



Environmental Guidelines

Swine Rearing Operations

2011

These guidelines have been adapted from: EPA-US, Profile of the Agricultural Livestock Production Industry; the World Bank Group, Environmental, Health, and Safety Guidelines for Mammalian Livestock Production; and the Swine Production Best Management Practices (LSUAGC).

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Environmental Guidelines for Swine Rearing

1. What are Environmental Guidelines?

- ▶ Environmental Guidelines are technical documents to encourage the use of the best management practices and cost-effective technologies to improve environmental conditions at the workplace and the surrounding community.
- ▶ This document includes information on effective management/husbandry practices relevant to swine rearing operations, specifically identifying the courses of action required for alleviating or preventing pollution-related issues arising from such operations.



2. Why the concern about Swine Rearing Operations?

Solid waste is produced at all stages of the swine rearing operation process, including housing, feeding, and watering, it includes faecal waste of swine, the feed, bedding, litter and soil with which faecal and urinary matter and process water become intermixed, and condemned carcasses.



Contaminants from animal waste can **pollute the environment, and affect human health** (waterborne diseases). Dermal contact may cause skin, eye, or ear infections. Additionally, waterborne diseases, such as diarrhea, can be caused by water polluted with these contaminants.

- According to the World Health Organization, diarrheal disease is responsible for the deaths of 1.8 million people every year (WHO, 2004).

-  Contaminants from animal wastes can enter the environment through different ways such as during major precipitation events resulting in either overflow of drains, or other waterways and runoff from pens, or atmospheric deposition followed by dry or wet fallout.
-  Runoff can leach through sandy soils to aquifers that tap ground water sources for human consumption. Runoff of manure can also find its way into surface water such as lakes, streams, and ponds.
-  Many contaminants are present in livestock wastes, including nutrients, pathogens, veterinary pharmaceuticals and naturally excreted hormones. Improper disposal of animal carcasses and abandoned livestock facilities can also contribute to water quality problems in surrounding areas of swine rearing operations.
-  Manure from swine rearing operations, when discharged directly and without treatment into waterways, can cause the decrease of the oxygen levels in the water. These degraded conditions can cause major kills of freshwater fish of all species in the affected areas.
-  Air pollution is also a concern in relation to animal waste. Farms on which animals are raised often concentrate odours associated with the microbial degradation of manure. Odours can be a nuisance to neighbours of animal

operations, and there is increasing concern about the potential health effects from emissions of odorous compounds.

3. Is this applicable to Guyana?

- ▶ In the Guyana, many small-scale swine rearing operations are located in close vicinity to residential areas. The environmental issues associated with this type of operation become a serious problem for surrounding residences.
- ▶ This document was developed as a result of extensive field work carried out by the Agency and it focuses on the major environmental concerns identified by the EPA and common concerns raised by the public.
- ▶ This can serve as a guide for new developers to avoid non-environmentally friendly practices. Further, current operators can identify opportunities to improve their operations.

4. What to consider?



4.1. Location

For new operations, the most suitable location for swine rearing operation facilities are agriculture areas where there are existing farmlands or/and the operation is at least 50m (~164ft) downwind from residences, major facilities and water bodies/water catchments.

4.2. Solid Waste Management

In order to control and mitigate the mentioned environmental concerns, practical measures are recommended.

How to manage Waste Feed?

- ✓ Feed must be stored in a specific area designated for storage or in secured bins.
- ✓ Storage area must be dry, well ventilated and meshed where necessary to avoid pests.
- ✓ Use storage racks elevated from the ground (15-30cm/6-8inch) to guard against absorption of moisture and contamination.
- ✓ The handling of feed must be efficient, avoiding spilling to soil and water ways.
- ✓ Use covered or protected feeders to prevent exposure of feed to rain and wind.
- ✓ Consider mixing of waste feed with other materials destined for use as fertilizer, or else consider composting

How to facilitate handling of animal waste?

- ✓ Pens should be cleaned, at least, twice daily. This includes dry cleaning (collection of solid waste without using water) and scraping of solid floors before water flushing and disinfection (multi-purpose disinfectants may be used).
- ✓ Collected manure may be used as a fertilizer on agricultural land. Animal manure has been recognized for centuries as an excellent source of plant nutrients and as a soil “builder” in terms of its positive benefits to soil quality. The manure from sick animals is not recommended to be used as fertilizer, as it may contain pathogens or residue from medications that could negatively affect the soil, water, vegetation and human health.
- ✓ Following collection, animal waste not immediately used may be stored in covered pits or tanks.
- ✓ Reduce the volume of rainwater in the storage system by covering slurry tanks or lagoons with a rigid roof or floating cover and by placing dry manure or litter in a covered or roofed area.
- ✓ Storage may be short term (2-5 days) for the purpose of collection for transferral to another area for land deposition or treatment.
- ✓ Treatment of manure can be done on site by composting or used in anaerobic digesters; this type of treatment is particularly beneficial due to biogas production that can be used for cooking, or as energy source for the facility.
- ✓ After treatment, the solids can be spread in fields to improve soil conditions.
- ✓ Manure also may be used to fertilize fish ponds. The small amounts of manure will stimulate the growth of natural fish food and aquatic plants. Please consult with the fisheries department.
- ✓ A good fly and rodent control programme should be implemented and sustained. Lack of insect control leads to animal stress and could increase the spread of disease. Fly paper or index cards could be used to determine the insect population and density.

How to handle Condemned Animal Carcasses?

Animal carcasses should be properly managed and quickly disposed of in order to prevent the spread of disease and odours, and to avoid the attraction of vectors. Animal carcasses must not be recycled into animal feed as they could convey and spread diseases.



Recommended carcass management practices include:

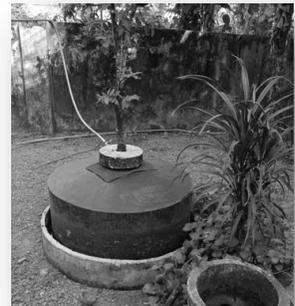
- ✓ Reduce mortalities through proper animal care and disease prevention.
- ✓ Dispose of carcasses by burial, either on land owned and/or controlled by the developer or at a site approved by relevant authorities, such as the area NDC. The burial area should be accessible to earthmoving machinery and have stable, clay soils with sufficient physical separation (at least 100 m) from houses and water resources to avoid contamination by vapours or filtrate from buried, decaying materials.
- ✓ Persons handling condemned carcasses should be properly equipped with the necessary protective clothing such as gloves, long boots, apron, respirator and other safety gear.
- ✓ Disinfect pens where condemned carcasses are found. Also, disinfect clothing and other gears worn by person doing the disposal.
- ✓ The use of lime or quicklime when burying carcasses is advised.
- ✓ Incineration should only be conducted in permitted facilities operating under national and/or international recognized standards for pollution prevention and control.

4.3. How to manage effluent discharges (wastewater)?

- ✓ Reduce water use and spills from animal watering by preventing overflow of watering devices.
- ✓ Reduce the amount of solids getting to the water.
- ✓ Install vegetative filters (grasses such as vetiver grass, that are planted around a pond or perimeter to absorb and prevent the movement of contaminants) to trap sediment.
- ✓ Install surface water diversions to direct clean runoff around areas containing waste.
- ✓ Implement buffer zones to surface water bodies, avoiding spreading of manure within these areas.

Techniques for treating wastewater in this sector include:

- ✓ Sedimentation for suspended solids reduction, using clarifiers or settling ponds.
- ✓ Biological treatment, typically anaerobic followed by aerobic treatment, for reduction of soluble organic matter.
- ✓ Biological nutrient removal for reduction of nitrogen and phosphorus.
- ✓ Chlorination of treated effluent when disinfection is required.
- ✓ Dewatering of residuals and composting or land application of wastewater treatment residuals.



4.4. Air Emissions

Air emissions from swine livestock production include ammonia, methane and nitrous oxide, odours, bio-aerosols, and dust. Effective waste management, as described above, is critical to reduce the emission of air pollutants. The management techniques discussed below is recommended to further reduce the impacts of air emissions from mammalian swine rearing operations.

What to do to mitigate Odours?

- ✓ Consider the setting up of new facilities taking into account distances to neighbours, the propagation of odours and wind direction (at least 50m or 164ft from nearest residence).
- ✓ Consider composting of manure to reduce odour emissions.
- ✓ Reduce emissions and odours during land application activities by applying the manure a few centimetres below the soil surface and by selecting favourable weather conditions (e.g. wind blowing away from inhabited areas).
- ✓ Apply all recommended measures concerning waste management.
- ✓ Pens may have ground covers such as sawdust to absorb odour.
- ✓ Watering ponds for free ranging swine should have an inlet and outflow drain and should be regularly flushed to prevent stagnation.
- ✓ Pens should be well ventilated to avoid the build-up of the ammonia scent.
- ✓ Provide animals with adequate water to alleviate the concentration of the ammonia in the urine.

What to do to control dust emissions?

- ✓ Install dust-collection systems at dusty operations, such as feed grinding.
- ✓ Implement fugitive-dust-control measures, such as wetting frequently travelled dirt roads, as necessary.
- ✓ Swine operations should be located downwind of residents and in areas suitable for such operations.
- ✓ Free ranging swine operations should be sectioned off to allow the animals' access to one area whilst the vegetation in the other is re-growing.
- ✓ A vegetative buffer zone should be established and maintained around the boundary of the pen to prevent fugitive dust emissions from escaping.

4.5. Animal Diseases



Animal diseases can enter a facility with new animals, on equipment, and on people. Some of the recommended general types of management methods to reduce the potential for the spread of animal pathogens include the following:

- ✓ Control farm animals, equipment, personnel, and wild or domestic animals entering the facility (e.g. quarantine periods for new animals before mixing with the existing population, washing and disinfecting crates, disinfection and coverage of shoes before entry into livestock zones, providing protective clothing to personnel, and closing holes in buildings to keep out wild animals).
- ✓ Vehicles that go from farm to farm (e.g. transport of veterinarians, farm suppliers, buyers, etc.) should be subject to special precautions such as limiting their operation to special areas, spraying of tires and treating parking areas with disinfectants.
- ✓ Sanitize animal housing areas.
- ✓ Identify and segregate sick animals and develop management procedures for adequate removal and disposal of dead animals. A special sick bay should be established to prevent the mixing of sick animals with the healthy animals and to reduce the spread of disease.
- ✓ The facility should be regularly visited by a veterinarian who should carry out regular checks on the animals for parasites that may be passed to humans through contamination from the faecal matter.
- ✓ Animals should not be allowed to stand for extended periods in their faecal matter, since this would encourage foot rot disease.
- ✓ Segregate pregnant sows and piglets. Special care should be given to the pens with pregnant sows and sows with litter, since poor hygiene may result in higher mortality rate among the young piglets and weaners.
- ✓ Pens should be constructed with materials that would prevent small piglets from escaping. Also, for free ranging swine operations, a boundary fence should be established using materials that may not be chewed by swine, which also prevents the small piglets from going to the surrounding area.
- ✓ No slaughtering should be done on site, unless permitted by the Environmental Health Officer of the NDC/RDC.
- ✓ When using offal as feed, ensure its safety and boil it before feeding to swine. You might store in a freezer for later use.

5. Do I need an Environmental Authorisation?

Regarding swine rearing operations, the Environmental Protection Agency requires an Environmental Permit for **large scale operations**; this means **over 70 total head of swine**.



5.1. What do I have to do?

The first step is to apply to the **Environmental Protection Agency (EPA)** for Environmental Authorisation. The developer must submit to the Agency a completed Application Form and all the required information:

New Projects	Existing Projects
<ul style="list-style-type: none"> ☛ Identification of the Permit Applicant (National ID Card, Passport). ☛ Proof of Land Ownership. ☛ A 'No-Objection' Letter for the operation from the relevant Local Authority – NDC/RDC/Town Council. Note the Approved Site Plan by the NDC/RDC/Town Council would be accepted as “no-objection”. ☛ 'No Objection' from the Village Council <u>and</u> Ministry of Amerindian Affairs if project falls within Amerindian titled lands. ☛ Land use suitability letter/Outline Planning Permission from the Central Planning & Housing Authority ☛ Map showing surrounding land uses, identification of receiving water(s) and the location of any existing or proposed intake and discharge structures and the location of any discharge. ☛ Draft Site Plan (approved by the NDC/RDC/Town Council, as applicable to project site) showing the layout of the Operation (submit a final version after all necessary adjustments have been made). ☛ Project Description (summary). ☛ Business Registration/Certificate of Incorporation (if applicable). ☛ Indication of whether or not a Permit or Licence from any other Government entity is required or have been obtained. Submit Permit, Licence, or Proof of Application from relevant sector Agency. 	<ul style="list-style-type: none"> ☛ Identification of the Permit Applicant (National ID Card, Passport). ☛ Proof of Land Ownership. ☛ A 'No-Objection' Letter for the operation from the relevant Local Authority – NDC/RDC/Town Council. Note the Approved Site Plan by the NDC/RDC/Town Council would be accepted as “no-objection”. ☛ Map showing surrounding land uses, identification of receiving water(s) and the location of any existing discharge structures and the location of any discharge. ☛ Site Plan showing the layout of the Operation. ☛ Project Description (summary). ☛ Business Registration/Certificate of Incorporation (if applicable). ☛ Indication of whether or not a Permit or Licence from any other Government entity is required or have been obtained. Submit Permit, Licence, or Proof of Application from relevant sector Agency.



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