



Ministry of Agriculture, Animal Industry and Fisheries
(MAAIF)



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

Goat and Sheep Farming



2020

Cover page – Visiting veterinary practitioner on a goat farm, vaccinating goats with the farm owner in attendance.

Art illustrations in this guide by Godfrey Toskin, Uganda +256 778 915443

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Guidelines for Infection Prevention and Appropriate Antimicrobial Use in the Animal Sector: Goat and Sheep Farming

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Copies may be obtained from:

Department of Animal Health
Directorate of Animal Resources
Ministry of Agriculture, Animal Industry and Fisheries Headquarters
P.O Box 102, Entebbe Plot 16-18,
Lugard Avenue, Entebbe Uganda

Email: ps@agriculture.go.ug

Email: animalhealth@agriculture.go.ug

Tel: 041 4320004

Tel: 041 4320166

Tel: 041 4320627

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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 MTaPS Program, implemented by Management Sciences for Health (MSH), for the, 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 down the 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, 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 my 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.



Dr. Juliet Sentumbwe

Director Animal Resources

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

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We hereby thank the 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.

Secretariat and Veterinary Medicines Desk

- Dr. Erechu Richard, Senior Veterinary Officer/AMR Focal Person, Department of Animal Health, MAAIF
- Dr. Isingoma Emmanuel, Senior Veterinary Officer/Veterinary Drugs Desk/Stewardship Committee, Department of Animal Health, MAAIF
- Dr. Ben Ssenkeera, Senior Veterinary Officer/Veterinary Drugs Desk, MAAIF

Technical Team

- Dr. Patrick Vudriko, Lecturer, MakCOVAB, Director, RTC Laboratory at MakCOVAB
- Dr. Dominic Mundrugo-ogo Lali, Member, Uganda Veterinary Board, Executive Director, UNESCO
- Dr. Freddy Eric Kitutu, Lecturer, Makerere University Pharmacy Department (MakPD), Dean, School of Health Sciences and Program Lead, Antimicrobial Stewardship, Consumption and Use at MakPD
- Ms. Linacy Nampa, Pharmacist, Antimicrobial Stewardship, Consumption and Use Program at MakPD
- Dr. Reuben Kiggundu, Senior Technical Advisor, USAID/MTaPS, MSH

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 introduction¹ and spread² 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.

¹ 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>

² 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

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 disease 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 goat and sheep farming in Uganda. Goats and sheep 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

Infection prevention plays a very important role in promoting the health and wellbeing of small ruminants, including goats and sheep. Ensuring animal health is a prerequisite for efficient and sustainable food production³, thereby avoiding losses for the farmers.

Moreover, prevention of infection and disease can also help limit the use of antimicrobials, which in turn reduces the rate of development of AMR.

Infection prevention in goat and sheep flocks can be achieved by implementing strategies that ensure biosecurity, good nutrition and breeding. These strategies are discussed in detail below.

2.1 BIOSECURITY⁴

Biosecurity is the implementation of a series of basic management practices to prevent the introduction of microbes, vectors and diseases to and within the farm⁵.

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

⁴ Government of India. General guidelines for biosecurity at central sheep breeding farm, Hisar: Basic tenets can be applied to state sheep/goat farms. 2016 [cited 2020 June 27] Available from:

<https://dahd.nic.in/sites/default/files/Biosecurity%20guidelines%20for%20sheep%20and%20goat%20.pdf>

⁵ 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>

2.1.1 ACQUISITION OF NEW ANIMALS

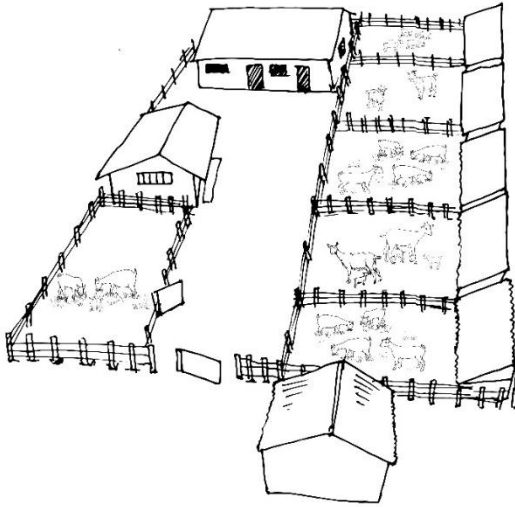


Illustration: A farm layout with boundary, housing units, and multiple paddocks, as well as an isolation paddock located at least 3 m away from other paddocks and on the lower side of the entrance.

- Purchase goats and sheep from a reputable farmer who maintains records about animal health.
- Inspect the animals to ascertain that they are healthy and are not infested with ticks and other parasites before purchasing them.
- Separate animals to be purchased from the rest, drench them with appropriate dewormer and spray them with suitable acaricide.
- Trim hooves and treat as if they have foot rot or scald.
- Keep the animals in an isolation paddock at the farm of origin for at least 24 hours before transferring them to the new farm.
- Upon arrival at the new farm, the animals should be kept in isolation paddock that is located at least 3 m away from existing stock for at least 21 days.

- In case, any of the animals is found to be sick during this period, call and consult with a veterinary practitioner for diagnosis and subsequent management.
- Ensure that isolation paddocks/pens are as near to the farm gate as possible, and at least 3 m away from animals already in stock.
- Only acquire new animals if necessary; otherwise, raise replacement animals on the farm.

2.1.2 TRANSPORTATION OF ANIMALS AND OTHER FARM INPUTS

Transportation is an important routine activity on the farm to allow restocking and taking due animals to the markets. However, this movement can facilitate or be a source of infection, including transboundary animal diseases. To prevent the spread of disease, the following steps should be taken:

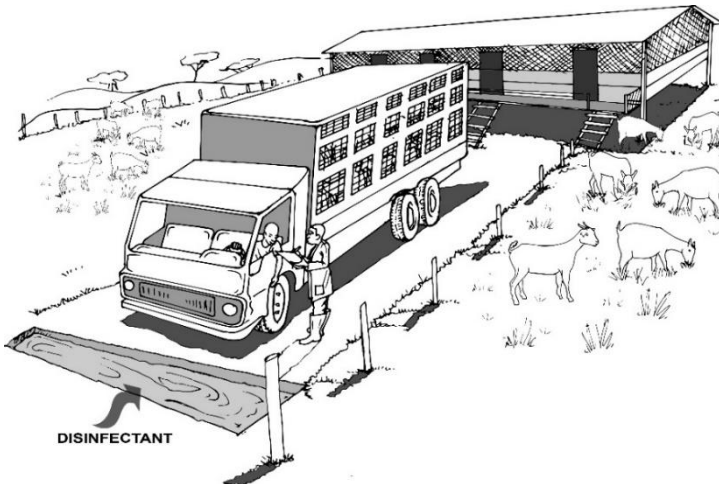


Illustration: Driver receiving the animal movement permit from the DVO, vehicle is open roof with rails to restrain the goats.

- Ensure that the vehicle used for transportation of animals is cleaned and disinfected before use.
- Animals must be inspected and certified as healthy by the district veterinary officer (DVO) and issued with a valid animal movement permit.
- Do not transport sick animals since the movement could facilitate spread of microbes or be a source of infection.
- Do not transport pregnant animals within two weeks of the delivery due date or within two weeks after delivery or abortion.
- Vehicles that transport animals to the farm should not go beyond the areas where the animals are off-loaded.
- Do not allow off-farm vehicles onto the farm unless the exterior and undercarriage have been cleaned and disinfected.
- Load and unload animal transportation vehicles as near to the farm gate as possible.
- Unload feed trucks near the feed storage area.
- Provide a wash area for vehicles that need to enter the farm.
- Maintain a vehicle register for vehicles that enter and exit the farm.

2.1.3 GOOD PERSONAL AND FARM HYGIENE PRACTICES

Farm workers and poor hygiene practices are among the factors that enable the spread of microbes, parasites, and vectors. The following steps should be taken to prevent the spread of infection:



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

- Staff should **maintain good personal hygienic practices**, such as washing hands on arrival at the farm and changing into farm clothes to avoid spreading infection.
- Ensure that all workers and visitors wash their hands with soap and water upon entry and exit of the farm, and between farm sections.
- The farm should have a foot path that provides for visitors to disinfect their footwear, and a car entrance that allows disinfection of tyres during entry and exit.
- Wash hands upon contact with animals—especially sick ones or those of unknown health status, e.g., aborted fetuses, placenta, dead animals, etc.

2.1.4 REGULAR CLEANING AND DISINFECTION OF THE FARM FACILITIES

Farm activities lead to accumulation of manure, mud and waste, which provides a conducive environment for the growth and multiplication of

microbes. The dust in the animal house and mud around the house predispose goats and sheep to respiratory diseases and hoof rot diseases. To prevent these, the following steps should be taken:

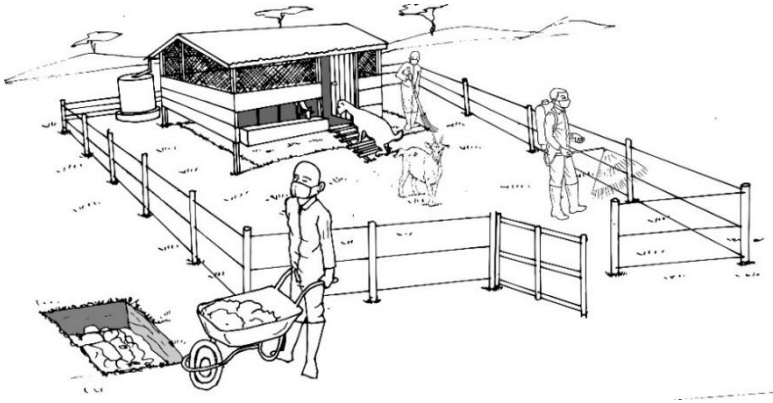


Illustration: Slatted goat house with a fence. One person is sweeping the house and another is taking the manure to a manure pit in a wheelbarrow.

- Clean pen areas daily to remove manure and other organic material.
- Clean and disinfect (where possible) after procedures such as sheep shearing, clipping, removal of manure etc.
- Safely dispose of manure in a composite manure pit where it can be used as organic fertilizer.
- Clean and disinfect (where possible) areas where animals have died or aborted or placentas have been handled.
- Farm utensils such as water and feed troughs should be regularly cleaned and disinfected.

2.1.5 BEDDING

Bedding may be used routinely in houses where dairy goats and kids are kept. However, poor hygiene of the bedding can create an environment

where microbes can multiply and cause udder, respiratory, and navel infection.

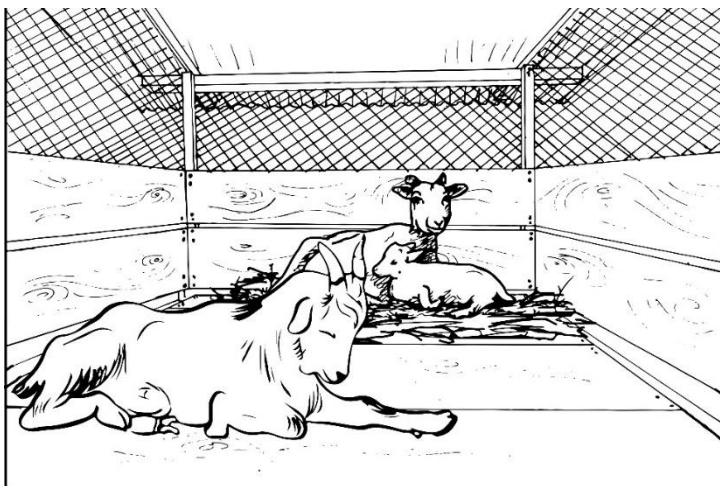


Illustration: Housing goats; there should be enough space and bedding.

To prevent this, the following should be done:

- Ensure that the bedding materials are clean, dry, and free of visible contamination.
- Do not reuse bedding material for another lot of animals.
- Ensure regular replacement of bedding materials.

2.1.6 DISPOSAL OF DEAD ANIMALS



Illustration: Wear personal protective equipment when burying a dead animal.

- Remove dead animals as soon as possible.
- Dispose of dead animals either by incineration or deep burial.

2.2 PROPER FEEDING AND GOOD NUTRITION OF GOATS AND SHEEP

2.2.1 PROPER FEEDING

Good nutrition and water provided as needed to the animals enables good immunity that is important for the animal to fend off infections.

- Ensure that grazing land for the animals is clean and free of contamination, such as manure.
- Provide supplemental feed to grazing and forage-fed animals, as necessary.
- Where possible, do not graze goats/sheep in areas with a lot of vectors such as flies.
- Do not graze sheep/goats with other ruminants.

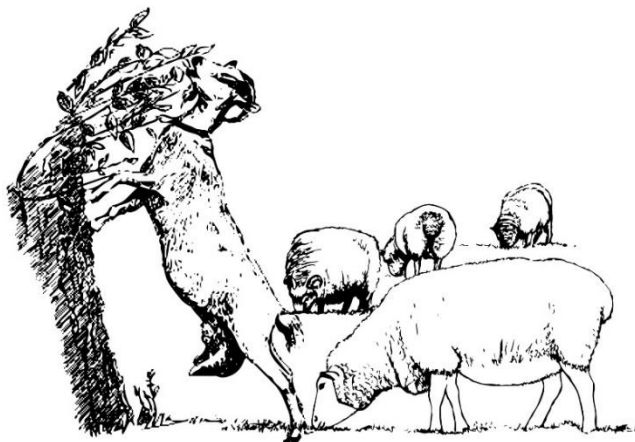


Illustration: Sheep grazing separately from other animals.

In case you buy feed for the animals,

- Purchase feed from a trustworthy source.
- Transport feed in clean carriers.
- Ensure that feed does not contain visible contaminants such as feces, manure, mold, etc.
- Store feed in a secure, clean, dry place that limits degradation and prevents access to wild animals and vermin.

2.2.2 WATER



Illustration: A secure water source for goats and sheep.

- Collect drinking water from a trustworthy water source, e.g., tap or deep well water.
- If you use surface water sources such as wells, dams, river; treat the water by filtration or sedimentation followed by chlorination.
- Place water bowls and troughs to prevent contamination with faeces and other matter.
- Dispose of contaminated water as soon as it is found.
- Disinfect water sources between water changes.

2.2.3 GOOD NUTRITION⁶

It is important that sheep/goats have adequate nutrition to promote their health and reproduction potential.

⁶ University of Arkansas Division of Agriculture. Basic nutrition of small ruminants. [cited 2020 June 27] Available from: <https://www.uaex.edu/farm-ranch/animals-forages/sheep-goats/nutrition.aspx>

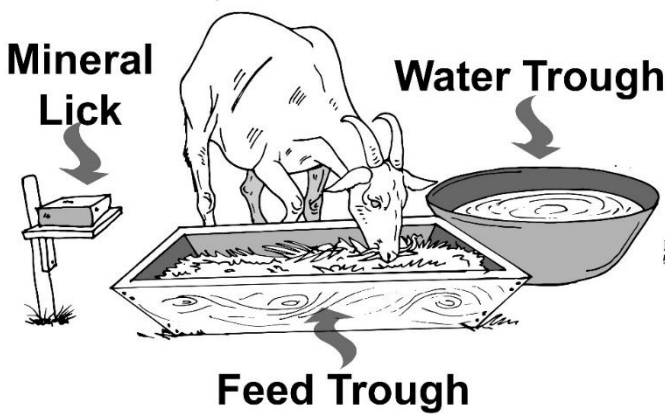


Illustration: Goat in a gazette feeding area with adequate water and minerals.

- Ensure that animals have access to sufficient pasture.
- Avail clean, fresh drinking water to the animals during feeding hours.
- Provide supplemental feed to grazing and forage-fed animals, as necessary.
 - REMEMBER: Pregnant and lactating ewes have higher food and water requirements
- Rotate pastures so that they can stay in a vegetative state that is easier for animals to eat and digest.
- Where hay is used, preferably use legume hays rather than grass hays. Legume hays are more nutritious.
- Ensure that purchased feed has an adequate mineral balance for the particular animal stage.
- Ensure that lambs/kids receive adequate colostrum from the ewe/doe, or via a bottle, within the first 24 hours of life.
- Do not wean lambs/kids before they are at least six weeks of age.
- Ensure that lambs/kids have access to dry food from about one week of age.

2.2.4. PROPER HOUSING

Housing offer protection from adverse weather conditions, predators, and accidental injuries, as well as many diseases that are carried by wild animals and microorganisms.

Housing also allows larger numbers of animals to be more easily handled, to receive proper nutrition, and clean water as well as individual and consistent care by farmers.

- Ensure that the position of the house is oriented length wise in the East to West direction (i.e. against the direction of sunrise and sunset) to allow for good shade, ventilation and air circulation within the house.
- There must be different sections within the structure to house adults (breeders) and growing animals (fatteners).
- The house must be structured in a form that allows the movement of humans and animals from the section of young animals to older animals, and not vice-versa.
- There must be an isolation pen for sick animals. This should be separated from the main house to avoid contamination.
- The house must be well secured to prevent entry of undesirable elements such as pests, insects and robbers.
- The floor of the house should not be smooth since animals may slip. However, it should also not be too rough, as rough surfaces are more likely to harbor pathogens or hamper cleaning.
- The floor must be sloped towards the drainage outlet for easy drainage of liquid substances.
- In the case of wooden flooring, allow for a spacing between 1.0 and 1.5 cm to facilitate the disposal of dung and urine.
- The wooden flooring shall be constructed at a height of at least one metre above the ground level.

- In this case, a suitable ramp or steps of wooden planks should be provided.

Good ventilation should not be compromised. It is therefore necessary to raise the shed sufficiently high and create openings in the walls to allow for good ventilation. This allows for entry of fresh air and exit of damp air.

2.3 BREEDING⁷

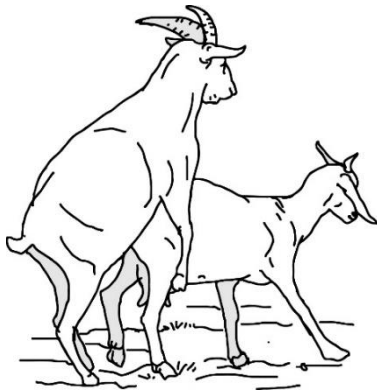


Illustration: Fit male goat mounting a viable female goat.

- Retain animals with good characteristics for breeding.
- Consider characteristics such as production of meat, milk, and wool, which are hereditary when selecting animals for breeding.
- Use superior rams in breeding.
- Do not practice in-breeding.
- Do not use the same ram in a free-ranging flock for more than two breeding seasons in order to avoid in-breeding.

⁷ Department of Agriculture: Republic of South Africa. Breeding in sheep and goats. Updated 2020 July [cited 2020 June 27]. Available from: <https://dalrrd.gov.za/Branches/Agricultural-Production-Health-Food-Safety/Animal-Production/Services/Infopacks>

- Cull or sell off old ewes/does (more than eight years or after six lambing/kidding seasons), infertile ewes/does, those with udder problems, and those with visible physical defects. It is important such animals are culled regularly to maintain a healthy flock.

2.4 VETERINARY EQUIPMENT



Illustration: A farmer cleaning veterinary equipment.

- Ensure that all equipment leaving the farm has been authorized.
- Minimize lending and borrowing of farm equipment.
- If equipment has been borrowed or lent, ensure that it is cleaned before and after use.
- Clean and disinfect equipment before and after use on animals or between different batches or flocks of sheep/goats.
- Avail dedicated equipment, clothes and footwear for use in high-risk areas like isolation pens.

2.5 PEST CONTROL

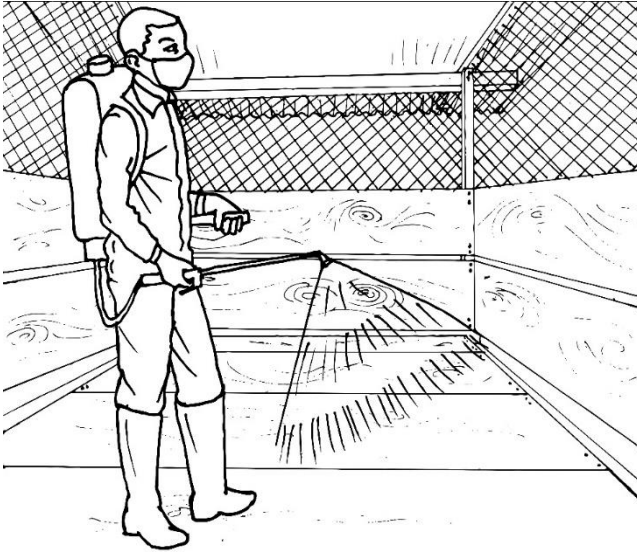


Illustration: A farmer disinfecting the animal house.

- Where possible, enclose the farm area so that dogs, cats, and other livestock do not access the farm.
- Ensure that farm buildings are in good repair.
- Ensure that feed stores are enclosed and screened to prevent access by vermin.
- Ensure that the boundary fences are in good condition.
- Remove waste and anything else that may attract vermin and wild animals.

2.6 PARASITE CONTROL

- Practice rotational grazing. Rule of thumb is not to graze below four inches as 80% of worm larvae is in the first few inches of vegetation.

- Deworm as per guidance from veterinary practitioner.
- If possible, keep animals in dry-lot facilities for 48 hours after deworming; if the whole herd is treated, do not move animals to a clean pasture.
- Spray/dip animals as per guidance from veterinary practitioner.
- For vaccination of animals, also consult a veterinary practitioner.

3.0 APPROPRIATE ANTIMICROBIAL USE PRACTICES

3.1 PURPOSE OF THE GUIDELINES

These guidelines are intended as a set of recommendations and practical measures to create farm conditions that prevent or minimize the occurrence and spread of infection, and that promote the effective and safe use of antimicrobial medicines. Taken together, these two approaches can minimize the selection of antimicrobial-resistant microbes in animals.

The underlying purpose is to conserve and sustain the effectiveness of available antimicrobial agents intended for use in animals so as 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, so as 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, so as 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 IN DIAGNOSIS OF COMMON CONDITIONS



Illustration: Laboratory technician examining a sample under a microscope.

In all animal species, “prevention is better than cure”.⁸ 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.

- Give accurate information to the attending veterinary practitioner so that he/she can ably make a correct diagnosis, hence correct medication and dosage.

⁸ 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

- 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.

3.5 APPROPRIATE APPROACH TO TREATMENT

- Do not give antimicrobials to whole flocks, but rather to individual animals.
- Do not give antimicrobials unless they have been prescribed by a veterinary practitioner or based on veterinary advice.
- Do not use antimicrobials for prevention of disease unless advised by a veterinary practitioner.
- Ensure that you clearly understand the instructions concerning the medicine prior to giving it to the animals.
- Ensure that you tell the prescribing veterinary practitioner about other medicines that the animals are being treated with to avoid adverse reactions or drug interactions.

3.5.1 OBTAINING MEDICINES



Illustration: Farmer receiving drugs and instructions from a veterinary pharmacy

- DO NOT use illegally obtained medicines on the farm since their safety and efficacy cannot be ascertained.
- Do not buy medicines from people who market medicines that you or your veterinary practitioner have not ordered.
- 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 GOATS AND SHEEP



Illustration: A farmer restraining a goat and administering medicine.

- Do not administer two or more antimicrobials at the same time unless specifically advised by a veterinary practitioner.
- Ensure that animals receive the full course of treatment at the correct dosage, as instructed by the veterinary practitioner.
- Only animals intended to be treated should be treated with medication.
- Clean all equipment used for in-feed or in-water administration of medicine to ensure that no residues are retained.
- Do not mix medicines unless you have been advised to do so by a veterinary practitioner, since mixing can result in the medicine being ineffective or lead to adverse reactions.
- Give the correct dose of medication during the appropriate time period.

3.5.3 STORAGE OF MEDICINES

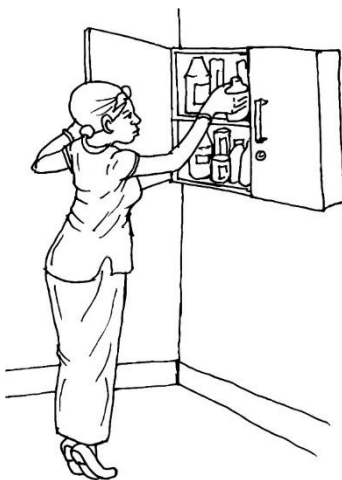


Illustration: Farmer picking medicine from the storage cabin on the farm's medicine store.

- 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, birds, 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

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

- Follow manufacturer's advice for disposal, as written on medicine label.
- Do not reuse medicine containers; wash them and dispose of them in landfill sites.
- Return unused medicines to the prescribing veterinary practitioner or supplier for disposal.

3.6 WITHDRAWAL PERIODS

A withdrawal period is the minimum time required between the last treatment given to food-producing animals, and the collection of meat or milk for human consumption.

Withdrawal periods may limit the selection and use of antimicrobial drugs in food producing animals. With extra-label use, an extended withdrawal period should ensure that there are no tissue residues.

The recommended withdrawal periods should always be observed to prevent harmful residues of antimicrobial occurring in tissues, eggs or milk.

- Identify treated animals to ensure that withdrawal times are observed.
- Strictly adhere to the appropriate withdrawal period before the slaughter of treated animals or the use of milk for human consumption.
- The withdrawal period is usually indicated on the prescription, or on the label of the medicine, or may be given by the veterinary practitioner.
- Withdrawal periods vary for milk and for meat. Ask your veterinary practitioner if you are unsure

4.0 KEEPING RECORDS FOR ANIMALS AND VETERINARY MEDICAL PRODUCTS

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).



Illustration: Farmer reviewing medical records.

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

See the next page for an example.

Example of herd health register

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

4.2 VETERINARY MEDICAL PRODUCT RECORDS

- Upon purchase of a medicine, record:
 - Name of the prescribing veterinary surgeon
 - Name of veterinary medicine
 - Batch number
 - Date of expiry
 - Date of purchase
 - Quantity obtained
 - Name and address of the supplier

- At the time of administration, record:
 - Name of veterinary medicine
 - 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 veterinary medicinal product was disposed of
 - Where product was disposed of

- Ensure that all records are kept for at least five years.

OTHER CONTRIBUTORS

Dr. Marion Murungi, Senior Technical Advisor, USAID/MTaPS
Dr. John Paul Waswa, Technical Advisor, USAID/MTaPS
Dr. Nassolo Winnie, Monitoring and Evaluation, APD/MAAIF
Ms. Nakyeyune Carolyne, Monitoring and Evaluation, APD/MAAIF
Dr. Mwanja Moses, Senior Veterinary Officer, MAAIF
Dr. Kajo Francis, Veterinary Inspector, MAAIF
Dr. Fred Monje, Senior Veterinary Officer, OHF, MAAIF
Dr. Dan Tumusiime, Senior Veterinary Officer, MAAIF
Dr. Merab Acham, Veterinary Inspector, MAAIF
Dr. Annet Praise Namboowa, Veterinary Inspector, MAAIF
Mr. Kassi Yusuf, Senior Fisheries Officer, Aquaculture business development, MAAIF
Mr. Butete Cosmas Alfred, Senior Apiculture Officer, MAAIF
Dr. Lumu Paul Johnson, Senior Veterinary Officer, MAAIF
Dr. Kenneth Mugabi, Senior Veterinary Officer, MAAIF
Dr. Kalanda Rodgers, Veterinary Inspector, Northern Uganda, MAAIF
Dr. Kimaanga Michael, Senior Veterinary Inspector, MAAIF
Dr. Nanozi Beatrice, Senior Veterinary Officer, MAAIF
Dr. Nakanjako Maria Flavia, Veterinary Inspector, MAAIF
Dr. Jeanne Muhindo, Head, Veterinary Products, NDA
Dr Wilfred Opira, Regulatory Officer, NDA
Dr. Sandra Tuhairwe, Regulatory Officer, NDA
Dr. Juliet Nalubwama, Regulatory Officer, NDA
Dr. Noel Aineplan, Principal Regulatory Officer, NDA
Dr. Kayizzi Magembe Vincent, Principal Regulatory Officer, NDA
Mr. Mutasaaga Joseph, Manager, Planning and Business, NDA, Kampala
Dr. Robert Aruho, Senior Wildlife Veterinarian, UWA, Kampala
Dr. Samuel G. Okech, Lecturer, MakCOVAB
Dr. David Musoke, Lecturer, Department of Disease Control and Environmental Health, Makerere University

Dr. Esther Buregyeya, Senior Lecturer, Department of Disease Control and Environmental Health, Makerere University
Dr. Kubiriza Kawooya Godfrey, Lecturer, MakCONAS, Makerere University
Dr. Nguma Willy, District Veterinary Officer, Arua
Dr. Taban Luke, Veterinary Officer, Arua Municipality, Arua
Mr. Caku Benjamin, DAPO, Arua
Mr. Kalia Victor, Assistant Veterinary Officer, Nyadri, Maracha
Ms. Taburu Christine, Assistant Veterinary Officer, Yivu, Maracha
Mr. Drate Cox, Drug shop Operator, Arua
Mr. Aroma Stephen, Veterinary Practitioner, Arua
Mr. Bada Kennedy, Veterinary Practitioner, Arua
Mr. Eceta Patrick, Veterinary Practitioner, Arua
Mr. Asea Fred, AAHO, Ayivuni, Arua
Mr. Nyakuta Hillary, Assistant Veterinary Officer, Tara, Maracha
Mr. Ezu Paska, Drug shop operator, Arua
Ms. Adiru Kevin, Assistant Veterinary Officer, Tara, Maracha
Mr. Atama Emmanuel, Assistant Veterinary Officer, Tara, Maracha
Dr. Onzima Charles, AAHO, Madi-Okolo District.
Dr. Candia Alex, District Veterinary Officer, Maracha
Mr. Acidri Jimmy, AAHO, Madi-Okolo District
Mr. Abirima Abubakar, Assistant Veterinary Officer, Maracha
Mr. Diku Charles, Drug shop operator, Arua
Mr. Izama Yazid, Drug shop operator, Adjumani
Dr. Ijo Didemous, Veterinary Officer, Adjumani
Dr. Dramwi Mathias, Veterinary Officer , Adjumani
Dr. Akule Urri Richard, District Veterinary Officer, Moyo
Mr. Unzimai Vincent, Assistant Veterinary Officer, Moyo
Mr. Dralobu Akuti Pascal, Assistant Veterinary Officer, Moyo
Dr. Kiryabwire, District Veterinary Officer, Mukono
Mr. Margaret Nankya, Owner, Bulunzi poultry and animal feeds, Mukono
Ms. Katana Grace, Sales representative, Agroservice (U) Ltd, Mukono

Dr. Kaaya, Veterinary Surgeon, Dealer/Supplier of Kuroilers, Mukono

Dr. Kyobe, Veterinary Surgeon, Mukono

Dr. Charles Musoke, Veterinary Surgeon, Mukono

Notes
