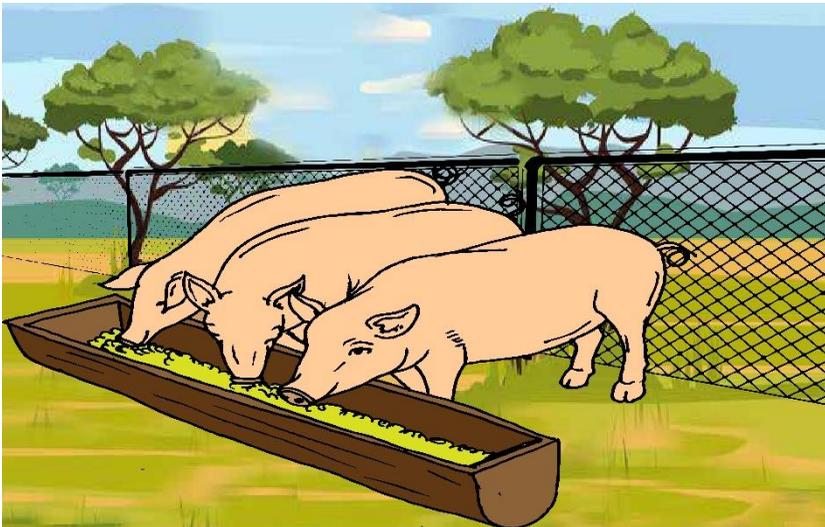




# GUIDELINES FOR INFECTION PREVENTION AND APPROPRIATE ANTIMICROBIAL USE IN THE ANIMAL SECTOR:

## Pig Farming



2020

**Cover page** – Healthy pigs feeding from a trough.

Art illustrations in this guide by Godfrey Toskin, Lochart (Uganda) Limited

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**Guidelines for Infection Prevention and Appropriate Antimicrobial Use in Animal Sector: Pig Farming**

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## FOREWORD

Welcome to the *first edition* of the *Guidelines for Infection Prevention and Appropriate Antimicrobial Use in the Animal Sector*. This edition focuses on five livestock production systems, namely cattle farming, fish farming, goat and sheep farming, pig farming, and poultry farming. We trust that these operational guidelines will be valuable for farmers and frontline veterinary practitioners.

The Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) is grateful to the Directorate of Animal Resources, and particularly the Department of Animal Health, for completing this task. We also thank the technical team of Dr. Dominic Mundrugo-ogo Lali, Dr. Patrick Vudriko, and Dr. Freddy Eric Kitutu for the technical support, as well as Makerere University and the USAID-funded Medicines, Technologies and Pharmaceutical Services (MTaPS) Program, implemented by Management Sciences for Health (MSH), for the material, technical, and financial support for this output.

Indeed, these guidelines play an important role in implementing the Uganda National Antimicrobial Resistance National Action Plan to slow the spread of resistant microbes. Around 75% of emerging resistant pathogens are related to zoonotic care. Taking steps to ensure the livestock industry improves its use and management of antimicrobials reinforces our commitment to strengthening the country's capacity for global health security—a goal that can only be achieved through a concerted effort focused on health management at the interface between human and animal health.

Farmers in Uganda will play a critical role in promoting food safety and security, improving household incomes, and promoting animal and environmental welfare. These guidelines are intended to help farmers:

- Understand strategies for infection prevention and appropriate antimicrobial use;
- Establish practices for recordkeeping of herds and medicinal products used.
- Better understand the need for withdrawal periods for cases in which animals are justifiably given antimicrobials.



Vincent Bamulangaki Ssempijja (MP)

**Minister of Agriculture Animal Industry and Fisheries,  
Republic of Uganda.**

## PREFACE

Farmers and frontline veterinary practitioners offer essential services that sustain food security, food safety, and the livelihoods of many households. The rising tide of resistant microbes, zoonoses and transboundary diseases has laid a foundation for pressure from key actors to restrict use of antimicrobial agents in the animal sector. It is, therefore, imperative that farmers and frontline veterinary practitioners demonstrate a responsible approach to the use of antimicrobial medicines in livestock production systems.

This is the first edition of the *Guidelines for Infection Prevention and Appropriate Antimicrobial Use in the Animal Sector*. It is envisaged that these guidelines will be widely disseminated and used, and that they will become a useful resource for farmers and frontline veterinary practitioners. They are written in a manner that allows easy and rapid access to vital information under three themes: infection prevention practices; appropriate antimicrobial use practices; and recordkeeping for farm animals and veterinary medical products on the farm.

These guidelines are intended to help create farming conditions that prevent or minimize the occurrence and spread of infections and to promote the effective and safe use of drugs. Appropriate antimicrobial use, also referred to as prudent or responsible use, in the animal sector is the scientific and technically directed use of these compounds which should form an integral part of good veterinary and animal husbandry practices. Recommendations and practical measures of infection prevention, such as vaccination and improvement in husbandry conditions, should be encouraged and prioritized as a core intervention to slow the down spread of antimicrobial resistance (AMR). Infection prevention, if well implemented, will reduce or

even eliminate the use of antimicrobial agents, which in most cases are used as an alternative for deficient animal husbandry practices.

All the relevant government ministries, departments, and agencies—including the MAAIF, the National Drug Authority (NDA), the Uganda Wildlife Authority (UWA), and other parastatals—must apply and promote these principles. Veterinarians and other veterinary practitioners, pharmaceutical actors, and livestock keepers are also expected to apply these principles.

It has been no small task to propose and develop this first edition of the guidelines by summarizing the most current and relevant literature. The MAAIF Directorate of Animal Resources is enormously grateful to the technical team of Dr. Dominic Mundrugo-ogo Lali, Dr. Patrick Vudriko, and Dr. Freddy Eric Kitutu, as well as Makerere University and the Medicines, Technologies, and Pharmaceutical Services (MTaPS) Program, implemented by Management Sciences for Health, for their work in producing this first edition.

These guidelines are one of many technical documents produced by MAAIF in line with global and national aspirations to optimize use of antimicrobial agents in the animal sector as a key strategy to slowing down the spread of AMR. These guidelines will be available as a downloadable PDF document. However, we are also aware that many people would rather have a book and flip through the pages to easily find the information they need. We want to ensure the dissemination of this crucial knowledge is inclusive.

Therefore, these guidelines will be available in both formats—as a hard copy and as an electronic version. The electronic version enables updates and additions to be made without the need to wait for the next edition to come to print. Thus, the guidelines will, in an “active sense,” inform

farmers and veterinary practitioners and continue to play their part in reducing infections, reducing unnecessary antimicrobial use, and, consequently, slowing the spread of resistant microbes.

A handwritten signature in black ink, appearing to read 'Sentumbwe' with a period at the end.

Dr. Juliet Sentumbwe

**Director Animal Resources**

**Ministry of Agriculture Animal Industry and Fisheries,  
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## ACKNOWLEDGEMENT

The *Guidelines for Infection Prevention and Appropriate Antimicrobial Use in the Animal Sector* were produced by the Uganda MAAIF with financial support from the Medicines, Technologies, and Pharmaceutical Services (MTaPS) Program, implemented by Management Sciences for Health. Makerere University (Mak) provided technical support in the process.

We hereby thank the USAID/MTaPS program for their financial support in developing these guidelines. The MAAIF Department of Animal Health, Directorate of Animal Resources, gratefully acknowledges the technical assistance, guidance, and constructive comments provided by all stakeholders during the development process.

We also extend sincere gratitude to all other government agencies (UWA, NDA UWEC, and NARO) who cooperated extensively to make sure the development of these guidelines occurred comprehensively and ensured that the final guideline document is in line with national and international standards.

I participated in crafting the *Guidelines for Infection Prevention and Appropriate Antimicrobial Use in the Animal Sector* and had the pleasure of working with the following talented individuals, from inception to final editing.

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We also thank Makerere University College of Veterinary Medicine, Animal Resources, and Biosecurity (MakCOVAB) Makerere University School of Public Health (MakSPH), Pharmacy Department (MakPD), School of Health Sciences; Makerere University College of Health Sciences (MakCHS); the Uganda Veterinary Association (UVA) and Uganda Veterinary Board (UVB) for their tireless efforts in the review, finalization, and printing of the Guidelines for Infection Prevention and Appropriate Antimicrobial Use in the Animal Sector.



Dr. Anna Rose Ademun Okurut (PhD)

**Commissioner Animal Health**

**Ministry of Agriculture Animal Industry and Fisheries.**

**Republic of Uganda.**

## ABBREVIATIONS

AMR	antimicrobial resistance
DVO	district veterinary officer
FAO	Food and Agriculture Organization
FVE	Federation of Veterinarians of Europe
ILRI	International Livestock Research Institute
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MSH	Management Sciences for Health
MTaPS	Medicines, Technologies, and Pharmaceutical Services
RUMA	Responsible Use of Medicines in Agriculture Alliance

## DEFINITIONS

**Administration:** In medical terms, refers to giving medicine to an animal/fish.

**Antimicrobial agent:** Drugs, chemicals, or other substances that kill, inactivate, or slow the growth of microbes, including bacteria, viruses, fungi, and protozoa. Because of these properties, antimicrobial agents are used in treatment and infection prevention in animal health and production.

**Antimicrobial resistance (AMR)** The ability of microbes to grow in the presence of substances that previously used to kill them.

**Appropriate medicine use:** The selection of the proper drug to be administered according to a dosage regimen appropriate to the sick animal after due consideration of the potential benefits and risks of that therapy. This is also referred to as prudent or responsible medicine use. “Appropriate medicine use” is now the preferred term, replacing the previously common “rational medicine use.”

**Biosecurity:** The implementation of a series of basic management practices to prevent the introduction<sup>1</sup> and spread<sup>2</sup> of microbes and diseases within and between farm (s).

**Colostrum:** The milk secreted by animals following parturition (birth) that is rich in nutrients and antibodies and boosts the immunity of a newborn animal.

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<sup>1</sup> Agriculture Victoria. A practical approach to beef herd biosecurity. Updated 2020 June 22 [cited 2020 June 27]. Available from: <https://agriculture.vic.gov.au/livestock-and-animals/beef/biosecurity/a-practical-approach-to-beef-herd-biosecurity>

<sup>2</sup> Mayega, L., Dione, M.M., Kawuma, B., et al. Pig management: Ensuring appropriate husbandry practices for profitability: Uganda smallholder pig value chain capacity development training manual. ILRI Manual 15. 2015.

**Diagnosis:** The art and science of identifying disease-causing germs and parasites by observation, examination, or use of medical devices and laboratory tests.

**Disinfectant:** Any substance which is mainly used on non-living objects/surfaces to kill microorganisms that cause infection and disease.

**Disinfection:** The process of cleaning a surface with a chemical (disinfectant) to destroy microorganisms.

**Extra-label use:** The use of drugs in ways that are not in accordance with the manufacturer's label and package insert. Extra-label use can only be authorized by a veterinary practitioner who takes full responsibility for such use. Veterinary practitioners must inform clients if a product is being used in such cases.

**Footbath:** A bath for disinfecting feet, placed at the entrance of the farm or other physically separated places.

**Hatchery:** A place where eggs of fish and birds (poultry) are hatched under artificial conditions.

**Husbandry:** The care, cultivation and breeding of crops and animals. These guidelines focus on animal husbandry where animals are raised for meat, fiber, milk, eggs, and other products.

**Infection:** When an organism (usually a microbe or germ) enters another organism's body (e.g., bird, fish, cow, or other animal) and causes disease.

**Medicine:** A natural or synthetic substance used to prevent or treat disease or maintain health in animals. This substance can be drenched, injected, applied, or smeared on any part of the animal.

**Microbe:** Disease-causing germs that cannot be seen with naked eyes. They are also referred to as microorganisms and include bacteria, fungi, viruses, and protozoa.

**Parasite:** An organism that lives and feeds on an animal. Parasites may cause physical injury and/or spread disease-causing microbes (germs).

**Pest:** A destructive arthropod or other animal that attacks livestock, including flies, ticks, mice, rats, and birds.

**Vector:** An organism that transmits a disease or parasite from one animal to another.

**Quarantine:** A state, period, or place of isolation or confinement in which animals are placed after transport from another place or after exposure to an infectious or contagious disease. It separates or restricts the movement of those animals to see if they become sick.

**Veterinary pharmacy/drug shop:** A place where medicinal products, medical devices and diagnostics for animals are sold. A licensed pharmacy or drug shop must have a valid license that is displayed where it can be seen.

**Veterinary practitioner:** A person who is licensed by the Uganda Veterinary Board to practice veterinary medicine in Uganda, e.g., a veterinary surgeon or doctor and veterinary paraprofessionals.

**Withdrawal period:** The minimum time required between the last treatment and the collection of meat or milk for human consumption.

## I.0 INTRODUCTION

Antimicrobial resistance (AMR) presents challenges for global public health, and is impacted by both human and animal antimicrobial usage. Ineffective antimicrobial agents endanger the effectiveness of many interventions in modern medicine. For instance, most treatment of common infections, prophylaxis for elective surgeries and transplantations, and cancer treatment are not possible with AMR. Widespread AMR, left unattended, compromises the achievement of multiple Sustainable Development Goals (SDGs), including ending poverty, ending hunger, ensuring healthy lives, reducing inequality, and revitalizing global development partnerships.

Economic growth is less likely to be achieved in sick populations, which in turn hinders poverty reduction efforts. And yet, poor people are more at risk of suffering from resistant infections and they are less able to prevent or treat them. In other words, AMR breeds poverty and poverty fuels AMR.

In the animal sector, AMR presents a grave danger to sustaining food production and the livelihood of farmers. Antimicrobial usage in animals threatens food safety and security, and puts humans at greater risk of infection.

Global and national action plans have been developed and prioritized for implementation to mitigate the adverse effects of AMR. At the agricultural practice level, farmers and frontline veterinary practitioners must embrace evidence-based strategies and actions to meet this challenge. Farmers must seek to minimize the occurrence of infection through AMR control mechanisms, including proper feeding, avoiding stress to the animals, improved sanitation and hygiene, and early detection, isolation, and treatment of sick animals. For all animal sickness, treatment should be based on the best available clinical judgement supported by veterinary expertise and/or laboratory investigation. Judicious use of antimicrobial agents cannot be over-emphasized. The guidelines propose concrete

evidence-based steps and actions to aid farmers and frontline veterinary practitioners in achieving these aspirations.

These guidelines for infection prevention and appropriate antimicrobial use in the animal sector have been developed in line with the *Uganda AMR National Action Plan 2018-2023*. By following this plan, farmers and veterinary practitioners will contribute to reduction of infections in animals, resulting in more judicious use of antimicrobial agents in the animal sector. This will reduce the development and spread of resistant microbes in animals and humans and reduce the presence of antimicrobial residues in food-producing animals.

These guidelines are for use in pig farming in Uganda. Pigs are an important source of animal protein, and thus their products are also a source of income for a substantial number of small- and large-scale farmers. The guidelines can be categorized under three broad themes:

- Infection prevention practices;
- Appropriate medicine use practices;
- Keeping animal and veterinary medical product records on the farm.

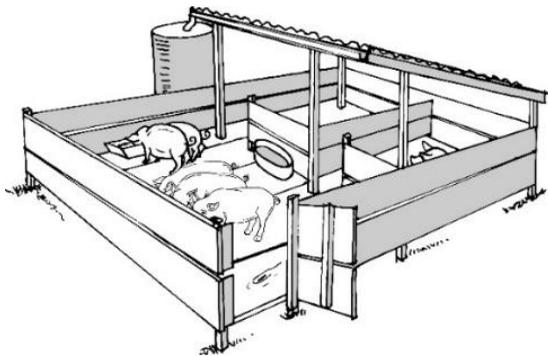
## 2.0 INFECTION PREVENTION PRACTICES

African swine fever (ASF), gastroenteritis, coccidiosis, swine dysentery, and respiratory diseases are some of the frequently diagnosed pig diseases in Uganda.

Infection prevention is an important part of promoting the health and wellbeing of animals. Ensuring animal health is a prerequisite for efficient and sustainable food production<sup>3</sup>, thereby avoiding losses for farmers.

More so, prevention of infection and disease also leads to reduced use of antimicrobials, which in turn reduces the rate of development of antimicrobial resistance (AMR).

The burden of diseases can be reduced by implementing programs that prevent infection among pigs. These programs include: proper housing and management of house environment, nutrition, water supply, housing, hygiene and biosecurity.<sup>4</sup>

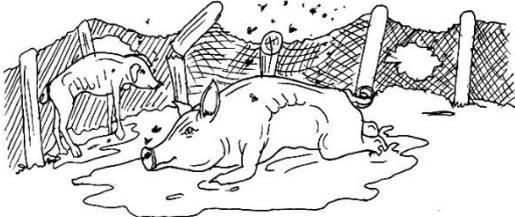
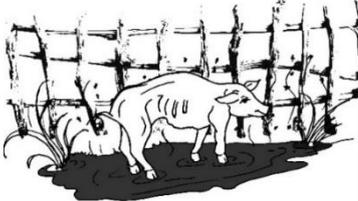


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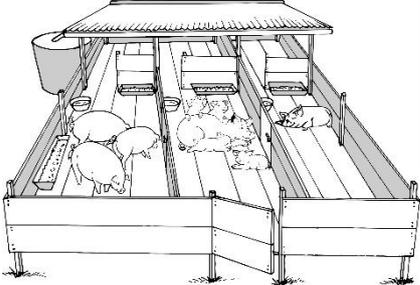
<sup>3</sup> Animal Health Europe. Preventing disease. [Cited 2020 June 27] Available from: <https://www.animalhealthurope.eu/our-contribution/67-prevention-protects.html>

<sup>4</sup> Pig Health and Welfare Council. Practical Guide to Responsible Use of Antimicrobials on Pig Farms. 2018 [cited 2020 June 27]. Available from: <https://www.ruma.org.uk/pigs/responsible-use-antimicrobials-pig-production/>

## 2.1 FOUR GUIDING PRINCIPLES OF INFECTION CONTROL IN PIG FARMING<sup>5</sup>

<p>Rule 1: Ensure appropriate biosecurity on introducing new animals</p>	<ul style="list-style-type: none"><li>• Disease spreads onto and around farms by contamination, usually by faeces or dust. Limit this contamination and you will help to limit the prevalence of disease.</li><li>• REMEMBER this contamination can occur indirectly through water systems, equipment, vehicles, or other animals or people.</li><li>• Don't spread disease by sharing equipment or personnel.</li></ul>	
<p>Rule 2: Stress is a killer, and it is important to minimize it.</p>	<ul style="list-style-type: none"><li>• Stressed animals are far more likely to become diseased. This includes not only obvious physical stress factors such as overcrowding or chilling; but also exposure to microorganisms which cause major stress to the immune system.</li></ul>	

<sup>5</sup> Pig Health and Welfare Council. Practical Guide to Responsible Use of Antimicrobials on Pig Farms. 2018 [cited 2020 June 27]. Available from: <https://www.ruma.org.uk/pigs/responsible-use-antimicrobials-pig-production/>

	<ul style="list-style-type: none"> <li>• CONSIDER: If a procedure causes pigs to become stressed, ask “Can this be done in a less stressful manner?”</li> </ul>
<p>Rule 3: Good management and hygiene</p>	<ul style="list-style-type: none"> <li>• There is no substitute for good hygiene.</li> <li>• Cleaning and disinfecting buildings and equipment, including water and feeding systems, coupled with good personal hygiene will make a difference.</li> <li>• Don't be complacent about areas outside of the pigs' living area</li> </ul> 
<p>Rule 4: Good nutrition</p>	<p>Balanced diets with adequate levels of trace elements, minerals, vitamins, proteins, carbohydrates, fats and antioxidants are essential if the immune system of pigs is to work properly in tackling diseases.</p>

## 2.2 GOOD HOUSING ON A PIG FARM

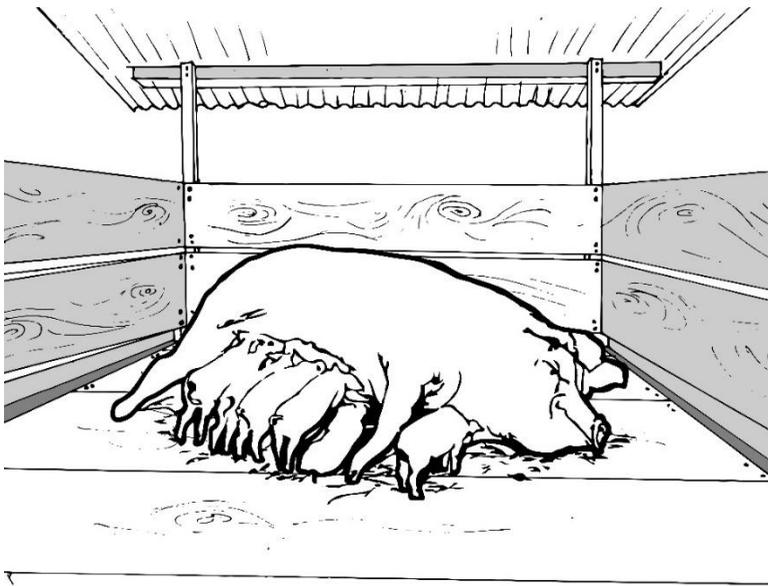


Illustration: A pig sty should be spacious for a weaner and her piglets, separated from other pigs.

A well sited and constructed house helps to minimize stress due to adverse weather, ensures comfort of pigs, and prevents hygiene related diseases.

- Site the house in a location that has a gentle slope to allow proper drainage.
- The pig house should have a good roof that protects pigs against rain and direct sun.
- The wall(s) should protect pigs against wind and separate different age groups.
- The floor should be devoid of mud and use indigenous microorganism (IMO) to prevent bad odors.

- Provide bedding materials on the floor of the pig house to provide comfort.
- Bedding material for pigs of all ages should be changed regularly to improve house hygiene.
- House space should be enough (on average 3m by 3m per animal) to avoid overcrowding of pigs since this can cause stress and also facilitate spread of diseases.
- Ensure that the sow(s) is/are separated from other pigs before farrowing.
- Provide adequate space (on average 3m by 3m per animal) for the sow so that it does not crush the piglets.
- Provide heat (lamps) in the resting area for piglets to prevent cold stress.
- Dig a composite pit about 10m away from the pig sty in which to throw manure and other waste.

## 2.2.1 VENTILATION<sup>6</sup>

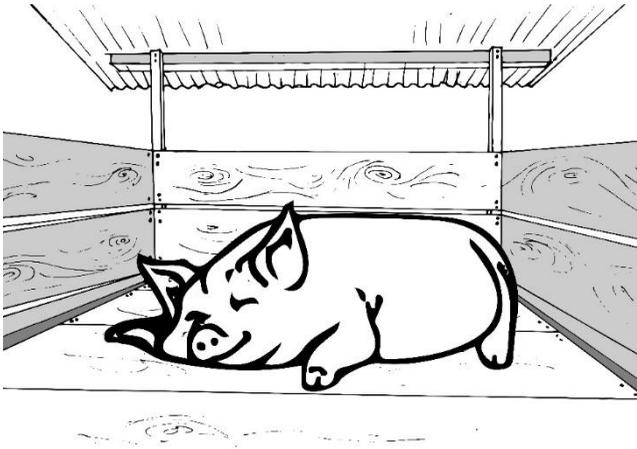


Illustration: A pig sty with a half wall, wire mesh, and a sufficiently high roof.

Proper air flow (ventilation) is very important in ensuring that the pigs get fresh air and maintaining good levels of humidity and temperature in the pig house (sty).

- The design of the pig sty should allow proper ventilation.
- The pig house should be built in such a way that the side wall is half open.
- Orient the house to allow proper air flow.
- Ensure good ventilation by checking regularly to ensure that it is not clogged or blocked to ensure good respiratory health and prevent dampness.

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<sup>6</sup> Food and Agriculture Organization of the United Nations. Prudent and efficient use of antimicrobials in pigs and poultry. 2019 [cited 2020 June 27]. Available from: <http://www.fao.org/3/ca6729en/CA6729EN.pdf>

## 2.3 GOOD NUTRITION AND WATER INTAKE IN PIGGERY

### 2.3.1 GOOD NUTRITION

Feed is an essential component of swine health and productivity. To keep a pig healthy, it should be given dry matter (feed) equivalent to 4% of its live body weight. A balanced feed should contain carbohydrates, protein, fat, minerals and vitamins needed for growth, body building, health and reproduction.

- Buy feed from a reputable or certified feed supplier manufacturer.
- The farmer is encouraged to test or verify the feed samples to make sure it has the right composition and is free from toxic substances.
- Ensure availability of good quality feed at all times by ordering feed before the current batch runs out.
- Ensure you seek technical assistance to formulate the right feed composition/ration to meet the needs of the pig, e.g., creep feed, weaner, grower and finisher feed.
- Purchase raw materials from a trusted vendor who supplies quality feed ingredients.
- Boil kitchen waste obtained from restaurants or homes before giving it to pigs.
- Start exposing piglets to small amount of high protein baby feed (starter feed) at 20 days of age.
- DO NOT wean piglets before they are 28 days of age; preferably wean them at 35 days.
- Pack excess feed in bags and store it in a dry storage room.
- Place sacks on wooden racks rather than directly on the ground to prevent mold and contamination from mycotoxins.

### 2.3.2 WATER SUPPLY

Water is life. About 65% of the body of pigs is made of water. This means a clean and constant supply of water is needed to keep pigs healthy and productive.

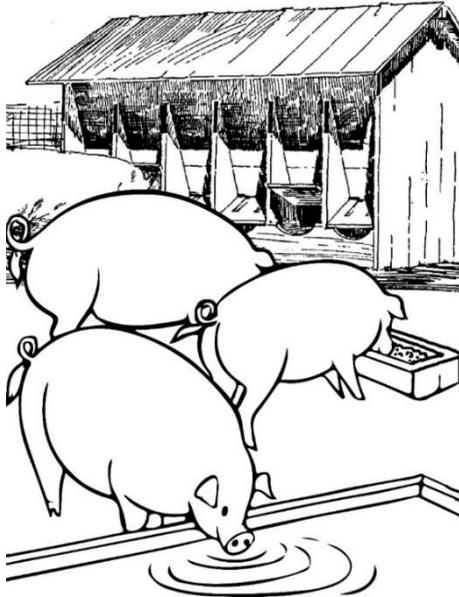


Illustration: Clean water should be available in the pig sty.

- Ensure that drinking water is clean and adequate.
- If you obtain water from an open source such as a shallow well, pond, or dam, treat the water by leaving it to rest overnight. Then filter it and add chlorine tablet(s).
- To cut down on water costs and increase availability, always harvest rainwater from the roof and store it.
- Wash water storage materials and/or water troughs to ensure their cleanliness.

## 2.4 BIOSECURITY PRACTICES

Most diseases on a pig farm can be prevented by being vigilant and careful when bringing in new stock, good hygiene practices, and creating barriers that prevent free access to the farm by unauthorized persons. This is explained in detail below:

### 2.4.1 ACQUISITION OF NEW ANIMALS

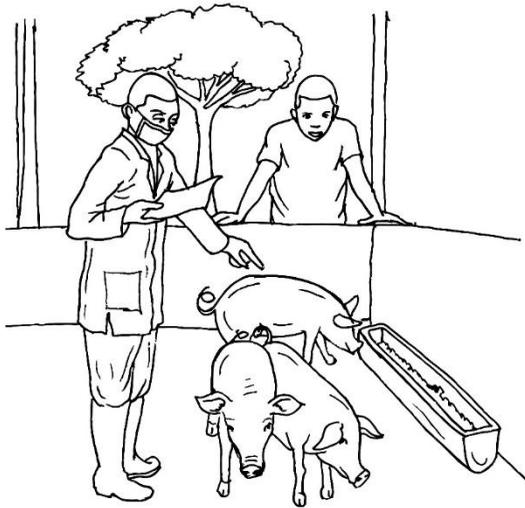


Illustration: Farmer holding a farm record, selecting a pig to sell to another pig farmer.

- Purchase breeding stock from a reputable pig breeder.
- Purchase only healthy pigs.
- Obtain a veterinary movement permit from your local veterinary office certifying that the pigs to be moved are healthy.
- Limit sources for purchase of pigs to as few as possible to limit spread of disease.

- Isolate all new pigs for 30-60 days to prevent direct or indirect contact (via people, tools, equipment) with the other pigs on the farm.
- Watch out for signs of sickness among the isolated pigs.
- Call your area veterinary practitioner to inspect, examine and give the appropriate treatment to the pigs.
- Keep equipment and personnel protective materials used in the isolation unit in that unit. Do not transfer them to another pig unit since they can be source of infection.

#### 2.4.2 CLEANING AND DISINFECTION ON THE PIG FARM

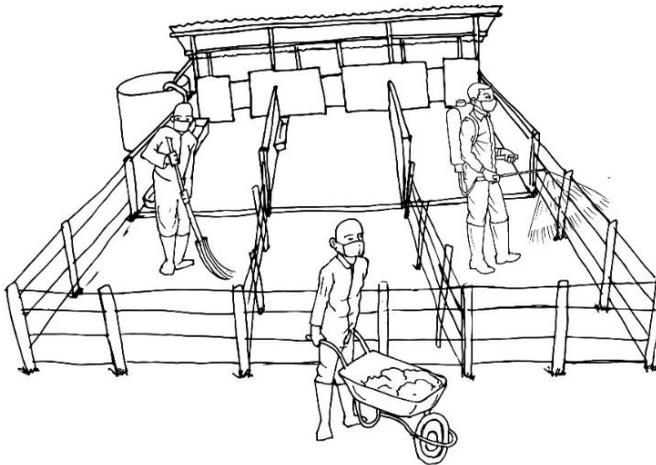


Illustration: Workers in overalls cleaning (left), spraying (right), and taking manure in a wheelbarrow to composite pit (outside the pen).

- Add clean bedding (including IMO) where needed (depending on the design of the house).
- Clean and disinfect tools and equipment when moving between physically separated animal groups, or keep separate tools and equipment for different groups.

- Clean and disinfect water and feed troughs daily.
- Remove manure, urine, soiled bedding material, and unconsumed feed from pig facilities twice daily after feeding.
- Perform a major cleaning of all pens and drainage channels once a week.
- Clean (remove dirt, wash, then disinfect dried surfaces) the store before introducing a new batch of feed.

## 2.5 SOURCING AND HANDLING SEMEN



Illustration: Veterinary practitioner drawing semen from liquid nitrogen tank.

- Semen can be source of infection on a farm if not obtained from a healthy boar and handled hygienically.
- Where artificial insemination is used, buy the semen from a reputable company or supplier.
- Ensure all new genetic material for insemination originates from healthy animals; ask a veterinary practitioner if in doubt.
- Keep records of semen used on the farm for traceability.

## 2.6 SEGREGATION OF PIGS

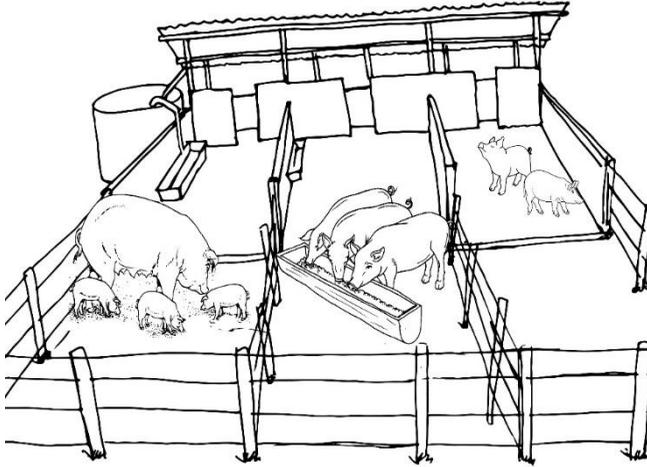


Illustration: Segregated pig units separated by a walkway: one for mother pigs and their young ones, one for young pigs, and one for adult pigs.

Mixing different age groups of pigs can predispose to fighting, trauma and stress. Injuries predispose animals to infection while stress due to fights affects feed consumption, immunity and health of pigs.

- Physically separate animals (e.g., based on age groups).
- Do not move or mix pigs unless it is absolutely necessary.
- Remove any protruding objects from pens, especially near feed and water troughs to prevent injuries.
- Use an all-in/all-out system for each group of pigs, i.e. all pigs in a batch are moved in or out of a compartment at the same time.
- When entering or moving on the farm, always move from youngest to oldest and never vice versa. Young animals are more susceptible to bacteria and diseases that can be transmitted from older animals.

## 2.7 GOOD PERSONAL HYGIENE PRACTICES<sup>7</sup>



Illustration: Farmer donning personal protective equipment and performing hand hygiene practices in preparation for attending to his animals.

The aim of hygiene is to reduce the load of infectious agents and reduce the effect of environmental factors that aggravate diseases

- Ensure that caretakers of pigs wear clean clothing and footwear when working on the farm.
- Wash hands with soap and water and disinfect them between “clean” and “dirty” work and when moving between different age groups.
- Wash and disinfect hands before and after direct contact with a group of animals on the farm.

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<sup>7</sup> Food and Agriculture Organization of the United Nations. Prudent and efficient use of antimicrobials in pigs and poultry. 2019 [cited 2020 June 27]. Available from: <http://www.fao.org/3/ca6729en/CA6729EN.pdf>

- If change of boots is not possible, use a disinfectant footbath when moving from one group of pigs to another.
- Change footbaths frequently because they are inefficient if they are dirty.
  - **REMEMBER:** Boots should first be cleaned with water to remove dirt and manure.
- Wear disposable gloves or thoroughly clean hands with soap and water when performing high-risk activities such as castration, assisted farrowing.
- Apply a skin disinfectant such as iodine at the navel of the newborn, and when cutting a tail or castrating.
- Minimize the number of routine surgical procedures since all skin breaches are potential entry points for bacterial infections.

## 2.8 DISPOSAL OF DEAD ANIMALS



Illustration: Worker in personal protective equipment burying dead animal remains.

Death of pigs usually occurs as a result of infection and other causes such as trauma toxicities, suffocation, deficiencies and others. If death is due to infection, the dead animals can be source of infection for surviving pigs in

a farm. Thus, a pig farm must have a plan for the safe disposal of dead carcasses on the farm.

- Dispose of dead animals as soon as possible to avoid spread of infections.
- Incinerate or bury dead animals in a deep pit as soon as possible.
- The pen where the pig has died should be cleaned and disinfected to kill any germs that may be in the environment.

## 2.9 OTHER IMPORTANT INTERVENTIONS

- Maintain litter sizes of at most 11-14 piglets, to match the number of working teats of the sow.
- Maintain newborn piglets at temperature between 30-33°C, and other pigs at normal room temperature.

## 2.10 FARM EQUIPMENT



Illustration: A farmer cleaning his farm equipment.

Farm equipment and protective gear are used for routine operations. Care must be taken to prevent any possibility of accidental transfer of germs from one group of animals to another.

- When using farm equipment on pig farms, move from the younger to the older to limit spread of infections.
- Do not share equipment such as brooms, barrels, shovels, etc. between piglets and fatteners.
- If you must use the same equipment, always clean and disinfect the equipment before using in another group of pigs.
- Avoid borrowing equipment from a neighboring farm because it can be a source of infection for your pigs.

## 3.0 APPROPRIATE ANTIMICROBIAL USE PRACTICES

### 3.1 PURPOSE OF THE GUIDELINES

These antimicrobial use guidelines work in two main ways: first, they help create farm conditions that prevent or minimize the occurrence and spread of infections; second, they promote the effective and safe use of these drugs. Taken together, these two approaches broadly would minimize the selection of antimicrobial resistant bacteria in animals.

The underlying purpose is to conserve and sustain the effectiveness of available antimicrobial agents intended for use in animals to:

- Enable farmers to comply with the moral obligation and economical need to keep animals healthy.
- Protect consumer health by ensuring the safety of food of animal origin.
- Prevent or reduce the transfer of resistant microbes within animal populations to maintain the efficacy of antimicrobial agents used in livestock.
- Prevent or reduce the transfer of resistant microbes or their resistance genes from animals to humans to maintain the efficacy of antimicrobial agents used in human medicine.
- Prevent the contamination of animal-derived food with antimicrobial residues that may have a detrimental effect on human health.

### 3.2 GENERAL PRINCIPLES TO GUIDE DECISIONS ON THE USE OF ANTIMICROBIAL AGENTS IN ANIMALS

- Use of antimicrobial agents in veterinary medicine is guided by the law which outlines licensed persons who can trade in, prescribe, and/or administer these medicines. Only a qualified veterinary practitioner is authorized to prescribe their use.

- Antimicrobial agents used for therapy should be used for as long as needed, but for as short a duration as possible and using the appropriate dosage regimen.
- Label instructions as provided by the manufacturer should be carefully followed. Due attention must be paid to species and disease indications and contraindications, dosage regimens, and storage instructions. Extra-label use of the antimicrobial agent should be exceptional, and always under the professional responsibility of a veterinary practitioner.
- Records of all veterinary medicinal products administered to animals and those available on the farm should be kept in a retrievable form. Additionally, there should be an effective system of stock control.
- Use of vaccines and strict adherence to the proposed infection prevention measures are effective and have been proven as better alternatives to reduce or completely eliminate antimicrobial use in the animal sector.
- Antimicrobial agents should be used under supervision of a veterinary practitioner.
  - Therapeutic antimicrobials should be used when it is known or suspected that an infectious agent is present which will be susceptible to therapy.
  - It is the responsibility of the veterinary practitioner to choose the antimicrobial product based on his/her informed professional judgement, balancing the risks and benefits for humans and animals.
  - Antimicrobial agents should only be used when necessary and then selected rationally and used appropriately.
  - When antimicrobials need to be used for therapy, bacteriological diagnosis with sensitivity testing should, whenever possible, be part of the informed professional judgement.

### **3.3 CONSULTATION WITH HEALTH PROFESSIONALS TO PROMOTE APPROPRIATE ANTIMICROBIAL USE**

Only professionals trained to the level of a veterinary surgeon or higher have the requisite knowledge, expertise and experience to prescribe antimicrobial medicines.

Each case provides a different set of considerations as explained below.

1. Drug factors such as dosage, dose, dosage interval, route of administration, duration of treatment, mechanism of action, combined use, adverse drug reactions.
2. Microbial infection factors, including objective evidence of infection, susceptibility of the causative organism(s), stage of infection, locality of infection, and microenvironment at the site of infection.
3. Animal factors such as type, age, condition and sex of animal, disease condition, type of husbandry, and feeding of animals.
4. Animal farmer factors, such as agreement between farmer and veterinary practitioner on treatment policy, level of training, and experience of farmer.

### **3.4 KEY POINTS FOR FARMERS FOR DIAGNOSIS OF COMMON CONDITIONS**

In all animal species, “prevention is better than cure”.<sup>8</sup> However, sometimes animals become sick regardless of good prevention strategies and proper care. When this happens, early recognition and treatment is essential to protect animal welfare and promote responsible use of medicines.

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<sup>8</sup> Federation of Veterinarians of Europe. Antimicrobial use in food-producing animals. 2016 February 29 [cited on 2020 June 27]. Available from: [https://www.ema.europa.eu/en/documents/report/annex-replies-efsa/ema-questions-use-antimicrobials-food-producing-animals-eu-possible-measures-reduce-antimicrobial\\_en.pdf](https://www.ema.europa.eu/en/documents/report/annex-replies-efsa/ema-questions-use-antimicrobials-food-producing-animals-eu-possible-measures-reduce-antimicrobial_en.pdf)

- Give accurate information to the attending veterinary practitioner so that he/she can ably make a correct diagnosis, hence correct medication and dosage.
- Base initial diagnosis on clinical signs and experience but a veterinary practitioner should also use a laboratory for diagnosis.
- If unsure, consult the veterinary practitioner.
- In case the veterinary practitioner wants to take samples of diseased, dead, or even clinically healthy animals, allow him/her to do so.



Illustration: A laboratory technician examining a laboratory sample under a microscope.

### 3.5 APPROPRIATE APPROACH TO TREATMENT

If pigs are found to be sick, it is important that treatment is given promptly.

Evaluate any treatment given to pigs. If there is no improvement within a few days, treatment can be considered ineffective. This may be due either to resistance or to having chosen an antimicrobial that is not effective against the relevant pathogen, or which cannot reach the relevant infection site.

- Only use antimicrobials on the advice of or upon prescription by a veterinary practitioner.
- Inform the prescribing veterinary practitioner about other medicines being administered to the animals so that adverse reactions can be avoided.
- Treat individual animals, rather than all of them when one or more are reported sick.
- Obtain clear instructions regarding medication, dosage and administration from the veterinary practitioner.
- Follow all instructions given by your veterinary practitioner.
- Collect dust and manure from rooms where the animals being treated are kept separately to avoid the spread of antimicrobial residues.
- Do not use antimicrobials as growth promoters.

### 3.5.1 OBTAINING VETERINARY MEDICINES



Illustration: A farmer receiving instructions on use of medicines from a trained veterinary practitioner.

- DO NOT use illegally obtained medicines on the farm since their safety and efficacy cannot be ascertained.
- Do not borrow or move medicines between farms.
- Check expiry date and ensure that medicines and other products are not expired before buying them for use on the farm.

### 3.5.2 ADMINISTRATION OF VETERINARY MEDICINES TO PIGS



**Illustration:** A farmer administering medicines to a pig.

- Give treated pigs the correct dose of medication during the appropriate treatment period.
- Administer antimicrobials in drinking water rather than in feed if group treatment cannot be avoided.
- Clean all equipment used in administration of in-water antimicrobials, such as such as pipes and containers, to avoid cross-contamination.
- Change needles for injections for every next litter or next pen.
- Do not reuse a needle if it has been used to inject a sick pig.
- Keep syringes clean.
- Do not mix medicines before injection without the approval of the veterinary practitioner.
- Do not give two or more antimicrobials at the same time unless your veterinary practitioner has advised you to do so.

### 3.5.3 STORAGE OF VETERINARY MEDICINES

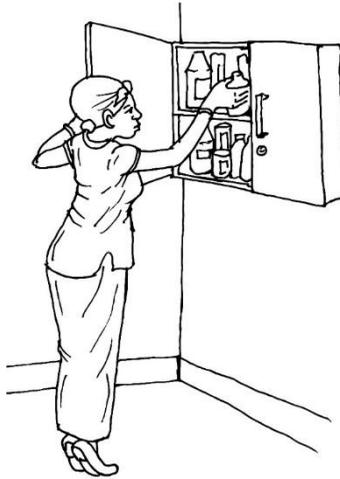


Illustration: Farmer picking medicine from the storage cabin on the farm's medicine store.

- Store medicines as indicated on the medicine label.
- Store most medicines in a clean, cool, dry area such as a farm office or utility room.
- Store medicines away from direct sunlight, dust, animals and insects.
- Store medicines that should be refrigerated at temperatures between 2°C and 8°C.
- Keep medicines locked away from the reach of children and unauthorized persons.

### 3.5.4 DISPOSAL OF UNUSED OR EXPIRED MEDICINES

- RETURN unused medicines to the prescribing veterinary practitioner or supplier for disposal.

Dispose of unused, spoiled, out-of-date medicines, expired, containers and application equipment (including needles to a sharps container) when the treatment for which they were intended is completed.

Follow manufacturer's advice as written on the medicine label.

Do not reuse medicine containers; wash them and dispose of them in a pit.

### **3.6 WITHDRAWAL PERIOD**

A withdrawal period is the minimum time required between the last treatment and the collection of meat for human consumption.

- Identify treated pigs to ensure that withdrawal times are observed.
- Withdrawal periods for medicines used in pigs vary from as low as two days to as many as 60 days. Read the information leaflet to ascertain or ask your veterinary practitioner.
- For most vaccines, observe a withdrawal period of 21 days. If in doubt, ask your veterinary practitioner.
- Follow your veterinary practitioner's advice regarding withdrawal periods.

### **3.7 FARM EQUIPMENT**

Farm equipment and protective gears are used for routine operations. Care must be taken to prevent any possibility of accidental transfer of germs from one group of animals to another.

- When using farm equipment on pig farms, move from the younger to the older to limit spread of infections
- Do not share equipment such as brooms, barrels, shovels, etc. between piglets and fatteners between different units or houses or pens.

- If you must use the same equipment, always clean and disinfect the equipment before using in another group of pigs.

Avoid borrowing equipment from neighboring farm. Such equipment may carry dangerous germs that can infect your pigs and cause serious losses.

## 4.0 KEEPING RECORDS FOR ANIMALS AND VETERINARY MEDICAL PRODUCTS



Illustration: A farmer reviewing farm records.

- Keep a record of medicine use on the farm. You can use a durable book, files, or an electronic system.
- If you use an electronic system, ensure that the information is regularly backed up in a retrievable form (e.g., on an external hard drive).

### 4.1 HERD HEALTH REGISTER

- This contains information such as:
  - Identity of diseased animal(s)
  - History of disease
  - Symptoms of disease
  - Diagnosis
  - Treatment given
  - Name of veterinary practitioner who treated animals

*Example of herd health register*

<b>Health Record</b>	
Animal species	Date
Sex	Identity/No/Tag/House number
Breed	Age
Case history	
Clinical exam	
Laboratory test	
Diagnosis	
Prescription	
Withdrawal time for each medicine	
<b>Veterinarian</b>	
Name	Contact
Signature	Date

## 4.2 KEEPING RECORDS OF VETERINARY MEDICINES USED ON THE FARM

- Upon purchase of a medicine, record<sup>9</sup>:
  - Name of prescribing veterinary surgeon
  - Name of product
  - Batch number
  - Date of expiry
  - Date of purchase
  - Quantity obtained
  - Name and address of the supplier
  
- At the time of administration, record:
  - Name of product
  - Name and identity of the animal
  - Date of administration
  - Quantity administered
  - Withdrawal period
  - Identity of the animal(s) treated
  
- In case you dispose of the medicine without using it, record:
  - Name of veterinary medicine
  - Date of disposal
  - Quantity of product
  - How product was disposed of
  - Where product was disposed of
  
- Ensure that all records are kept for at least five years.

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<sup>9</sup>Pig Health and Welfare Council 2018. Practical Guide to Responsible Use of Antimicrobials on Pig Farms. <https://www.ruma.org.uk/pigs/responsible-use-antimicrobials-pig-production/>



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