



Environmental Guidelines

Poultry Rearing Operations

2013

These guidelines have been adapted from the World Bank Group Environmental, Health, and Safety Guidelines for Poultry Production, the Good Practices in Small Scale Poultry Production from the Food and Agriculture Organization of the United Nations, and the USEPA Poultry Production and Environmental Stewardship.

Approved by EPA Board: March 13, 2013

Contents

1. What are Environmental Guidelines?	3
2. Why the concern about Poultry Rearing Operations?	3
3. Is this applicable to Guyana?	4
4. What to consider?	4
4.1. Location.....	4
4.2. Solid Waste Management.....	7
How to facilitate handling of poultry waste?	7
How to handle Condemned Poultry Carcasses?.....	8
4.3. How to manage effluent discharges (wastewater)?	9
4.4. Air Emissions	10
4.5. Animal Diseases	11
4.6. Hazardous Materials	12
5. Do I need an Environmental Authorisation?	13
5.1. What do I have to do?.....	13
References	13

Environmental Guidelines for Poultry 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 in the workplace and surrounding community.
- ▶ This document contains information on effective management/husbandry practices for poultry rearing operations. It identifies measures to be taken to reduce or prevent pollution-related issues associated with poultry rearing.
- ▶ Emphasis is placed on the general conditions necessary for healthy poultry development and environmental safety.



2. Why the concern about Poultry Rearing Operations?

Poultry Rearing Operations are **associated with a number of environmental and health concerns**. Transmission of diseases to humans is one of the health issues associated with these operations. From an environmental standpoint, there is concern regarding the management of solid waste, wastewater, odour nuisance, and pollution of waterways.



Contaminants from animal waste can pollute the environment, and affect human health. Dermal contact may cause skin, eye, or ear infections depending on the duration of exposure. Additionally, waterborne diseases, such as diarrhoea, can be caused by water polluted with these contaminants. **According to the World Health Organization, diarrhoeal disease is responsible for the deaths of 1.8 million people every year (WHO, 2004).**

-  **Solid waste** is produced at all stages of the poultry rearing process, including housing, feeding, and watering. It includes faecal waste of poultry, feed, bedding, litter and soil intermixed with faecal and urinary matter and process water; and condemned poultry carcasses.
-  Contaminants from poultry waste can enter the environment during heavy rainfall resulting in either overflow of drains, or other waterways.
-  Runoff can leach through sandy soils to aquifers and enter ground water sources used for human consumption. Runoff of manure can also find its way into surface water such as lakes, streams, and ponds.
-  Poultry rearing can be a major source of **odour nuisance**. Odours can be a nuisance to neighbours of poultry operations, and there is increasing concern about the potential health effects from emissions of odorous compounds.

-  Excreta from poultry contain uric acid, which is converted to volatile ammonia under certain conditions. Emissions of ammonia from poultry buildings contribute to the acidification of soils and water, and can have a negative impact on populations of acid-sensitive flora.
-  Improper disposal of poultry carcasses and abandoned facilities can also contribute to **water quality problems** in surrounding areas of poultry rearing operations. When discharged directly and without treatment into waterways, it can cause the decrease of the oxygen levels in the water. In affected areas, these degraded conditions can cause major freshwater fish kills.

3. Is this applicable to Guyana?

- ▶ The poultry industry is of strategic importance to food security, employment and income in Guyana, especially to a number of low-income families in both rural and urban areas. Poultry Production comprises two major categories: meat production and egg production.
- ▶ However, this widespread practice of poultry production has led to several environmental complaints due to poor environmental management practices.
- ▶ The Environmental Protection Agency thus, finds it necessary to prepare these guidelines which are intended to safeguard the environment, the health and safety of workers, as well as those who reside in close proximity to these Poultry Production Operations.

4. What to consider?



4.1. Location and site conditions

For new operations, the most suitable location for poultry rearing operation facilities are agricultural areas where there are existing farmlands and/or the operation is at least 50 m (~164 ft) downwind from residences, schools, hospitals, other major facilities, and water bodies/water catchments. The following recommendations regarding the pen and site conditions should be considered:

Location

- ✓ It is important to select high, easily drained land. The site must be near to reliable water and fuel sources and provide adequate space for expansion.
- ✓ Where the land is spacious, the pen/s should be positioned downwind of the nearest residence.
- ✓ The site must also be easily accessible. Location of bridges and entrances should not pose a traffic hazard and must not obstruct the free flow of water through any water course especially during rainy seasons.

Housing

- ✓ The poultry housing should be one storey, sturdy, safe and comfortable. The design must allow for adequate ventilation and efficient work by attendants.
- ✓ The construction of broiler houses should be made of materials that are easy to maintain, wash and disinfect. Some materials that can be used are:
 - ☛ Floors: Concrete.
 - ☛ Walls: Clay bricks, hollow blocks, lumber, round wood, staves, mesh or wattles. Walls should be boarded or blocked up to 0.30 m (1 ft) from the floor to retain litter and continued with mesh, or other suitable material, to the roof for ventilation.
 - ☛ Roof – Aluminum sheets, galvanized sheets, troolie palm, shingle or any impervious material may be used. An overhang of 0.90m (3 ft) is ideal.
- ✓ The facility should be fenced and secured from the hazards of pests and stray animals and from being a nuisance to neighbours. Windows should be covered with chicken wire-netting which does not allow wild birds to enter the broiler house.
- ✓ The height of immovable pens should allow for the comfortable movement of attendants. The design should allow for adequate ventilation but prevent excess drafts.
- ✓ An efficient drainage system should be maintained around the pens where all washings are channeled to the exit drains. Pens should be washed and disinfected following each change of litter bedding.
- ✓ A foot bath (40 x 40 x 10 cm) with disinfectant should be placed outside the broiler house at the entrance and visitors should not be allowed entry into the house.

As a poultry operator, before deciding on the type of housing to be constructed, it is important to understand that housing conditions are dependent on the system of management. In general, there are two types of housing for poultry operations: **Deep Litter System** and **Battery Cage System**. Depending on the scale of the operation, the following facts should be considered, taking into account the advantages and disadvantages of using either system.

DEEP LITTER SYSTEM

- A wall of 30 cm high is built all around to contain the litter or bedding.
- Fresh bedding should be spread over the entire floor area at a depth of about 7.5 – 10 cm. Materials used for bedding include wood shavings and sawdust, or any material that is readily available, economical and has good moisture absorbency.
- For broilers, during the rearing period, the bedding should be removed and replaced routinely in areas which become wet. The litter bed can be kept loose by raking. This is often necessary next to water dispensers/holders.
- Litter bedding should always be kept as dry as possible and changed at least after each batch of chickens has been harvested. When the birds are removed, the pens should be dusted, washed thoroughly and disinfected.
- On the windward side of pen, feed bags can be hung to keep out the rain.
- There should be two tube feeders for every 100 birds and three automatic waterers for every 100 birds.

DEEP LITTER SYSTEM

- Light is also necessary as it stimulates egg production in layers, and facilitates feeding in broilers.
- If layers are reared, there should be nest boxes and perches. One nest box should be available for every 4-5 birds.
- Layers start to lay from about 5 months. The cock to hen ratio is 1:10 to 12. The economic life of a hen is about 2 years.

ADVANTAGES

- ✓ No need for large amount of capital.
- ✓ The ammonia produced, leads to the production of Vitamin B Complex and acts as a disinfectant for Coccidiosis.
- ✓ Losses from vermin are reduced

DISADVANTAGES

- ✗ Labour is intensive - turning of litter is required regularly.
- ✗ It is not easy to pin point a problem.
- ✗ Disease can spread easily.



BATTERY CAGE SYSTEM

- This is practiced where land is limited or for household rearing. Each hen is confined to a cage just large enough to permit limited movement.
- Cages may be arranged in tiers with dropping trays.
- Feeders and waterers are placed outside the cages.
- Lime is applied to prevent bad smell and flies.
- The floor is slanted so when the egg is laid, it rolls downwards to be collected.

ADVANTAGES

- ✓ Labour is saved. One person can collect all the eggs and litter does not have to be turned.
- ✓ Accurate records can be kept – each bird is in confinement. This will facilitate culling.

DISADVANTAGES

- ✗ Initial capital is high – buildings are to be constructed as well as cages.
- ✗ Loss of eggs by thieves and vermin.



4.2. Solid Waste Management

Solid waste generated during poultry production includes waste feed, poultry waste, carcasses, sediments and sludge from on-site wastewater treatment facilities. Other wastes include various kinds of packaging (e.g. for feed and pesticides), used ventilation filters, unused / spoilt medications, and used cleaning materials. In order to control and mitigate the mentioned environmental concerns, the following practical measures are recommended.

How to manage Waste Feed?

Feed can become unusable waste material if spilled during storage, loading, and unloading or during animal feeding. Recommended measures to maximize the efficiency of the operation and minimize wasted feed include the following:

- ✓ Protect feed from exposure to rain and wind during processing, storage, transport and feeding.
- ✓ 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 (15-30 cm) to guard against absorption of moisture and contamination.
- ✓ The handling of feed must be efficient, avoiding spilling to soil and water ways.
- ✓ Ensure that feed storage, transport and feeding systems are properly maintained and in good working condition.
- ✓ Consider mixing of waste feed with other materials destined for use as fertilizer, or else consider composting

How to facilitate handling of poultry waste?

Poultry rearing generates significant quantities of poultry waste, mainly manure and bedding. The following management measures are recommended to minimize the amount of manure produced, to facilitate handling of poultry wastes, and to minimize migration of contaminants to surface water, groundwater, and air:

- ✓ Match feed content to the specific nutritional requirements of the birds in their different production / growth stages. This will avoid the use of unnecessary amounts of feed which may become waste, and will ensure covering of nutritional requirements.
- ✓ When removing animal waste and bedding, keep waste as dry as possible by scraping wastes instead of flushing with water. Water may be used for cleaning after scraping, and the amount used should be minimized by using high-pressure, low-flow nozzles.
- ✓ Manure is sometimes composted, but can also be stored in stacking sheds, roofed storage areas, or occasionally in ponds until it is ready for transport to a disposal site or land application area.
- ✓ Manure storage facilities should be constructed in a way that prevents manure contamination of surface water and ground water (e.g. use of concrete floors, use of roof gutters on buildings to collect and divert clean storm/rain water, and covering manure storage areas with a fixed roof or plastic sheeting).

- ✓ Collected manure may be used as a fertilizer on agricultural land. Animal manure, including that from poultry, 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 birds 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.
- ✓ Locate manure piles, or storage area, away from water bodies, floodplains, wellheads or other sensitive habitats.
- ✓ 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 Poultry Carcasses?

Condemned poultry 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. Condemned poultry carcasses must not be recycled into animal feed as they could contribute to the spread diseases.



Recommended carcass management practices include:

- ✓ Reduce mortalities through proper animal care and disease prevention.
- ✓ Collect carcasses on a regular basis to prevent putrefaction/decay.
- ✓ Compost only disease-free carcasses and ensure that the composting process is managed to prevent leachate and odours (e.g. sufficient cover material, proper temperature and moisture content).
- ✓ Disease-free carcasses may be used for animal feeding. This practice should be avoided if the animal was a carrier of a contagious disease, or the carcass is in state of putrefaction.
- ✓ 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. Burial should be undertaken at a certain depth to avoid accessibility by animals such as dogs, vultures, etc.

- ✓ The use of lime when burying carcasses is advised. This helps to eliminate nuisance conditions and to accelerate the decomposition process.
- ✓ Open burning should be avoided. Incineration should only be conducted in permitted facilities operating under national and/or international recognized standards for pollution prevention and control.
- ✓ Persons handling condemned carcasses should be properly equipped with the necessary protective clothing such as gloves, long boots, apron, respirator and other safety gear.

How to dispose of other waste?

Other wastes such as cardboard boxes, feathers, cleaning containers, etc. should be disposed of at an approved site or preferably composted and reused as organic manure. The storage of such wastes on the property prior to removal must be secured to prevent pest interference and spillage. Containers for the storage of such wastes should be located at an appropriate site. These containers should be emptied and washed as regularly as possible to avoid the build-up of pests and odour.

4.3. How to manage effluent discharge (wastewater)?

Poultry operations may generate wastewater from various sources including runoff from poultry housing, feeding, and watering, and from waste storage and management facilities, which have the potential to contaminate surface water and groundwater. The following management techniques are recommended to reduce the impacts of water runoff from poultry operations.

- ✓ Reduce water use and spills from animal watering by preventing overflow of watering devices.
- ✓ 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.
- ✓ Maintain a good drainage system around the holding house. Drains for rain water should be diverted from the holding house drain to avoid contamination of rain water.
- ✓ Wastewater from the cleaning of the holding pens must undergo treatment before discharge.
- ✓ 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 (e.g. black tanks or constructed lagoons).



- ✓ Bio-digestors to treat the sludge and produce biogas. Additional information regarding design and installation can be sought through the **Institute of Private Enterprise Development (IPED)**.
- ✓ Dewatering of residuals and composting or land application of wastewater treatment residuals.

4.4. Air Emissions



Air emissions from poultry rearing include primarily ammonia, odours, and dust. Ammonia gas has a sharp and pungent odor, and act as an irritant when present in high enough concentrations. Effective waste management, as described above, is critical to minimizing emissions of air pollutants. In addition, the management techniques discussed below are recommended to reduce the impacts of air emissions from poultry operations.

What to do to mitigate Ammonia emissions and Odours?

- ✓ Set up facilities taking into account distances to neighbours, the propagation of odours, and wind direction (at least 50 m from nearest residence).
- ✓ Compost the manure to reduce odour emissions.
- ✓ Reduce emissions and odours during land application activities by applying a few centimeters below the soil surface and by selecting favorable weather conditions (e.g. wind blowing away from inhabited areas).
- ✓ Apply chemicals (e.g. urease inhibitors) weekly to reduce conversion of nitrogen to ammonia. The use of aluminum sulfate (alum), to reduce ammonia emissions and phosphorous runoff is recommended. Alum may be applied to poultry litter between each flock of birds at a rate equivalent to 5-10 percent by weight (alum/manure). This also results in higher nitrogen content in the litter, which boosts crop yields.

What to do to control dust emissions?

- ✓ Install dust-collection systems at areas of the operation where dust emissions are most evident, such as feed grinding.
- ✓ Implement fugitive-dust-control measures, such as wetting frequently traversed dirt/earthen roads, as necessary.

- ✓ Poultry operations should be located downwind from residents and in areas suitable for such operations.
- ✓ When wire mesh is used for the construction of pens, the sides exposed to neighbouring residences should be sheeted with a suitable material to prevent dust emissions from affecting residents.
- ✓ A vegetative buffer zone should be established and maintained around the boundary of the pen to prevent fugitive dust emissions.

4.5. Animal Diseases



Animal disease-causing agents can spread rapidly, especially in intensive livestock operations. Animal diseases can enter a facility with new animals, on equipment, and on people. Some diseases can weaken or kill large numbers of animals at an infected facility. Both poultry manure and carcasses contain pathogenic organisms which can infect humans, for example viruses such as Avian Influenza (strain HN51), and parasites such as parasitical worms.

Some of the recommended general types of management methods to reduce the potential for the spread of animal pathogens include the following:

- ✓ Prevent the interaction of wild birds with feed, as this interaction could be a factor in the spread of avian influenza from sparrows, crows, etc.
- ✓ 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 subjected to special precautions such as limiting their operation to special areas, spraying of tires and treating parking areas with disinfectants.
- ✓ Sanitize bird housing areas.
- ✓ Identify and segregate sick animals and develop management procedures for adequate removal and disposal of dead birds. 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.

- ✓ Where possible, establish all-in and all-out systems with only one age group per farm.
- ✓ Workers on multiple age bird farms should always work with the youngest birds first before moving on to the older birds.
- ✓ Train workers in the application of animal health products.
- ✓ No slaughtering should be done on site, unless permitted by the Environmental Health Officer of the NDC/RDC.

4.6. Hazardous Materials and Waste

-  Pesticides are hazardous materials that should be managed with precaution; they are used in poultry rearing operations to control pest and some predators.
-  Pesticides can pollute the surface and ground water; additionally, some pesticides are suspected or known to be chronic or acute health hazards for humans as well as to cause adverse ecological impacts.
-  By reducing pesticide use, poultry production operators may reduce not only the environmental impacts of their operations, but also production costs.



Some recommendations for the minimization of use and management of pesticides are the following:

- ✓ Maintain structures to keep out pests (e.g. plug holes, seal gaps around doors and windows).
- ✓ Use mechanical controls (e.g. traps, barriers, light, and sound) to kill, relocate, or repel pests.
- ✓ Use predators to control pests. Protect natural enemies of pests by providing a favorable habitat (e.g. bushes for nesting sites and other indigenous vegetation) that can house pest predators.
- ✓ Use good housekeeping practices in pens and other facilities to limit food sources and habitat for pests.
- ✓ Improve drainage and reduce standing water to control mosquito populations.
- ✓ Consider covering manure piles with geotextiles (which allow water to enter the pile and maintain composting activity) to reduce fly populations.
- ✓ If pesticides are used, identify the need for the pesticide and evaluate their effectiveness, as well as potential environmental impacts, to ensure that the pesticide with the least adverse impact is selected (e.g. non-leachable pesticides).

5. Do I need an Environmental Authorisation?



Regarding poultry rearing operations, the Environmental Protection Agency requires an Environmental Permit for **medium/large scale operations; this means over 500 poultry**.

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
☛ 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 and 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.	☛ 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". ☛ 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 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.



References

- FAO (2009). *Good Practices in Small Scale Poultry Production*. Food and Agriculture Organization of the United Nations. 2009. 95 pp.
- Moore, P.A., Jr., S. Watkins, D.C. Carmen and P.B. DeLaune. (2004). *Treating poultry litter with alum*. University of Arkansas Cooperative Extension Fact Sheet (FSA8003-PD-1-04N).
- Ragoonanan Sahadeo (1991). *CXC Agriculture- A Revision Course*. Caribbean Educational Publishers Ltd, Trinidad.
- USEPA (2003). *Poultry Production and Environmental Stewardship*. Office of Enforcement & Compliance Assurance. United States Environmental Protection Agency. Washington, DC 20460. April 2003. 6 pp.
- WBG (2007). *Environmental, Health, and Safety Guidelines for Poultry Production*. World Bank Group. April, 2007. pp 24.