COMPLETE INSTRUCTIONS

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B.S. West and J.E. Turnbull

This publication provides the basic design information you need to plan and operate a manure system for a pig production enterprise. It deals with pig manure characteristics, collection, transfer, storage and field spreading under Canadian conditions.

Facilities and management practices may vary from region to region. Ask your regional extension engineer about the methods and manure management systems that work best with your climate, soil type, etc.

SWINE MANURE PROPERTIES AND HANDLING CHARACTERISTICS

Pig manure may be solid, semisolid or liquid, depending upon the proportions of bedding and water it contains.

Solid manure (less than 80% moisture) usually occurs when bedding gets into the manure. It can be stacked and handled by conventional solids-handling equipment such as gutter cleaners, tractor fork-loaders and box-type manure spreaders. When stacked, part of the liquid fraction can separate and drain out. Some producers use bedding in breeding and gestation housing for sows, especially where the sows are penned in groups and individually fed at an electronically controlled self-feeding station. However, few modern swine operations in Canada still use bedding.

Semisolid manure (80-90% moisture) is difficult to handle, being too thick to pump and too thin to handle with a tractor and front-end loader. Modified equipment may be required — an example is the hydraulic end-gate attachment for a manure spreader — but it may be simpler to modify the management system to produce either liquid or solid manure. This may require better feeding equipment to minimize solid feed wastage, more or less bedding, the repair of leaking drinkers or changes to floor-washing methods that affect the dilution water added. Solid/liquid separation techniques may be employed to separate the solid and liquid fractions.

Liquid manure (over 90% water) results when almost no bedding is used, where the urine is contained and where extra water is added. This extra water may come from washwater, leaky drinkers, sprinkler cooling, etc. Wasted feed, on the other hand, gets into the manure and reduces the proportion of water. After mixing, liquid manure is relatively free-flowing, suitable for pumping and for flushing by gravity through sewer pipes.

SETTLING CHARACTERISTICS Liquid pig manure stored in a tank or pond will, in time, separate into layers. Denser, coarser solids settle to form a heavy sludge at the bottom, leaving a relatively free-flowing liquid above. In open-top tanks exposed to summer wind and sun, a thin floating crust of dried solids may also form on top. This crust is no disadvantage; in fact, it reduces odors and ammonia loss as long as you leave it undisturbed.

A Manitoba study showed that the settled bottom sludge in a closed transfer tank (sized to hold one-quarter of the total storage volume) was 84-89% water (semisolid manure) and the separated manure fraction on top ranged from 95-99% water (liquid manure). The depth of the sludge increased over time. Mixing equipment must be capable of completely recombining these separated fractions before pumping out, otherwise the storage gradually fills with permanent sludge, reducing its useable capacity. In the Manitoba study, the farmer took advantage of these settling characteristics to obtain a concentrated sludge that was mixed and carried by tanker to more remote fields. The greater-volume top fraction was siphoned off into an adjacent storage pond and spread by irrigation onto fields nearby.

Agricultural Engineering Plan Service

B.C. MINISTRY OF AGRICULTURE AND FISHERIES

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