RWANDA POLYTECHNIC

TVET LEVEL II

AGRICULTURE

Animal Diseases Prevention

TRAINER MANUAL

RWANDA POLYTECHNIC

Approved by: Workforce Development Authority

USAID FROM THE AMERICAN PEOPLE

EDC Education Development Center

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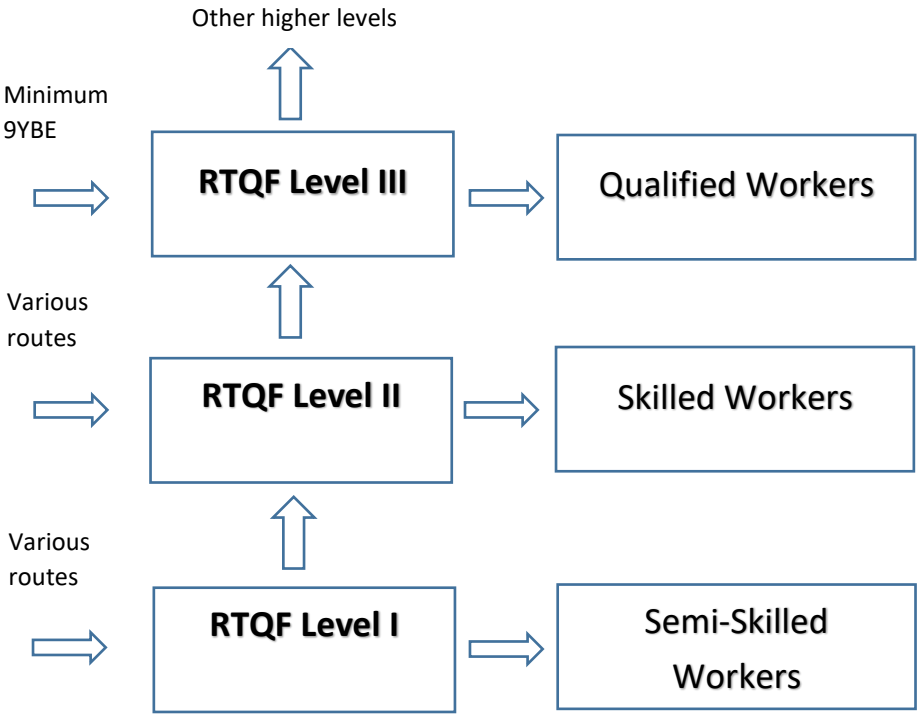
Introduction to RTQF Level II Training Modules

Background

Rwanda Polytechnic, with support of and in collaboration with USAID Huguka Dukore Akazi Kanoze, has developed RTQF TVET Level II programs that combine basic education, soft skills and vocational skills modules. Bridging the gap between Level I and Level III programmes, Level II aims to prepare learners who have a minimum education level of Primary 6 or equivalent to continue with their education or become skilled workers in the labour force.



Following the Workforce Development Authority (WDA) curriculum development process that involved experts from Rwanda Polytechnic, Rwanda Education Board, Ministry of Agriculture, technical vocational institutions, Education Development Center, Akazi Kanoze Access and other technical experts, training modules were developed in basic education, soft skills (work readiness) and, initially, agriculture. Additional vocational areas will be added over time. Trainees will be trained in all Basic Education and Soft Skills modules listed below, as well as in 6 - 8 modules that make up their chosen technical vocational programme.

Module Requirements:

Basic Education	Soft Skills	Vocational Skills
• English • Kinyarwanda • Mathematics	• Basic Entrepreneurship Skills • ICT Essentials	• Vocational programmes will have a set of 6 – 8 required technical modules.

• Integrated Science (Physics, Chemistry, Biology)	• Communication Skills • Safety, Health and Sustainable Environment • Personal Development and Career Guidance	E.g. Food Crop Production and Processing includes the following modules: 1. Food Crop Production 2. Small Scale Post-Harvest Operations 3. Growing Medium 4. Food Safety and Sanitation 5. Food Preservation and Storage 6. Flour Processing

Organization of the Training Manuals

For each module there is a Trainer Manual and a Trainee Manual. These manuals, based on the curricula for each subject, are divided into Learning Units, and each Learning Unit includes 3 – 5 Learning Outcomes. The learning outcomes make up the essential skills, knowledge and attitudes to be acquired by trainees. To make the Trainee Manual more user friendly, Unit and Topic are used respectively for Learning Unit and Learning Outcome. The number of hours per training module varies, ranging between 30 and 120 hours.

Teaching and Learning Methodology of RTQF Level II 2 TVET Materials

The teaching and learning methodology used in the materials is based in experiential and adult learning. Activities are designed to engage trainees, build upon what they know and learn and provide them with opportunities to build their skills in the classroom and in the workplace. More specifically, guiding principles in the development of the manuals include:

- Building on participants' knowledge, skills and experiences
- Facilitating a learning process through active engagement of participants rather than through lecturing
- Providing opportunities to practice – inquiry based and hands on practice, both in the classroom and workplace
- Using simple and clear language
- Connecting to the real world: use local resources and the environment for learning
- Promoting critical thinking through properly debriefing activities and asking questions that get learners to think, analyze, relate issues and topics to their own lives and come up with solutions

- Applying social inclusion principles: Finding ways to include all types of youth (and trainers) – males and females; different cultural/ethnic/religious backgrounds, people with disabilities (PWD); people with different types of health status …

- Encouraging risk taking – promote questioning and being free to explore

- Promoting habits of mind that support life-long learning: curiosity and wonder, open mindedness, creativity

These principles are reflected in the layout and flow of activities in the manuals:

1. **Key Competencies:** Table found at the beginning of each Learning Outcome that describes the main knowledge, skills and attitudes to be gained by the end of the activities.

2. **Self-Assessment:** Conducted at the beginning and end of each Learning Unit to get a sense of trainees' knowledge and skills going into it and what they have gained by the end of the Learning Unit (and steps they need to take to further their understanding and skills).

3.  **Getting Started Activity:** Typically, a quick activity or questions to 1) give the trainer a sense of trainees' existing knowledge and skills; 2) spark the interest of trainees in the topic; 3) introduce the objectives and key competencies of the topic.

4.  **Problem Solving Activity:** A challenging activity to get trainees engaged and to learn through discovery instead of memorization of facts. A variety of teaching and learning methodologies are used, including individual and group work such as reading real life work-based scenarios and answering accompanying questions to activities such as identifying proper tools and equipment from the school workshop to conduct a certain activity. Following the sharing of responses, the trainer guides trainees through the content and processes being introduced.

5.  **Guided Practice Activity:** Building on the concepts and skills gained in the Problem Solving Activity, the trainer guides trainees through practical examples.

6.  **Application Activity:** Consolidates trainees' knowledge and skills through a real life application of the topic in the classroom, community or workplace. Trainees are given more independence in applying what they have learned.

7. **Key Facts boxes:** Throughout the Trainee Manual, one will find Key Facts boxes. These contain the main information or content for a given Learning Outcome. They are there for the trainees' reference and are used throughout the different types of activities.

8.  **Points to Remember:** List of the top key learning points or "take-aways" from the topic.

9.  **Formative Assessment:** Questions and activities to assess trainees' level of understanding of the concepts introduced.

10.  **Summative Assessment:** Based on the integrated, real life situation approach used in other TVET levels, this is done at the end of every module for agricultural modules and, with some variations, at the end of each Learning Unit for Basic Education and Soft Skills modules.

11.  **Self-Reflection:** Trainees re-take the Self-Assessment given at the beginning of the Learning Unit and identify their strengths, challenges and actions to improve their level of competence.

The Trainer and Trainee Manuals are meant to be used in conjunction with each other and are well coordinated through the headings and labelling of activities. The trainer will always be able to refer trainees to specific activities by the coordinated numbering system. For instance, a specific exercise might be labelled Topic 1.2 Task 2. The Topic is the number of the Learning Outcome and the task is the specific exercise to be done. The Key Facts are also numbered for easy reference. These nor the Self-Assessment tables are in the Trainer's Manual so the trainer should have a copy of both manuals.

The Trainer's Manual includes answers (or guidelines to the trainer as appropriate) to Formative and Summative Assessments as well as to problems given throughout the activities. Summative Assessments are not included in the Trainee's Manual. These are meant to be used as a guide for those who will be developing a context-appropriative Summative Assessment at the end of the Module or Learning Unit. Basic Education and Soft Skills modules include Summative Assessments at the end of every Learning Unit while the technical modules include it only at the end of the module.

Lastly, there is a section in the Trainer's Manual for additional information to the trainer that includes either specific information or references to information that can help them deepen their understanding of the particular content.

ANIMAL DISEASES PREVENTION

Learning Units	Learning Hours	Learning Outcomes
Learning Unit 1: Maintain safety and hygiene	10	**1.1** Clean workplace, material, and equipment
		1.2 Disinfect workplace
		1.3 Store material and equipment
		1.4 Monitor physical parameters
Learning Unit 2: Prevent ruminant diseases	25	**2.1** Assist in identification of diseases
		2.2 Spray acaricides
		2.3 Deworm ruminants
Learning Unit 3: Prevent pig diseases	20	**3.1** Assist in identification of diseases
		3.2 Spraying acaricides
		3.3 Deworm pig
		3.4 Wash pig
Learning Unit 4: Prevent poultry disease	20	**4.1** Assist to identification of diseases
		4.2 Deworm poultry
		4.3 Apply preventive measures
Learning Unit 5: Prevent rabbit diseases and predators	15	**5.1** Assist to identify diseases
		5.2 Control diseases
		5.3 Deworm rabbit
		5. 4 Control predators

Learning Unit 1: Maintain safety and hygiene

Cleaning material and equipment

Disinfect workplace by spraying

Learning Outcomes

By the end of the Learning Unit, trainees will be able to:

1.1 Clean workplace, material, and equipment

1.2 Disinfect workplace

1.3 Store material and equipment

1.4 Monitor physical parameters

Learning Unit 1 Self-Assessment

1. Ask trainees to look at the illustrations above (in their Trainee Manuals) and discuss what they see. What topics do they think this unit will include based on the illustrations? After some brainstorming, share the main topics.

2. Explain that this Unit is going to focus on the importance of maintaining a clean, safe, and hospitable workplace. Trainees will learn how to identify and monitor various factors that can have potential effects on animal health.

3. Ask trainees to fill out the self-assessment at the beginning of the unit in their Trainee Manuals. Explain that the purpose of the self-assessment is to become familiar with the topics in the unit and for them to see what they know or do not know at the beginning. At the end of the unit, they will do a self-reflection, which includes re-taking the self-assessment and identifying their strengths, areas that need improvement, and actions to take. The self-assessment is not a test!

Learning Outcome 1.1: Clean workplace, materials, and equipment

Objectives: By the end of the learning outcome, trainees will be able to:

a. Identify cleaning tools and cleaning products
b. Explain the use of cleaning tools and cleaning products
c. Recognize and explain the difference between detergents and disinfectants

Time Required: 2 hours

Learning Methodology: Simulation, practical exercises, field visits, demonstration, small and large group discussions, brainstorming, oral presentation of group work

Materials Needed:

- **Standard training materials** – flip chart, markers, tape, A4 paper
- **Visual material (optional) of cleaning tools and products** – laptop, projector, internet
- **Sample cleaning materials/tools** – brooms, sponges, cleaning brushes, squeegees
- **Sample cleaning products** – detergents, disinfectants

Preparation:

- ❑ Prepare pictures/videos that represent cleaning products and how to use them
- ❑ Prepare a demonstration of how to use cleaning tools and products, including a dirty/unclean space to clean and disinfect
- ❑ Contact a farmer to organise a farm visit or, if a visit is not possible, arrange the classroom to mimic a disorganised cow stable

Cross Cutting Issues:

- ✔ **Environment and sustainability:** Ensure environment is maintained and respected while using cleaning products
- ✔ **Gender and inclusivity:** Gender inclusivity is considered while forming groups and allocating roles to assist in cleaning

Prerequisites:

- ❑ None

Key Competencies:

Knowledge	Skills	Attitudes
1. Identify cleaning tools.	**1.** Select the appropriate cleaning tool.	**1.** Detail-oriented
2. Identify cleaning products.	**2.** Select the appropriate cleaning product.	**2.** Detail-oriented
3. Describe cleaning procedures, using appropriate tools.	**3.** Clean a farm using different cleaning tools and products.	**3.** Safety-oriented; problem solver

Steps:

Getting Started: What do we know and where are we going?

1. Display a picture of material and equipment for cleaning and disinfecting the workplace or display materials and equipment at the front of the room. These could be brooms, squeegees, detergents, disinfectants, and/or cleaning brushes

2. Ask the trainees to describe what they see to a partner.
   a. Ask them to list all items that are in the picture.
   b. Ask them to identify which kinds of cleaning materials, equipment and/or cleaning products they have used or are familiar with.

3. Ask a few volunteers to share their responses with the large group and discuss.

Problem Solving Activity

1. Ask trainees to turn to **Topic 1.1 Task 2** in their manuals and discuss the following questions with a partner:
   a. How do farmers in your village maintain the hygiene and safety of their farms?
   b. Which tools do they use?

2. Divide the entire class into two groups. Ask each group to discuss:
   a. What are the dangers in misusing cleaning products?
   Possible Answers: Misusing cleaning products can ineffectively clean the surface or area, which means the actions were useless. Misusing cleaning products can also harm the environment and/or the health of humans and animals in the area. For

example, spilling a toxic disinfectant cleaning product may allow toxins to enter the soil or they may be accidentally ingested by animals.

b. What are some alternative solutions?
Possible Answers: Alternative solutions are storing cleaning products appropriately before and after using them. Knowing and applying knowledge of how and when to use cleaning products is essential to preventing dangerous outcomes.

c. How can we use cleaning products without harming the environment?
Possible Answers: We can use cleaning products without harming the environment by using caution and applying our knowledge to each circumstance.

3. Ask for volunteers to share their ideas with the rest of the class.

4. Encourage creativity and critical thinking during group and full class discussions. Then, direct trainees to **1.1 Key Facts** to read about the procedures for cleaning (cleaning, washing, rinsing, drying). Also, share the **Possible Answers** listed above, if they have not already been mentioned.

Guided Practice Activity

1. Tell trainees to work individually to complete the matching exercise in **Topic 1.1 Task 3**. They should draw a line to connect the photo of the cleaning equipment to the name of the item to its use.

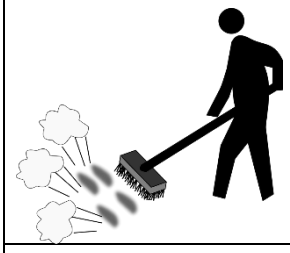
2. Then, tell them compare their answers with a partner.

3. Finally, give the correct answers (key below).

4. Show these tools and demonstrate how to use them.

Answers:

	Detergent To remove dirt or grease from porous surfaces, such as fabrics or clothes; made of soaps.

	Disinfectant To kill germs (microbes) and viruses (bacteria, fungi).
	Broom To sweep floors; to remove dust or other undesired matter by pushing it into a dustpan.
	Cleaning brush To scrub or wash a surface; to scrub the stains out of clothing or shoes.
	Squeegee To remove or control liquid on a floor or flat surface.

Application Activity

1. Organise a visit to the school farm to clean the stable for cows or other animals.
   a. Confirm with the farmer that he/she is willing to have trainees assist with cleaning tasks.
   b. Alternatively, simulate a farm setting within the classroom.

2. Explain to trainees that they are responsible for selecting the cleaning materials and equipment needed to clean the workplace.

3. Request that a farm professional demonstrate how to use select materials and/or equipment.

a. Alternatively, demonstrate to trainees how to select cleaning materials & equipment by selecting one material/piece of equipment and then cleaning the workplace accordingly.

4. Divide trainees into small groups and tell them to select the appropriate cleaning materials.
   a. Remind them to read the manufacturer's instructions for each product.

5. If permitted by the farmer, have trainees carry out the cleaning process in the stable.

6. Observe the groups as they carry out the tasks and provide assistance when needed.

7. After all groups have finished their allocated tasks, have them collaborate within their group to write three key points on how to properly select and use cleaning materials and products.

8. Trainees present their key points to the rest of the class. Correct any mistakes or misunderstandings.

Points to Remember

- Always keep the workplace clean.
- Misuse of cleaning equipment can have serious consequences for the animals and the environment!
- Cleaning tools and products must be used according to the manufacturer's instructions to avoid dangerous or hazardous situations.
- The key difference between detergents and disinfectants is that detergents clean a surface, while disinfectants remove harmful microorganisms from the surface.

Formative Assessment

1. From the list below, circle cleaning tools and tick cleaning products:
   - ❑ Broom
   - ❑ Detergent
   - ❑ Soap
   - ❑ Disinfectant
   - ❑ Water

- ❑ Squeegee

Answers:
Cleaning tools: Broom, soap, squeegee
Cleaning products: Detergent, soap, disinfectant

2. Explain the difference between detergents and disinfectants in your own words. Give an example of when you would use each product.
Answer: Detergents are used to clean a space, whereas disinfectants are used to kill microorganisms and viruses. Disinfectant must be used to thoroughly clean a space.

3. Imagine you are working on a farm and must clean the cow shelter, where the cows sleep at night and are milked regularly.

a. What tools do you need to clean this space?
Answer: Squeegee (to mop excess or spilled milk), broom (to sweep dirt, faeces, or other material), a cleaning brush to wash the floors, and dustpan (optional- to sweep up the dirt and faeces).

b. What products do you need to clean this space?
Answer: Detergent, water, and disinfectant.

c. Explain the five stages of the basic cleaning process in this situation.
Answer: Based on **1.1 Key Facts**.
1. Cleaning: Use broom and/or squeegee to remove matter (dirt, waste/faeces, milk, sleeping straw or bedding) from the area.
2. Washing: Use water and detergent to scrub surfaces and remove remaining dirt.
3. Rinsing: Use water to remove detergent and loose dirt
4. Drying: Use towel or let sit overnight to remove moisture
5. Disinfecting: Use disinfectant to remove harmful bacteria or microorganisms

Leaning Outcome 1.2 Disinfect workplace

Objectives: By the end of the learning outcome, trainees will be able to:

a. Recognize and select Personal Protective Equipment (PPE) before beginning the disinfection process

b. Identify disinfectants used at animal farms and interpret their uses

c. Identify and apply the various uses of disinfectants

Time Required: 2 hours

Learning Methodology: Brainstorming, group work, demonstration, practical exercises, multiple choice on different disinfectants, farm visit.

Materials Needed:

- **Standard training materials** – flip chart, markers, tape, A4 paper.
- **Sample Personal Protection Equipment (PPE)** (or images, if items are not available) – goggles/glasses/eyewear, close-toed shoes, gloves
- **Sample cleaning products** – disinfectant, water (for dilution)

Preparation:

- ❑ Contact farmers to organise a farm/field visit
- ❑ Organise/arrange sample PPE and cleaning products OR prepare/download photos to display
- ❑ Organise materials for disinfection

Cross Cutting Issues:

- ✔ **Environment and sustainability**: Emphasize proper use of disinfectant and its potentially hazardous effects on the environment
- ✔ **Gender and inclusivity:** Ensure gender balance while forming cleaning groups and allocating roles

Prerequisites:

- ❑ Familiarity with different cleaning tools and products from **Learning Outcome 1.1**

Key Competencies:

Knowledge	Skills	Attitudes
1. Name Personal Protective Equipment (PPE) used during the disinfection process.	**1.** Choose the proper Personal Protective Equipment (PPE) and wear it during the disinfection process.	**1.** Proactive; attentive; safety-oriented
2. Identify disinfectants and detergents used in animal farms and interpret their uses.	**2.** Select the appropriate cleaning product to use and apply it to the workspace properly.	**2.** Forward-thinking; proactive
3. Identify the various uses of disinfectants.	**3.** Apply different techniques of disinfection, including application, spraying, and fumigation.	**3.** Detail-oriented

Steps:

Getting Started: What do we know and where are we going?

1. Separate trainees into small groups and ask them to turn to **Topic 1.2 Task 1** in their Trainee Manuals. Have them discuss daily activities done in their neighbouring farm regarding disinfection on the farm.
   a. What do you already know about disinfecting animal shelters?
   b. Are there different ways disinfection products are used? If so, what are the different ways?

   Possible Answers: Note to the trainees that there are different ways to use disinfection products and they will learn about them during this topic.

2. Ask volunteers to share their ideas with the rest of the class.

Problem Solving Activity

1. Tell trainees to imagine they are cleaning a workspace using detergent or disinfectant products. Ask them to consider the following questions found in **Topic 1.2 Task 2** in their

manuals.

   a. What might happen if the product got in your eyes or touched your skin?
      Possible Answers: It could harm or burn your skin, damage your eyes and/or eyesight.
   b. What could you do to prevent or protect yourself from this situation?
      Answer: Wear protective gear.
   c. List three pieces of equipment you could use to protect your hands, eyes, and feet.
      Possible Answers: Goggles or other protective eyewear, close-toed shoes (as opposed to sandals or any shoes where the toes/feet are exposed), helmet/casque, gloves.

2. Now tell trainees to imagine they are going to clean an animal shelter using disinfectant, but the disinfectant is too strong.
   a. What could they do to reduce the strength of the disinfectant?
      Possible Answers: Diluting the substance with water or another liquid. Trainees can refer to "Dilution" in **1.3 Key Facts**.

3. Trainees should share their ideas with a partner.

4. Ask volunteers to share their ideas with the rest of the group.

5. Direct trainees to **1.3 Key Facts** and instruct them to take turns reading the content out loud to the class. Draw attention to the important note sections and the important areas to disinfect. Facilitate a class discussion on the following questions:

   a. Why do you think pre-vaccination surfaces, animal housing between occupants, and high contact surfaces are the most important areas to disinfect?
      Possible Answers: Answers may vary. Encourage creativity and critical thinking. Some reasons are explained in the **1.3 Key Facts**. For high contact surfaces, a possible answer is that these are touched the most frequently by humans who carry bacteria and germs. Between occupants, it's possible that the previous occupants were vaccinated or immune to a disease that is living in the shelter.

   b. Why is it important to be aware of carriers?
      Possible Answers: Carriers spread diseases secretly, without obvious signs that they are sick. This allows diseases to spread more quickly and easily. If carriers are not identified, many animals may become sick before you notice a problem.

   c. How can you prevent yourself from being a carrier?
      Answer: Wash your hands regularly, wear PPE.

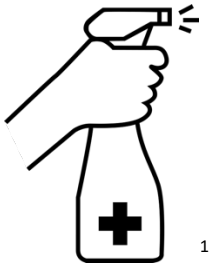
Guided Practice Activity

1. Tell trainees to turn to **Topic 1.2 Task 3** in their manuals. Trainees should imagine they are at a farm and must decide how to disinfect the various surfaces around them. Tell them to complete the following tasks with a partner.
   a. Write the steps you must go through before disinfecting:
      Answers:
      1. Pre-Cleaning
      2. Main Cleaning
      3. Rinsing
      4. Drying

   b. What are two factors to consider when choosing a disinfectant?
      Possible Answers: The concentration (if dilution is needed), time (do you have enough time to apply disinfectant, let is rest, and then rinse it?), cleanliness of the surface (has it already been adequately cleaned?), type of detergent used (some can cancel the actions of disinfectants—must read manufacturer's label to know).

2. Using the cleaning products in the classroom and/or the photos below, tell trainees to decide which disinfectant should be used on each surface pictured below. Then, if possible, using the manufacturer's instructions, determine how this product should be applied.

Answers:



1

2

Spray

[1] *Disinfectant*. (n.d.). Pixabay. https://pixabay.com/illustrations/disinfectant-cleaning-material-5251132/

[2] Hancock, K. (n.d.). *Table transparent* [Photograph]. Pixabay. https://pixabay.com/illustrations/table-transparent-wooden-furniture-4900096/

3

4

Apply

5

6

Fumigate

3. Now tell trainees that they need to disinfect a table that is 100 cm wide and 120 cm long by wiping the surface. The surface area requires 200 mL of water. The manufacturer's label says to dilute 10 mL of solution with every 50 mL of water. Calculate the amount of solution needed for 200 mL of water using the formula from **1.3 Key Facts.**

Answer:

$$\frac{\text{Given solution}}{\text{Given water}} = \frac{\text{Solution needed}}{\text{Water needed}}$$

[3] *Hand sanitizer* [Graphic]. (n.d.). Pixabay. https://pixabay.com/vectors/hand-sanitizer-wash-hygiene-clean-5295096/

[4] Clker-Free-Vector-Images. (n.d.). *Hands clapping applause free photo* [Illustration]. NeedPix. https://www.needpix.com/photo/178628/hands-clapping-applause-african-american-black-male-suit-ethnic-human

[5] *Person with backpack sprayer illustration* [Illustration]. (n.d.). Png Wing. https://www.pngwing.com/en/free-png-nkhad

[6] Huber, J. (2017, January 17). *People working in agriculture in Rwanda* [Photograph]. Wikimedia Commons. https://commons.wikimedia.org/wiki/File:People_working_in_agriculture_in_Rwanda.jpg

$$\frac{\text{10 mL solution}}{\text{50 mL water}} = \frac{\text{x solution}}{\text{200 mL water}}$$

Cross multiply:
10 * 200 = 50 * x
2000 = 50x
2000/50 = x
x = 40 mL solution needed

Application Activity

Organise a visit to a local farm, preferably one with animals. Ask the farmer and staff if it would be possible for the trainees to assist in cleaning the animal shelter areas. Check how many cleaning tools, materials, and products are available for use.

1. Before visiting the farm, separate trainees into small groups and tell them to refer to **Topic 1.2 Task 4**. In their groups, trainees should create questions about the following topics. Pay close attention to question formation and grammatical accuracy.

Possible Answers:

Topic	Questions
Where	**Where/which spaces does the staff clean?**
How often	**When/how often does the staff clean?**
Cleaning products	**Which cleaning products do you use?**
Equipment and tools	**Which equipment and tools do you use?**
Disinfection method	**How do you apply disinfectant?**

2. Upon arriving to the farm, tell trainees to complete the following tasks:

a. Representatives ask the farmer or another worker for the questions created beforehand. Trainees write the answers below:

Topic	Answers
Where	
How often	
Cleaning products	
Equipment and tools	
Disinfection method	

b. Identify the different types of disinfectants available.

c. After reading the manufacturer's label, determine which type of disinfectant is appropriate to use in the given workspace.

d. Determine if the chosen disinfectant needs to be diluted and, if so, calculate the amount of solution needed for a given workspace.

3. With the farmer's permission, have trainees apply the disinfectant to the farm surfaces and equipment properly, either by application, spraying, or fumigation. Refer trainees to **1.4 Key Facts** for more information on the methods for applying disinfection.

4. Assist as needed.

Points to Remember

- Some surfaces do not need to be disinfected after every cleaning, such as floors and walls.
- Check the manufacturer's instructions and expiration date on disinfectants and detergents.
- Always wear the appropriate Personal Protection Equipment (PPE) in order to protect yourself from hazardous conditions in the workplace.

Formative Assessment

1. Explain the stages of workplace disinfection:
Answer (found in 1.3 Key Facts):
- Pre-cleaning: Remove loose dirt and food waste by pre-rinsing
- Main cleaning: Wash with water and detergent
- Rinse: Remove loose food waste, grease and detergent
- Disinfection: Kill bacteria with disinfectants or heat
- Final rinse: Remove the disinfectants
- Drying: Remove all moisture

2. Choose **True** or **False** for the following statements:
   Answers:
   a. **False, dilution is used to make a liquid product weaker and less intense:** Dilution is used to make a liquid product stronger and more intense.

   b. **True:** It is important to disinfect pre-vaccination surfaces.

   c. **True:** Some areas can be disinfected through fumigation, or the elimination of harmful insects with fumes.

   d. **False, it IS necessary to read the manufacturer's instructions:** It is not necessary to read the manufacturer's instructions when using disinfectants.

ⓘ Further Information for the Trainer

1. Disinfection of Livestock Production Premises: https://www.oie.int/doc/ged/D8976.PDF
2. Cleaning & Disinfection of Poultry Farm: http://www.fao.org/3/al876e/al87600.pdf
3. Pesticide Exposures, Center for Disease Control: https://ephtracking.cdc.gov/showpesticideFumigants
4. Electronic Code of Federal Regulations: https://www.ecfr.gov/cgi-bin/ECFR
5. WDA, CBT Training Manual: AGRAH305: Prevention of Animal Diseases, Kigali 2015

Learning Outcome 1.3: Store material and equipment

Objectives: By the end of the learning outcome, trainees will be able to:

a. Identify material and equipment on a farm
b. Store material and equipment on a farm
c. Monitor storage facilities on a farm by taking stock

Time Required: 3 hours

Learning Methodology:
Small group discussions, brainstorming, field visit, simulation

Materials Needed:

- **Standard training materials -** flip chart, markers, tape, A4 paper
- **Sample cleaning materials and products** – brooms, sponges, detergents, disinfectants, squeegees
- **Personal protection equipment (PPE)** – goggles/eyewear, helmets/casques, gloves

Preparation:

- ❑ Organise a field visit to a farm and request that the farmer leave some spaces disorganised.
- ❑ Prepare areas of the classroom/training space as disorganised such that trainees can practice cleaning and arrange the space.

Cross Cutting Issues:

- ✔ **Environment and sustainability:** Understand the potential harmful effects of misused or spilled cleaning products. Explain the importance of properly storing cleaning products.
- ✔ **Standardisation culture:** Order cleaning tools and products according to manufacturer's instructions.
- ✔ **Gender and inclusivity:** Form gender balanced cleaning groups and be aware of gender when allocating roles.

Prerequisites:

- None

Key Competencies:

Knowledge	Skills	Attitudes
1. Identify materials and equipment to be cleaned and stored properly.	**1.** Collect and clean materials and equipment to be stored.	**1.** Proactive; accurate.
2. Describe the storage procedures on the farm.	**2.** Store material and equipment safely.	**2.** Detail-oriented.
3. Describe how to monitor and repair stock in the workplace.	**3.** Monitor and repair cleaning materials safely; Take stock and restock items as needed.	**3.** Problem solving.

Steps

Getting Started: What do we know and where are we going?

1. Inform trainees that they are going to discuss their daily activities with a partner using the following questions:

   a. What activities do you do at home to disinfect a surface?

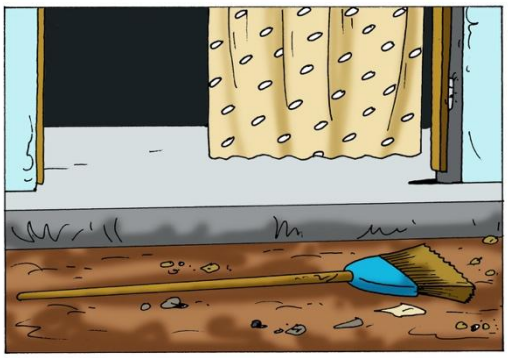
   b. What materials do you use?

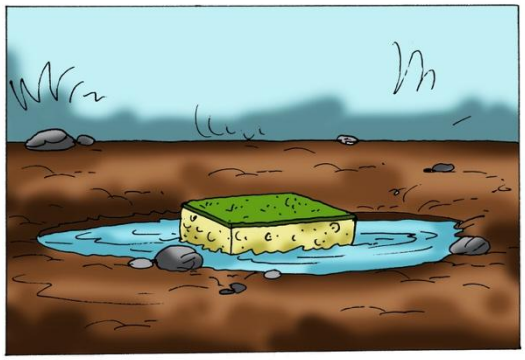
   c. How do you handle these materials before and after using them?

2. Ask for volunteers to share their answers to the third question—how to handle materials before and after using them—with the rest of the class.

Problem Solving Activity

1. Tell trainees to refer to **Topic 1.3 Task 2** and imagine they are on a field visit at a local farm. They have found that the materials, equipment, and tools are stored in an inappropriate way. A bottle of disinfectant is laying on the floor and the cap or top is not closed securely. A broom has fallen on the floor, in front of the entrance. A sponge is floating in a puddle of dirt.





2. Ask trainee to discuss the following questions in small groups:

a. Explain the danger behind the inappropriate storage of tools and cleaning materials at a farm. What could happen in the situation described?

Possible Answers: Inappropriately stored tools and materials could create hazardous environments. For example, someone could trip and fall on a broom that is laying across the floor and seriously injure themselves or those around them. An animal could drink the spilled disinfectant and become very ill. Using a dirty sponge could increase the number of dangerous microorganisms.

b. How do you think we should store materials, equipment, and tools on the farm? Where should they be placed? How do we know where to place them?
Possible Answers: In a separate, clean room. Either placed against the wall or on a hook (brooms, squeegees) or arranged on high shelves (products).

c. Which precautions do we have to take while storing chemicals and dangerous equipment on the farm?

Possible Answers: Lids are tightly and firmly closed on product containers. Broom bristles and other sharp items are pointed up and away from areas where people pass through.

d. Reflect on the field visit from the previous topic. Where did the farmer store the materials, equipment, and tools? What suggestions would you make?
Answers may vary.

3. Direct trainees to **1.5 Key Facts** in their manuals. Tell them to use this information to supplement their responses to the questions above.

4. Facilitate a class discussion and review of **1.5 Key Facts** as needed.

Guided Practice Activity

1. Using items from the classroom and campus, arrange different areas of the room so that cleaning products and tools are disorganised and disorderly. Direct the trainees to **Topic 1.3 Task 3** in their manuals and divide them into groups.

2. Assign each group an area of the room to properly arrange and clean.

3. Ask trainees to start cleaning and arranging the area accordingly and to check if chemicals are secured and stored according to the instructions on the label. Tell them to refer to **1.5 Key Facts** for guidance.

4. Monitor groups as they carry out the tasks and provide assistance as needed.

5. After all the groups have finished, ask them to discuss the following questions:
a. Which materials were the most challenging to store? Why?

b. Which materials or equipment take the longest amount of time to store?
Answers may vary. Make sure trainees explain their reasoning with details and evidence.

6. Invite group representatives to share their group's experiences and ideas with the rest of the class.

7. Answer any questions regarding proper cleaning and storage of materials and equipment.

Application Activity

1. Make an appointment with a farmer to assist him in storing new or recently purchased cleaning materials and equipment.

2. After arriving to the farm, divide trainees into 3 groups.

3. Ask each group to work closely with the farmer or other workers to perform the following activities:
   a. Wear the appropriate Personal Protection Equipment (PPE).
   b. Identify and collect cleaning materials and equipment.
   c. Clean materials and equipment as needed.
   d. Safely store the cleaning materials and equipment.
   - Remind trainees to read instructions to arrange disinfectants and detergents according to their toxicity levels.
   - For dangerous cleaning products, trainees should handle them safely and keep all containers tightly closed.

4. Facilitate a discussion between the trainees and the farmer about taking stock and how often it is necessary to take stock and restock materials.

5. Encourage trainees to ask the farmer any remaining questions they have about storing materials and equipment.

Points to Remember

- Cleaning materials and equipment should be stored in an area that is clean and free of debris.
- Any substance that cannot be readily identified must be treated as a hazardous chemical.
- Always monitor the storage and cleaning of materials and equipment by taking stock regularly.
- Check if there are instructions on storage procedures, such as temperature or exposure to sunlight, especially for toxic disinfectants.

Formative Assessment

1. List three reasons to keep cleaning material and equipment clean and in a separate room.

   Possible Answers:

   1. Spilled or open chemicals can poison or harm farm workers as well as animals.
   2. Materials and equipment that are left disorderly in the workspace, particularly on the floor, may cause workers to trip or fall and injure themselves.
   3. Equipment must be kept clean or it gathers dirt and/or bacteria that becomes a threat to workers and animals.

2. How and why should someone store potentially hazardous products, such as cleaning and sanitizing products?

   Answer:

   Chemicals must be stored in a place where there is no public access and where tipping or breaking can't happen, such as secure shelves inside a locked cupboard. The cupboard should be labelled with the type of materials it contains. The materials should be arranged in order of toxicity levels. (See: **Key Facts**)

   These products should be stored in this way in order to protect workers and animals from exposure to toxic substances that could result in health problems.

3. Why is stocktaking necessary? What can it prevent?

   Answer:

   Stocktaking is necessary to maintain an adequate supply of materials and predict how much material should be purchased regularly. It can prevent an unexpected loss or absence of needed material, especially when local stores or providers are closed or have not restocked themselves.

Further Information for the Trainer

1. Storing cleaning chemicals at your workplace: www.blog.storemasta.com.au/storing-cleaning-chemicals-workplace
2. WDA, CBT Training Manual: AGRAH305: Prevention of Animal Diseases, Kigali 2015

Learning Outcome 1.4: Monitor physical parameters

Objectives: By the end of the learning outcome, trainees will be able to:

a. Describe physical, biological, and chemical parameters for animal health maintenance

b. Monitor physical, biological, and chemical parameters according to farming standards

c. Describe regulation procedures for physical parameters

Time Required: 3 hours

Learning Methodology:
Small and large group work, brainstorming, field visit, simulation, interview farmer/expert

Materials Needed:

- **Standard training materials** – flip chart, markers, tape, A4 paper
- **Measuring tools –** thermometer, hygrometer

Preparation:

- ❑ Organise a visit to a farm to observe the parameters
- ❑ Gather measuring tools (listed above)

Cross Cutting Issues:

- ✔ **Environment and sustainability:** Environmental conditions and factors are considered while monitoring the physical, biological, and chemical parameters.
- ✔ **Standardisation culture**: Use measuring devices with standardized units to measure physical parameters.

Prerequisites:

- ❑ None

Key Competencies:

Knowledge	Skills	Attitudes
1. Describe physical, biological, and chemical parameters for animal health maintenance.	**1.** Identify and adjust physical, biological, and chemical parameters in the workplace.	**1.** Detail-oriented.
2. Explain the importance of monitoring physical, biological, and chemical parameters for animal health.	**2.** Monitor physical, biological, and chemical parameters according to farming standards.	**2.** Forward-thinking; diligent.
3. Describe regulation procedures for physical parameters.	**3.** Regulate physical parameters appropriately in the workplace.	**3.** Methodical.

Steps

Getting Started: What do we know and where are we going?

1. Tell trainees to look at **Topic 1.4 Task 1** in their manuals discuss the following questions with a partner:
   a. What external or environmental factors are important to maintain good animal health?
   b. What actions are done in an animal shelter in both the morning and the evening to help the animals maintain good health?

2. Ask trainees to share their responses with the rest of the class.

Problem Solving Activity

1. Now, turn trainees' attention to **Topic 1.4 Task 2** in their manuals and tell them to imagine that at a local farm, some animals have been suffocated due to incorrect shelter construction.

2. Tell them to think about the following question individually:
   a. What could be the causes of this accident?

b. Consider the different parameters which could cause this problem, such as ventilation, humidity, temperature, and lighting.

3. Next, tell trainees to compare their ideas with a partner.

4. Now, with their partner, trainees should discuss:
   a. How can someone measure these physical parameters?
   b. Propose preventative measures and solutions to avoid this situation in the future.

5. Ask trainees to share their ideas with the rest of the class. Allow for open discussion and encourage creativity and critical thinking. Then, correct and fill in missing information by reading through **1.6 Key Facts** as a class.

Guided Practice Activity

1. Trainees must match the physical parameter to its definition.
   Answers:
   Temperature = The intensity of heat in a room or area, measured in degrees Celsius.
   Ventilation = The circulation of fresh air in a room or building.
   Lighting = The equipment in a room for producing light.
   Humidity = The amount of water vapour or moisture in the air, measured in percentage.

2. Trainees should imagine that they are on an animal farm and one of the animals appears to be weak, uncomfortable, and generally suffering. Although its health has been good recently, it has not been productive. How can you monitor the physical parameters to check that these factors are not causing the animal's discomfort and lack of productivity? What questions should be asked?

   Possible Answers (Refer to 1.6 Key Facts):
   - Someone can monitor the physical parameters of the animal shelter.
   - Ventilation: Is there fresh air coming into the animal shelter? Specifically, where this animal sleeps and spends most of its time. Are there physical barriers constricting ventilation?
   - Lighting: Is there sufficient natural light?
   - Humidity: Is the air too moist? Is more ventilation needed?
   - Temperature: Is the animal shelter too hot or too cold? Is there a window that is strongly reflecting light such that it should be covered during part of the day?

3. Now, tell trainees that after monitoring the physical parameters, you decide they are not causing the problem. Now, you think the problem could be caused by biological and/or chemical parameters.
   a. Tell trainees to brainstorm some potential biological parameters—factors related to dangerous micro-organisms—and chemical parameters that could be affecting the animal's health using prior science knowledge.
   Answers: Hopefully, trainees will mention pests, predators, parasites, and/or air pollution in their responses. If not, you should suggest these other options at the end of the discussion.

4. Finally, refer trainees to **1.7 Key Facts,** which describes the different biological and chemical parameters, as well as preventative measures called biosecurity. Read these together. Facilitate a discussion on the differences between microbes, parasites, insects, and predators, and how to identify them.

Application Activity

1. Organise a visit to a local farm with animals and separate the trainees into four groups, one for each physical parameter.

2. Assign each group a physical parameter: ventilation, humidity, temperature, or lighting.

3. Encourage a representative from each group to ask the farmer or another worker what the farm standards are for the physical parameters. Trainees should note the responses in the table found in **Topic 1.4 Task 4** in their manuals.

4. Tell each group to identify the status of their assigned physical parameter in the farm stable. Determine if the parameter meets the farm standards. Trainees should note their findings in the table (sample below).

Physical Parameter	Farm Standards	Meets Standards? Yes or No
Temperature		
Lighting		
Ventilation		
Humidity		

5. Rotate the groups to a different parameter. Repeat Step 4.

6. Rotate the groups two more times until each group has assessed all four physical parameters on the farm.

7. Finally, the full group should check if a biosecurity system has been established to address biological and chemical parameters. They should note their answers in the table (sample below) and refer to **1.7 Key Facts** for guidance.

Biological Parameter	Biosecurity System
Microbes	
Insects	
Predators	
Parasites	
Air Pollution	

8. Groups should present and compare their findings with the rest of the class.

Points to Remember

- Good housing and layout of the farm can reduce animal stress.
- Check if lighting and ventilation are sufficient to reduce the air pollution.
- Check the biosecurity system, including doors and windows, ideally preventing the entrance of insects and predators.
- Handling animals during periods of high temperatures and humidity should be avoided, and good quality, cool drinking water should always be provided.

Formative Assessment

1. What are the different physical parameters used to control an animal shelter and how do we monitor them?

   Answers

   - ❑ Ventilation: Check windows and doors to see if they are allowing air to pass through the animal shelter. Use a fan, if possible.
   - ❑ Temperature: Measure using a thermometer or your sensory. Shield windows during the day, if needed.
   - ❑ Humidity: Measure using hygrometer. Can be improved by increasing ventilation.

- ❑ Lighting: Check any lighting equipment as well as natural light from windows and doorways. Adjust or replace lighting equipment so that it is comfortable for the animals.

2. Explain the importance of controlling chemical and biological parameters in an animal shelter. How can we avoid them?

Answer: Harmful chemical and biological parameters can irritate animals and lead to poor animal health. Poor or weakened animal health reduces animal productivity. Moreover, eliminating some harmful factors, such as insects and parasites, can be a time-consuming and expensive task, which reduces farm profits.

Biosecurity measures should be put in place to prevent and control these destructive factors. Biosecurity measures include keeping all tools and equipment clean and disinfected, using separate equipment for healthy and sick animals, and reporting signs of disease immediately (see **Key Facts** for more details).

Self-Reflection

1. Ask trainees to re-take the self-assessment from the beginning of the unit. They should then fill in the table in the Trainee's Manual to identify their areas of strength, areas for improvement, and actions to take to improve.

2. Discuss trainees' results with them. Identify any areas that are giving many trainees difficulty and plan to give additional support as needed. For example, before you begin the next learning outcome, use class time to go through commonly identified difficult concepts.

Note: The self-reflection will be done at the end of a unit, not at the end of every topic. This provides trainees the opportunity to identify what they understand and what they need to work on. It should take only a few minutes for them to complete.

3. Ask trainees to think about what they learned from the beginning of this unit and then fill in the self-reflection chart in their manual. Highlight the areas of strength, the areas for improvement, and the actions to take to improve.

4. Collect all papers and analyse the feedback. Share the overall results with trainees and clarify information in the most commonly stated "Areas for improvement."

ⓘ Further Information for the Trainer

1. WDA, CBT Training Manual: AGRAH305: Prevention of Animal Diseases, Kigali 2015
2. Climate in poultry houses: http://www.poultryhub.org/production/husbandry-management/housing-environment/climate-in-poultry-houses/
3. Effects of Lighting on Animal Farms: https://alliedscientificpro.com/blog/welcome-to-our-blog-1/post/effects-of-lighting-on-animal-farms-30
4. Barn Temperature and Humidity Monitoring in Dairy Farming: https://www.filesthrutheair.com/article/barn-temperature-and-humidity-monitoring-in-dairy-farming
5. Beneficial Microbes for Agriculture: https://www.noble.org/news/publications/ag-news-and-views/2008/october/beneficial-microbes-for-agriculture/
6. Animal Health Welfare and Biosecurity: https://www.mla.com.au/research-and-development/animal-health-welfare-and-biosecurity/parasites/identification/
7. Livestock Veterinary Entomology: https://livestockvetento.tamu.edu/insectspests/
8. Impact of Insects: https://projects.ncsu.edu/cals/course/ent425/text01/impact1.html
9. Effects of air pollution on the environment: https://www.airgo2.com/air-pollution/effects/environment-animals-plants-ecosystems/
10. What is Biosecurity?: https://www.news-medical.net/health/What-is-Biosecurity.aspx
11. Biosecurity Measures: https://www2.illinois.gov/sites/agr/Animals/AnimalHealth/Pages/Biosecurity-Measures.aspx

Learning Unit 2: Prevent ruminant diseases

Figure 1: Diseases Prevention - Vaccination

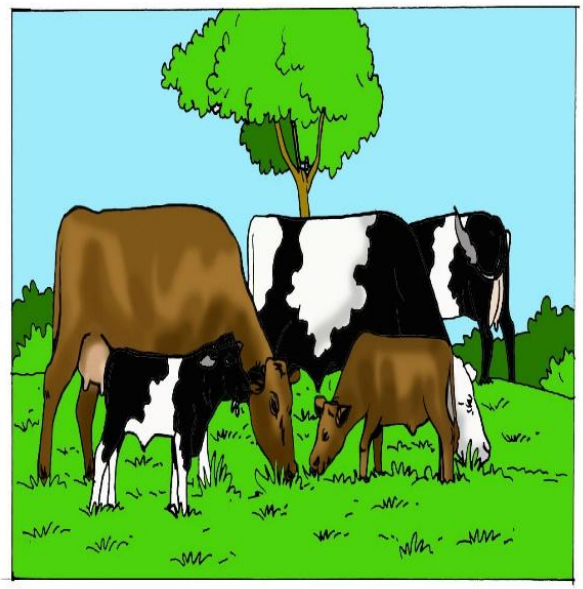


Figure 2: Healthy cows well-protected against diseases

Figure 3: Poor hygiene and animal health conditions

Figure 4: Foot and Mouth Disease (FMD)

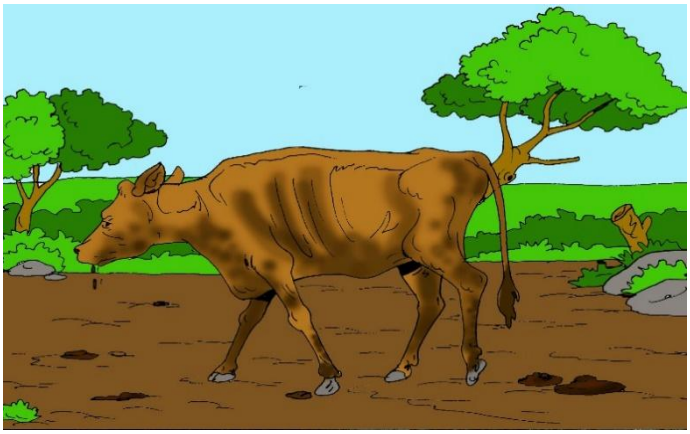


Figure 5: Nutritional and metabolic disease

Figure 6: Spraying acaricides

Figure 7: Healthy animal

Figure 8: Hemorrhagic mastitis in cow

Learning Outcomes

By the end of the Learning Unit, trainees will be able to:

2.1 Assist in identification of diseases

2.2 Spray acaricides

2.3 Deworm cattle

Learning Unit 2 Self-Assessment

1. Ask trainees to look at the illustrations above (in their Trainee Manuals) and discuss what they see. Based on the illustrations, what topics do they think this unit will include? After some brainstorming, share the main topics.

2. Explain that this unit is going to focus on the importance of preventing ruminant diseases from affecting animal health. Trainees will learn how to identify different types of ruminant diseases and how to prevent and treat them, specifically by spraying acaricides and deworming cattle.

3. Ask trainees to fill out the self-assessment located at the beginning of the unit in their Trainee Manuals. Explain that the purpose of the self-assessment is to become familiar with the topics in the unit and for them to see what they know or do not know. At the end of the unit, they will do a self-reflection, which includes re-taking the self-assessment and identifying their strengths, areas that need improvement, and actions to take. The self-assessment is not a test!

Learning Outcome 2.1: Assist in identification of diseases

Objectives: By the end of the learning outcome, trainees will be able to:

- **a.** Describe different types of ruminant diseases
- **b.** Differentiate the signs and causes of ruminant diseases
- **c.** Follow preventive procedures to maintain animal health

Time Required: 8 hours

Learning Methodology: Individual and group work, simulation, brainstorming

Materials Needed:

- **Standard training materials -** flip chart, markers, tape, A4 paper
- **Sample photos of ruminant diseases** – laptop, projector, internet, visual images of animals with the four different types of ruminant diseases

Preparation:

- ❑ Preparation of the pictures of animals with the four different types of ruminant diseases

Cross Cutting Issues:

- ✔ **Environment and sustainability**: Promoting and preserving animal health by maintaining a safe and clean environment and applying preventative measures
- ✔ **Standardisation culture:** Using scientific signs to identify and diagnose animal diseases and their causes

Prerequisites:

- ❑ Basic Sciences

Key Competencies:

Knowledge	Skills	Attitudes
1. Describe causes of ruminant diseases.	**1.** Identify ruminant diseases.	**1.** Detail-oriented
2. Describe signs and symptoms of ruminant diseases.	**2.** Differentiate signs and symptoms of ruminant diseases.	**2.** Safety-oriented
3. Outline preventive procedures of ruminant diseases.	**3.** Apply preventive procedures to avoid ruminant diseases.	**3.** Responsibility and teamwork

Steps:

Getting Started: What do we know and where are we going?

1. Direct trainees to the illustrations at the beginning of the Unit. Ask the trainees to describe and identify what they see in the illustrations.

2. Tell trainees to discuss the following questions found in **Topic 2.1 Task 1** with a partner:

a. Which animals in the illustrations look healthy and which look ill?
Answer: The animals in figures 4, 5, and 8 look ill. Figures 2 and 7 depict healthy animals.

b. What are the farm workers wearing? Why?
Answer: Personal Protective Equipment (PPE). Specifically, gloves, hats, closed-toed shoes/boots, and a mouth covering.

c. What are ruminant animals?
Answer: Ruminants are animals that chew cud (partly digested food) and whose stomachs have four parts (rather than just one). Ruminants include cows, goats, and sheep.

d. What do you already know about ruminant diseases?
Answers may vary. Encourage creativity and critical thinking in responses.

3. Ask a few volunteers to share responses and discuss as a class.

Problem Solving Activity

1. Separate trainees into small groups. Tell them to discuss the following question:
   a. What are common signs that an animal, specifically a ruminant, is sick?

2. Now, tell them to look at the illustrations from **Task 1** again and answer the following questions:
   a. How do you know which animals are ill? Consider the animals' skin, fur, mouths, and stomachs.
   b. What are the workers doing to the animals? Do you think they are preventing illness or treating ill animals?

3. Inform the trainees that there are four categories of ruminant diseases: infectious, parasitic, nutritional and metabolic, and traumatic. Explain that infectious diseases involve harmful bacteria or viruses; parasitic diseases involve parasites, such as mites; nutritional and metabolic diseases involve insufficient nutrients; and traumatic diseases involve stress-related injuries.
   a. Which of these diseases do you think apply to the photos above?

4. Ask volunteers to share their observations and predictions with the rest of the group. Encourage critical thinking in responses.

Guided Practice Activity

1. Direct the trainees back to the illustrations from **Task 1** once more. Tell them to use **2.1 Key Facts** to determine the following for **Topic 2.1 Task 3**:
   a. Which type of ruminant disease (infectious, parasitic, nutritional and metabolic, or traumatic) are the animals in Figures 4, 5, and 8 suffering from?
   b. Determine which illustrations show preventative measures.
   c. Have trainees compare their answers with a partner.

   Answers to A: Figure 4 depicts an infectious disease, specifically a foot and mouth disease; Figure 5 depicts a nutritional and metabolic disease; Figure 8 depicts an infectious disease, specifically Haemorrhagic mastitis.

   Answers to B: Figures 1 and 6 depict preventative measures. Figure 1 shows vaccination. Figure 6 shows spraying disinfectant, specifically acaricides. Inform trainees that they will learn more about acaricides in the next topic, but that they are generally chemical substances used to kill parasites.

2. Now, tell trainees to determine which type of ruminant disease (infectious, parasitic, nutritional and metabolic, or traumatic) might be present in or associated with the photos below. They should compare their answers with a partner.

Answers:

Parasitic diseases

 [7]

Nutritional and metabolic diseases (Milk Fever)

 [8]

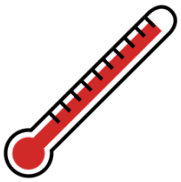
[7] Insight Pest Solutions. (2017, April 5). *Insight pest* [Illustration]. Flickr. https://www.flickr.com/photos/153628769@N03/33726575721 License: https://creativecommons.org/licenses/by-sa/2.0/legalcode; Credit to: https://insightpest.com/

[8] Philadelphia and London, W. B. Saunders Company. (1920). *Fig. 87 - Milk fever* [Photograph]. Flickr. https://www.flickr.com/photos/internetarchivebookimages/20547605819

Traumatic diseases (Traumatic reticuloperitonitis—caused by ingesting metal objects. Refer trainees to 2.1 Key Facts)

 [9]

Infectious diseases



[10]

3. Finally, provide your own images of animals affected by ruminant diseases. Trainees should determine if they indicate signs of infectious, parasitic, nutritional and metabolic, or traumatic diseases.

4. Verify trainees' answers to all the activities. Provide clarification as needed.

Application Activity

1. Tell trainees to read the scenario found in **Topic 2.1 Task 4** and complete the tasks that follow in small groups:

One farmer located in the surrounding area of the school has introduced new goats in his farm without first putting them into quarantine or vaccinating them.

[9] Tarabara, S. (2017, October 27). *Barbed wire after rain* [Photograph]. Wikimedia Commons. https://commons.wikimedia.org/wiki/File:Barbed_wire_after_rain.jpg License: https://creativecommons.org/licenses/by-sa/4.0/legalcode

[10] Ferreira, W. (2020, June 20). *Thermometer* [Illustration]. Pixabay. https://pixabay.com/illustrations/thermometer-temperature-fever-icon-5420066/

After a few days, 30% of the existing animals become sick, with very high temperatures, high mortality, and lesions on the oral cavity. Their productivity has sharply dropped. The farmer calls for assistance.

Tell the trainees that they must assist the farmer and work closely with the them to:

a. Identify the sick animals and signs of disease
b. Identify the causes of the disease
c. Differentiate it from other diseases
d. Identify the preventive procedures to be taken

2. Trainees must write a report addressing each of the points above. They should elaborate and submit the report to you for review.
   a. Remind them to include preparation procedures.
   b. Review the report and return it in the next session with feedback.

Possible Answers:

a. The 30% of animals mentioned are definitely sick. Additionally, other animals may be sick as well, but the signs have not yet become visible. The 30% should be separated immediately and the other 70% should also be checked for less obvious signs of disease. The signs of disease have been given: Very high temperatures, high mortality, discomfort, and lesions on the oral cavity.

b. The sickness was most likely caused by a harmful bacteria or virus.

c. While physical discomfort and decreased productivity are signs of multiple types of diseases, a high fever ("very high temperatures") and physical changes ("lesions in the oral cavity") indicate that this is an infectious disease.

d. Going forward, the farmer should keep the sick animals separated and vaccinate the remaining animals to prevent future instances of this disease. The farmer should regularly clean and disinfect the animal stable and check for signs of infectious diseases. The farmer should also be sure to properly dispose of dead animal carcasses.

*Note: The trainees should also mention in their reports that the farm workers must wear PPE before handling animals (preparation procedures).

Points to Remember

- Know the specific signs for each group of ruminant diseases.
- Avoid spreading diseases during diagnosis by wearing PPE and using disinfectant.
- Suspected animals shall be isolated immediately.
- Do not touch animals presenting signs of highly contagious diseases like Anthrax.
- It is prohibited to eat meat from sick animal.

Formative Assessment

1. Answer the following questions:

a. What are two examples of ruminant diseases caused by viruses?
Possible Answers: Lumpy skin disease, foot and mouth disease (or hoof and mouth disease), small ruminant pest.

b. What are two examples of ruminant diseases caused by bacteria?

Possible Answers: Anthrax (charbon bactéridien), contagious bovine pleuropneumonia (lung plague), mastitis, brucellosis.

c. What are the signs of parasitic diseases?
Possible Answers: Loss of appetite, emaciation, weight loss and/or blood loss (anaemia); rough fur coat, lesions on the head, neck, and shoulders and intense itching; diarrhoea, sometimes with blood clots; decreased productivity.

d. What are the signs of traumatic diseases?
Possible Answers: Arched back; reluctance to move and a slow, careful gait; groaning when lying down and getting up; sharp fall in milk production.

2. Circle the right answer:

a. Brucellosis is a cattle parasitic disease.
b. Brucellosis is a metabolic and nutritional disease.
c. Brucellosis is a traumatic disease.
d. **Brucellosis is an infectious disease.**

3. **Complete the following sentences:**
   a. Rough hair coat and diarrhoea are the main signs of **parasitic** diseases.

   b. Vaccination is one of the best measures to prevent **infectious** diseases.

ⓘ Further Information for the Trainer

1. WDA, CBT Training Manual: AGRAH305: PREVENTION OF ANIMAL DISEASES, Kigali, January 2015,
2. WDA, CBT Training Manual: AGRAH409: COMMON INFECTIOUS DISEASES, Kigali, January 2015
3. Common animal diseases and their management: http://vikaspedia.in/agriculture/livestock/general-management-practices-of-livestock/common-animal-diseases-and-their-prevention-and-treatments
4. Diseases of Small Ruminants in Sub-Saharan Africa: A Handbook http://www.fao.org/docs/eims/upload/agrotech/2014/diseases-of-small-ruminants.pdf
5. Traumatic Reticuloperitonitis: https://www.msdvetmanual.com/digestive-system/diseases-of-the-ruminant-forestomach/traumatic-reticuloperitonitis
6. Causes of Disease in Animals: https://www.nda.agric.za/docs/Infopaks/diseases.ht

Learning Outcome 2.2: Spray acaricides

Objectives: By the end of the learning outcome, trainees will be able to:

a. Identify and select acaricides

b. Describe techniques of preparing and spraying acaricides and calculate the quantities needed for dilution

c. Describe acaricide management and waste disposal procedure

Time Required: 8 hours

Learning Methodology: Brainstorming, field visit, demonstration, small group discussions, individual work

Materials Needed:

- **Standard training materials** – flip chart, markers, tape, A4 paper
- **Measurement tools** – calculators, graduated cylinders
- **Demonstration/practical activity items** (if farmer doesn't have) – acaricides, spraying tool, PPE, water

Preparation:

- ❑ Organise a farm visit to practice spraying acaricides
- ❑ Ask if farmer has the necessary tools for a demonstration. If not, prepare to bring your own PPE, acaricides, and spraying tools

Cross Cutting Issues:

- ✔ **Environment and sustainability:** Recognize the environmental impact of using acaricides, especially for waste disposal.
- ✔ **Standardisation culture:** Use standard measurement tool—graduated cylinder—to determine amount of solution quantities to mix in dilution process.

Prerequisites:

- Basic math
- Learning Outcome 2.1: Assist in identification of diseases

Key Competencies:

Knowledge	Skills	Attitudes
1. Identify the different types of acaricides.	**1.** Determine when and which acaricides to use.	**1.** Detail-oriented
2. Describe techniques of preparing and spraying acaricides.	**2.** Apply appropriate dilution and spraying techniques to acaricide use.	**2.** Methodical
3. Describe acaricide management and disposal procedures.	**3.** Perform acaricide waste disposal and storage tasks safely.	**3.** Forward-thinking

Steps:

Getting Started: What do we know and where are we going?

1. Start by telling trainees to turn to **Topic 2.2 Task 1** and brainstorm ideas on the following questions in small groups:
   a. What do you know about acaricides?
   b. How do farmers in your area apply acaricides?
   c. Which kind of acaricides do they use?
   d. How do you protect yourselves during acaricide application?

2. Lead a discussion with the entire class:
   a. What is the relationship between acaricides and ruminant diseases?
   Answer: Acaricides are pesticides/disinfectants used to kill ticks and mites. Ticks and mites can cause parasitic diseases in animals resulting in emaciation, lesions, diarrhoea, and decreased productivity.

3. Ask volunteers to share their responses with the rest of the class.

Problem Solving Activity

1. Divide trainees into small groups and tell them to discuss the following questions found in **Topic 2.2 Task 2**:
   a. When should acaricides be applied?
   b. What are the dangers of using acaricides? What are the benefits?

c. What should we do if the concentration of a liquid acaricide is too strong?

d. What might happen if acaricide waste is not properly disposed of after use?

2. A representative from each group should share they key points of their discussion with the rest of the class. Supplement their ideas by reading **2.2 Key Facts** together. Compare what they shared with the information given in the **Key Facts**.

Note that the dilution formula is slightly different here because it is used to change the concentration of the solution, rather than applying the same concentration to a larger quantity of water (which was the case with the formula in **1.3 Key Facts**). Assure them the concepts are the same, and they will practice both in the Guided Practice Activity (**Topic 2.1 Task 3**).

Guided Practice Activity

1. Tell trainees to turn to **Topic 2.2 Task 3** and imagine that they have been tasked with spraying acaricides to prevent ticks from attaching to and transmitting diseases to the cattle on a farm. What steps do they take to prepare the acaricidal solution for application? They should write these steps.

2. Verify their responses.

Answer:

- First, put on PPE—gloves, protective eyewear, close-toed shoes—to protect yourself from the hazardous materials.
- Remove the solution from the storage space.
- Read the manufacturer's instructions to see if the solution should be diluted and how to apply it properly.
- Dilute the solution, if needed.

3. For this application, you will need to dilute the acaricidal solution with water. The manufacturer's label says that 40 mL of solution should be used for every 500 mL of water. You need 4000 mL (or 4 litres) of water to treat the cattle. How much solution should you use? Recall and use the formula from **1.3 Key Facts**:

$$\frac{\textbf{Given solution}}{\textbf{Given water}} = \frac{\textbf{Solution needed}}{\textbf{Water needed}}$$

Answer:
Given solution = 40 mL
Given water = 500 mL
Solution needed = unknown = x
Water needed = 4000 mL

$$\frac{40}{500} = \frac{x}{4000}$$

40 * 4000 = 500 * x
160000 = 500x
x = 160000/500
x = 320 mL of solution

4. For the calf, you want to lower the concentration of the acaricidal solution. The manufacturer's label says to create 50 mL of solution at 10% concentration, using Deltamethrin 12.5% concentrate. How much Deltamethrin is required? Use the formula: $\mathbf{C_1V_1 = C_2V_2}$ from **2.2 Key Facts**.

Answer:
$\mathbf{C_1V_1 = C_2V_2}$

$\mathbf{C_1}$ = Concentration of stock solution = 12.5% = 0.125
$\mathbf{C_2}$ = Final concentration of stock solution = 10% = 0.10
$\mathbf{V_2}$ = Final volume of new solution = 50 mL
$\mathbf{V_1}$ = Volume of stock solution needed to make the new solution = **?**

(0.125) $\mathbf{V_1}$ = (0.10) (50)
V_1 = (0.10) (50) / (0.125) = 5 / 0.125 = **40 mL of stock solution**

5. After spraying, there isn't any acaricide solution remaining. What should you do?

Answer: Properly dispose of the empty containers in a separate trash bin where it will not contaminate other materials and/or potentially spread. Pay close attention and read the manufacturer's label for specific disposal instructions.

6. Ask trainees to share their responses to 3, 4, and 5 with the class. Verify their answers and refer them to **2.2 Key Facts** as needed.

Application Activity

1. In advance of class, organise a visit to a ruminant farm with trainees. Discuss with the farmer that the trainees are learning about acaricides and how to apply them. Ask if the farmer is willing to demonstrate how to use the acaricides and/or willing to allow trainees to use them on the animals. Trainees should at least have the opportunity to observe the farmer apply acaricides—if the original farmer is not willing or able to do this, try contacting a different farmer.

2. Begin by asking trainees to turn to **Topic 2.2 Task 4** in their manuals and identify the available acaricides on the farm:
   a. Are they powder or liquid?
   b. Ask for volunteers to read the label(s). Do the solutions need to be diluted before use?

3. Instruct trainees to observe the farmer while he or she demonstrates how to properly apply acaricides.

4. If the farmer gives permission, allow the trainees to take turns spraying the acaricides in small groups.
   a. Make sure trainees put on Protective Personal Equipment (PPE), including gloves, protective eyewear (glasses or goggles), and close-toed shoes.
   b. Ask the farmer or another worker for help as needed.

5. Afterwards, instruct trainees to safely dispose of the waste, if needed.

6. Trainees should ask the farmer any remaining questions they have about applying acaricides to ruminants.

Points to Remember

- Acaricides can pose hazards to humans, animals, and the environment.
- Always wear PPE (gloves, eyewear, closed-toed shoes) before handling chemical products.
- Before using acaricides, read the label and follow manufacturer's instructions.
- After use, be sure to safely dispose of empty containers.

Formative Assessment

1. Write the answers to the following questions:
   a. Why should you wear personal Protective Equipment (PPE) while handling acaricides?
      Possible Answers: Acaricides include toxins that could have harmful effects on humans and animals if not used properly. PPE prevents and protects from exposure to acaricides.

   b. What PPE should you use?
      Answers: Gloves, goggles or other protective eye wear, close-toed shoes so that the feet are not exposed.

   c. List three acaricides used in Rwanda.
      Possible Answers:
      1. Amitraz
      2. Deltamethrin
      3. Carbaryl
      4. Cypermethrin

   d. What is the most popular application method to control ticks?
      Answer: Spraying

2. Complete the following sentences:
   - Acaricidal products are toxic and could harm the **environment** if not used properly.
   - You should use a **graduated cylinder** to measure dilution quantities.
   - Ticks cause injuries to animals which leads to lower **productivity** and economic **losses**.

Further Information for the Trainer

1. RAB: Annual Report, 2013
2. UWUMUKIZA Bernardine: Thesis on "Prevalence of three frequent tick bone diseases: Babesiosis, Theileriosis and Anapasmosis in Huye District," UR Umutara Polytechnics, 2011
3. WDA, CBT Training Manual: AGRAH305: PREVENTION OF ANIMAL DISEASES, Kigali, January 2015
4. Dilutions: Explanations and Examples of Common Methods: http://quansysbio.com/support/tech-tips/dilutions/

Learning Outcome 2.3: Deworm ruminants

Objectives: By the end of the learning outcome, trainees will be able to:

a. Identify wormicides and their purpose

b. Describe techniques and procedures for deworming

c. Describe wormicide waste disposal procedures

Time Required: 9 hours

Learning Methodology: Brainstorming, group work, interview, field visit, demonstration

Materials Needed:

- **Standard training materials** – flip chart, markers, tape, A4 paper
- **Sample wormicides** – tablets, liquid solution, powder
- **Measurement tools** - graduated cylinder, calculator, syringe
- **Personal protective equipment** – eyewear, gloves

Preparation:

- ❑ Prepare the needed materials, including sample wormicides
- ❑ Organise a field visit to a local farm; Ask if farmer or other worker is willing to be interviewed and perform a demonstration

Cross Cutting Issues:

- ✔ **Environment and sustainability**: Emphasize potential negative environmental impacts if chemicals are not disposed of properly
- ✔ **Standardisation culture**: Use of measuring tools and formulas to calculate and apply appropriate amounts of wormicide

Prerequisites:

- Basic Chemistry (Solutions)
- Learning Outcome 2.1: Assist in identification of diseases
- Learning Outcome 2.2: Spray acaricides

Key Competencies:

Knowledge	Skills	Attitudes
1. Identify wormicides and their purpose.	**1.** Select wormicides for an appropriate purpose.	**1.** Decisive
2. Describe procedures for administrating wormicide.	**2.** Select the appropriate technique and dosage for administering wormicide.	**2.** Methodical
3. Describe wormicide waste disposal procedures and their significance.	**3.** Dispose wormicide waste safely.	**3.** Risk-aware

Steps:

Getting Started: What do we know and where are we going?

1. Divide trainees into small groups and tell them turn to **Topic 2.3 Task 1** in their manuals. They should brainstorm responses to the following questions:
   - **a.** What do you know about deworming?
   - **b.** Have you ever seen farmers in your area deworm their ruminant animals?
   - **c.** What does this process look like?
   - **d.** What tools, equipment, and materials do they use?
   - **e.** Why do you think farmers deworm their animals? Consider the effects of parasitic diseases from **Topic 2.1**.

2. Ask volunteers from each group to share their responses with the rest of the class.

3. Lead a class discussion on the responses shared.

Problem Solving Activity

1. Tell trainees to move on to **Topic 2.3 Task 2** and individually reflect on the following questions:
   - **a.** Think back to acaricides from **Topic 2.2**. What were the different types of acaricides?
     Answer: liquid and powder

b. Do you think there could be different types of wormicides—drugs used to deworm ruminants—as well? What different types or forms of wormicides could there be?
Possible Answers: Answers may vary. Allow trainees to brainstorm their own ideas. They will learn the correct answers in **2.3 Key Facts**.

c. If you are given wormicides in the form of liquid, tablets, and powder, how might you use each of these to the animal? What are the actions you would take?
Possible Answers: Pour-on, drinking or eating orally, injection, placed in feed

2. Ask trainees to share their ideas in small groups.

3. Now, with their groups, tell trainees to consider the following:
a. What might happen if an animal is not given the proper dosage, or amount, of a wormicide? Will the wormicide still work?
b. What could happen if the wormicides are not stored or disposed of properly?
Answers will vary. Encourage critical and forward thinking.

4. Present your group's predictions to the rest of the class.

5. Assign each group a section of **2.3 Key Facts** to read, discuss, and present to the rest of the class. After each presentation, have trainees identify if their predictions for questions 1 and 3 were correct. Facilitate a discussion or why or why not.

Guided Practice Activity

1. Tell trainees to turn to **Topic 2.3 Task 3** and imagine that they have been tasked with deworming the cattle at your farm. Due to supply constraints, they will use wormicide tablets for half of the cows and liquid wormicide for the other half. They should work individually and refer to **2.3 Key Facts** to guide their answers.

a. Tablet Dosage: Each cow weighs 600 kg. The manufacturer's instructions say that a cow should receive 1 tablet for every 150 kg of weight. How many tablets should you give to one cow? Use the formula from **2.3 Key Facts**.

Answer:
Use tablet dosage formula.
Weight given / Units given = Actual weight / X number of units needed

150 kg / 1 tablet = 600 kg / x tablets
150 / 1 = 600 / x
150 = 600 / x
x = 600/150
x = 4 tablets

b. Liquid Dosage: Each cow requires 50 mg of Anthelmintic drugs. You have a wormicide solution with 25 mg of anthelmintic drugs per 5 mL. How many mL of solution do you need for each cow?

50 mg / 25 mg * 5 mL
Answer:

Use liquid dosage formula.
(Desired dose / Strength on hand) * Quantity of solution = X unknown quantity

(50 mg / 25 mg) * 5 mL = x
(50 / 25) * 5 = x
2 * 5 = x
10 mL = x

2. How will you apply each of these types of wormicide?

a. Tablets:
Answer: Orally, making sure it is swallowed by the animal

b. Liquid solution:
Answer: Orally by drenching with a syringe, or poured on directly to animal's skin, or injected under the skin. Must read manufacturer's instructions.

3. Now that you have applied the wormicides appropriately, you must store the tablets and dispose of the liquid container. How should you do this?

a. Tablets:
Answer: Store securely in a separate room, away from direct sunlight, and follow the manufacturer's instructions.

b. Liquid solution:

Answer: Read manufacturer's instructions. Dispose in separate trash bin and away from where animals or humans may come into contact.

4. Tell trainees to compare their answers with a partner. Then review the correct answers as a class and correct any errors. Refer to **2.3 Key Facts** for evidence throughout.

5. Ask the class:
   a. Do you think deworming procedures are different for cattle than for sheep and goats?
   b. Why or why not?

6. With the class, read and review the **2.4 Key Facts** on the differences in deworming between cattle and sheep/goats.

Application Activity

Organise a visit to a farm with ruminants. Confirm that the farmer is willing to answer questions about the deworming process on the farm. Ask if the farmer is willing to demonstrate how to apply wormicide to an animal.

1. Begin the session by telling trainees that they are going to visit a farm and interview a farmer. After turning to **Topic 2.3 Task 4** in their manuals, they must individually prepare 5 questions about the deworming process to ask the farmer.

2. Then, instruct trainees to share their questions in small groups. With their group, they must select the 5 most important questions to ask the farmer about deworming ruminant animals. They should write down the selected questions.

3. Trainer should review questions before farm visit.

4. Now, visit the farm with the class. Each group should interview the farmer using their 5 questions. Trainees should note the farmer's responses to each question. Moderate the interview so that trainees do not ask a question that has already been asked.

5. If possible, trainees observe while the farmer applies wormicide to an animal. They should note their observations.

6. After the visit, facilitate a class discussion on the following questions:
   a. What did you observe?
   b. What did you learn that was not covered in the **Key Facts**?

c. What information do you still need?
Try to answer any remaining questions the trainees have. For information you do not know for certain, plan to consult a colleague or a farmer for accurate answers.

Points to Remember

- Always wear PPE before and while handling chemical products.
- Always read the wormicide manufacturer's instructions to determine the dosage and application method.
- Under-dosing can lead to poor efficacy and it can also reduce the duration of protection.
- Over-dosing can lead to a risk of toxicity, although most wormicides have a wide safety margin.

Formative Assessment

1. Ask trainees to answer to the following questions:
   a. What are three factors to be considered when selecting wormicide?

   Possible Answers: Animal being treated (calf vs. cow, beef vs. dairy); product efficacy; ease of application; cost effectiveness; slaughter/milk withdrawal time; personal safety

   b. What type of drug is used in wormicides?
   Answer: Anthelmintic

   c. Why is it necessary to avoid under-dosing during deworming?
   Answer: Under-dosing may lead to animals becoming resistant to the drug, in which case the drug is ineffective.

2. Ask trainees to complete the following sentences
   a. Lambs should be wormed at approximately **8 weeks** of age, and again every **4-8 weeks** until one year of age.
   b. At least **once** per year, goats/sheep should be dewormed for tapeworms.

   c. **Roundworms** are considered the most economically devastating internal parasites of livestock.

Self-Reflection

1. Ask trainees to re-take the self-assessment at the beginning of the unit. They should then fill in the table in the Trainee's Manual to identify their areas of strength, areas for improvement, and actions to take to improve.

2. Discuss trainees' results with them. Identify any areas that are giving many trainees difficulty and plan to give additional support as needed. For example, before you begin the next learning outcome, use class time to go through commonly identified difficult concepts.

Note: The self-reflection will be done at the end of a unit, not at the end of every topic. This provides trainees the opportunity to identify what they understand and what they need to work on. It should take only a few minutes for them to complete.

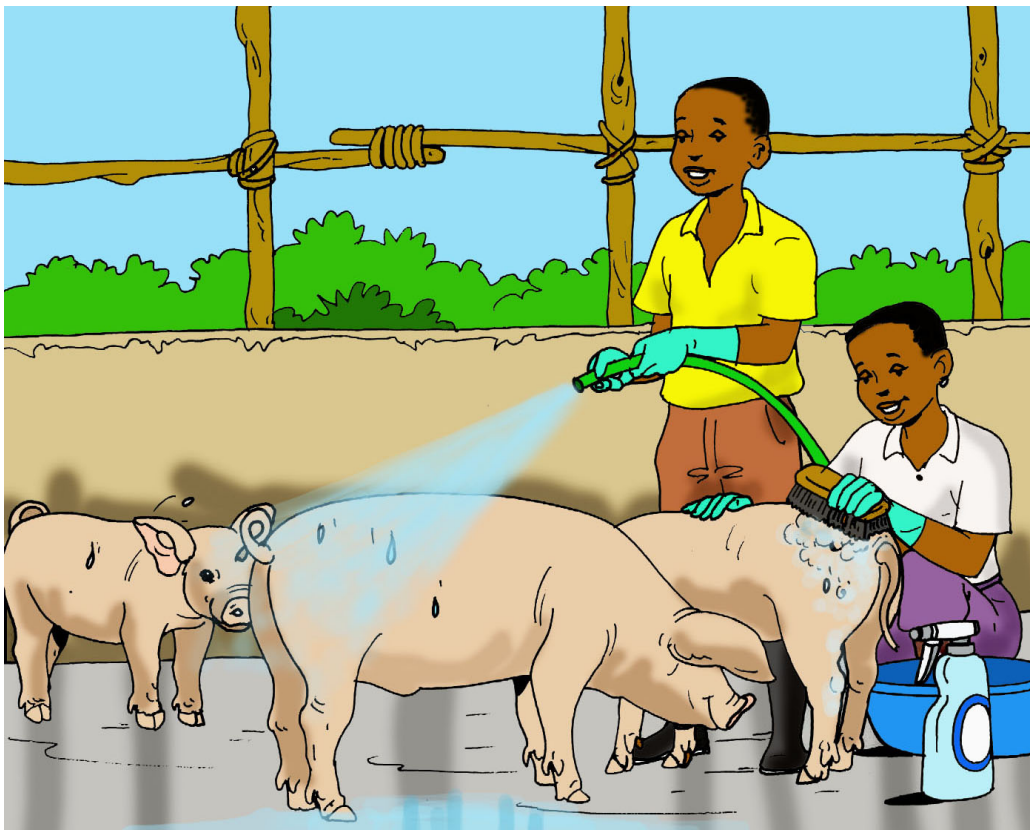
3. Ask trainees to think about what they learned from the beginning of this unit and then complete the self-reflection chart in their manuals. Highlight the areas of strength, the areas for improvement, and the actions to take to improve.

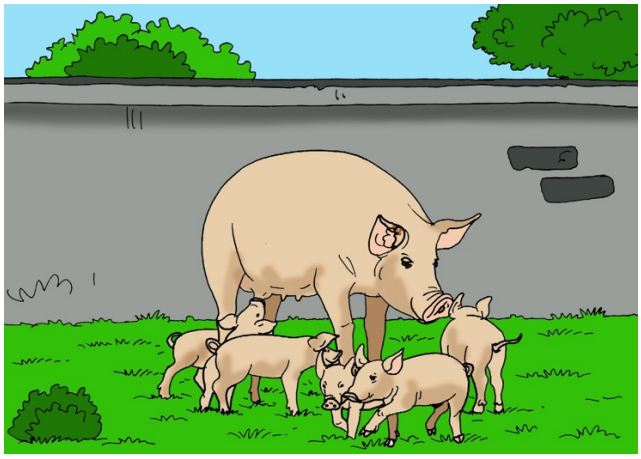
4. Collect all papers and analyse the feedback. Share the overall results with trainees and clarify information in the most commonly stated "Areas for improvement."

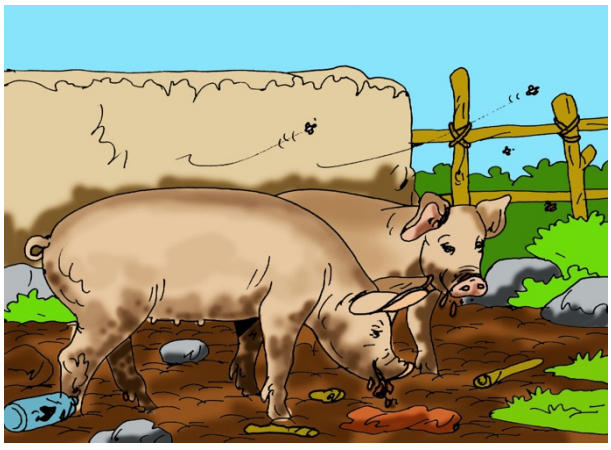
Further Information for the Trainer

1. WDA, CBT Training Manual: AGRAH305: PREVENTION OF ANIMAL DISEASES, Kigali, January 2015
2. Strategic Deworming for Small Ruminants: http://www.midamericaagresearch.net/documents/Strategic%20Deworming%20for%20Small%20Ruminants.pdf
3. Calculating Dosage: http://publichealth.lacounty.gov/phn/docs/MCE%20Study%20Guiderevised6-10.pdf
4. Administration of Wormicide: https://www.extension.purdue.edu/extmedia/VY/VY-51.html

Learning Unit 3: Prevent pig diseases







Learning Outcomes

By the end of the Learning Unit, trainees will be able to:

3.1 Assist in identification of diseases

3.2 Spray acaricides

3.3 Deworm Pig

3.4 Wash Pig

Learning Unit 3 Self-Assessment

1. Ask trainees to look at the illustrations above (in their Trainee Manuals) and discuss what they see. What topics do they think this unit will include based on the illustrations? After some brainstorming, share the main topics.

2. Explain that this Unit is going to focus on identifying the four types of pig diseases and how to prevent them. They will learn preventative measures, including spraying acaricides, deworming pigs, and washing pigs.

3. Ask trainees to fill out the self-assessment located in their Trainee Manuals at the beginning of the unit. Explain that the purpose of the self-assessment is to become familiar with the topics in the unit and for them to see what they know or do not know. At the end of the unit, they will do a self-reflection, which includes re-taking the self-assessment and identifying their strengths, areas that need improvement, and actions to take. The self-assessment is not a test!

Learning Outcome 3.1: Assist in identification of diseases

Objectives: By the end of the learning outcome, trainees will be able to:

a. Describe and identify the causes of different types of pig diseases
b. Differentiate between signs and symptoms of pig diseases
c. Follow preventive procedures for pigs and their living spaces

Time Required: 5 hours

Learning Methodology: Brainstorming, group discussions, simulations, field visit, discussions with a farmer/expert

Materials Needed:

- **Standard training materials** – flip chart, markers, tape, A4 paper
- **Visualisation materials** – Laptop, projector, internet, 5-10 images and/or videos of pigs with various diseases

Preparation:

- ❑ Organise a field visit with a pig farmer
- ❑ Research and download 5-10 pictures of pigs with various types of diseases

Cross Cutting Issues:

- ✔ **Environment and sustainability:** Preventing pig disease involves environmental factors, such as cleanliness and existence of pests and parasites
- ✔ **Peace and values education:** Preventing diseases requires an overarching care for animal health that promotes care and cooperation

Prerequisites:

- Learning Unit 2: Prevent ruminants diseases
- Basic Sciences

Key Competencies:

Knowledge	Skills	Attitudes
1. Describe the causes of pig diseases.	**1.** Identify the causes of pig diseases in order to prevent them from occurring in the future.	**1.** Accurate
2. Describe signs and symptoms of pig diseases.	**2.** Differentiate between signs and symptoms of different pig diseases.	**2.** Detail-oriented
3. Explain preventive procedures of pig diseases and their significance.	**3.** Follow preventive procedures for pigs and their living spaces.	**3.** Forward-thinking

Steps:

Getting Started: What do we know and where are we going?

1. Tell trainees to look at the illustrations for Unit 3 again and then answer the following questions and complete tasks from **Topic 3.1 Task 1** in their manuals:

a. What specific items do they see?

b. What kind of information do the illustrations provide?

c. Describe observations to a partner.

2. With a partner, trainees should discuss:

a. What pig diseases do you know?

b. Which of the illustrations above show pig diseases? How do you know?

c. What are other signs of pig diseases?

3. Ask trainees to share some of their ideas with the rest of the class. Encourage open and critical discussion. Answers may vary. The correct responses will be revealed later in this topic.

Problem Solving Activity

1. Divide trainees into small groups and direct them to **Topic 3.1 Task 2** in their manuals. Tell them to discuss the following questions:
   a. What similarities do you think there are between ruminant diseases and pig diseases?
      Possible Answers: Answers may vary. Both can be categorized into four types of diseases with the same causes. Some signs are the same as well.

   b. What differences do you think there are between them?
      Possible Answers: Answers may vary. Some of the signs and symptoms may include differences between ruminants and pigs.

   c. Based on what you know about ruminant diseases from unit 2, what do you think we can do to prevent pig diseases?
      Possible Answers: Deworming, spraying acaricides, good hygiene, vaccination

   d. What is the difference between prevention and treatment? Which do you think is better for animal health?
      Answer: Preventative measures are used *before* an animal displays signs of a disease or other illness. They are used to avoid a disease from affecting an animal. Whereas treatment is used *after* an animal has displayed signs of a disease with the goal of curing to removing the disease. Prevention is better for animal health because it eliminates the stress of the animal needing to heal from the disease.

2. Ask the groups to share and compare their group's ideas with the rest of the class.

3. As a class, read and review **3.1 Key Facts.**

4. Return to questions 1a, 1b, and 1c. Lead a class discussion on the following questions:
   a. Discuss if their ideas and predictions were correct.
   b. How are ruminant diseases and pig diseases different?
   c. How are they the same?

Guided Practice Activity

1. Tell trainees to turn to **Topic 3.1 Task 3** in their manuals. Separate them into 4 groups.

2. Display or project photos that show various pig diseases and have trainees do the following using **3.1 Key Facts:**
   a. Determine if each photo depicts an infectious, parasitic, nutritional and metabolic, or traumatic disease.

3. Assign each group one of the types of diseases. It is their objective to identify the exact disease displayed in the photos that fall under their assigned category. They should do the following:
   a. Research, using available resources, including manuals, books, internet, and local professionals.
   b. Determine the exact type of disease and the evidence.
   c. Present the findings/conclusion to the rest of the class. Cite the sources used.

4. Now, tell trainees to imagine they are at a farm and notice that one of the pig's has skin that is much paler than the others. Blood has also been appearing in his/her faeces.

   a. What could be the problem?
   Answer: A nutritional and metabolic disease, such as nutritional anaemia.

   b. What might have caused this problem?
   Answer: A deficiency of protein, fat, or minerals.

5. At a local farm, trainees notice that the conditions of the pig area is very dirty. The pigs are covered in dirt and haven't been washed in weeks. Trainees see a few of them eating faeces from a pit latrine behind their living area.
   a. What should be done?
   Answer: The pigs should be washed, and their area should be cleaned immediately. The pit latrine or the pigs' living area should be relocated or physically separated.

   b. What are the potential consequences of these circumstances?
   Answer: The pigs could contract a parasitic or other disease.

6. Discuss their answers and direct trainees to **3.1 Key Facts** for guidance.

Application Activity

1. Organise a visit to a local pig farm with the class. Confirm that the farmer will be present to answer questions regarding preventative measures, tools, and products used to promote pig health on the farm.

2. Tell trainees to observe the pigs closely and note any unusual behaviour or activity under **Topic 3.1 Task 4** in their manuals.

3. Tell trainees to compare notes with a partner.

4. Separate the trainees into small groups. Tell them to discuss whether they think any of the animals are showing signs of infectious, parasitic, nutritional and metabolic, and/or traumatic diseases. Then they should note their observations in the table (sample below):

Disease	Present? Yes or No	Observed Signs
Infectious		
Parasitic		
Nutritional and Metabolic		
Traumatic		

5. Request that groups share their observations with the rest of the class and the farmer.
   a. Verify their observations with the farmer.

6. Instruct the trainees to ask the farmer what preventative measures he/she takes to avoid the spread of these diseases. What tools or products do they use?

Points to Remember

- Observe the behaviour of pigs, such as the status of their manure, normal temperatures, and normal breathing, to identify and prevent diseases.
- Avoid spreading diseases during diagnosis by wearing PPE and maintaining good hygiene.
- Suspected animals should be isolated immediately.
- Do not touch or cut open suspected animals presenting signs of highly contagious disease like Anthrax or Swine Fever.

Formative Assessment

1. Answer the following questions:
   a. What are two examples of pig diseases caused by a virus?
      Possible Answers: classical swine fever/RNA Virus, African Swine Fever/Virus

   b. What are three examples of pig diseases caused by bacteria?
      Possible Answers: Anthrax, Brucellosis, Erysipelas, Mastis, Greasy pig disease

   c. What are the signs of nutritional disease in pigs?
      Possible Answers: Pale skin, jaundice, blood in faeces, early death, weak piglets

   d. What measures can be taken to prevent parasitic diseases in pigs?
      Possible Answers: Don't allow pigs to feed on faeces; proper hygiene and sanitation; deworming on arrival and before being placed in fattening house, except with piglets younger than 3 weeks old; wash the sow before farrowing at least twice, once per week; boars should be washed at least four times per year.

Further Information for the Trainer

1. Swine Diseases Manual:
   https://www.pig333.com/pig-diseases
2. WDA, CBT Training Manual: AGRAH305: PREVENTION OF ANIMAL DISEASES, Kigali, January 2015

Learning Outcome 3.2: Spray acaricides

Objectives: By the end of the learning outcome, trainees will be able to:

a. Identify and interpret the different types acaricides
b. Describe techniques of spraying acaricides
c. Prepare and appropriately spray acaricides
d. Describe acaricide waste disposal procedures

Time Required: 5 hours

Learning Methodology: brainstorming, individual and group work, simulation, demonstration, field visit

Materials Needed:

- **Standard training materials** – flip chart, markers, tape, A4 paper
- **Sample items** – acaricides, water, PPE
- **Measurement tools**—calculators, graduated cylinders

Preparation:

- ❑ Organise a visit to a farm with pigs
- ❑ Preparation of sample materials and measurement tools

Cross Cutting Issues:

- ✔ **Environment and sustainability:** Awareness of risks of using chemicals and their potential negative impact on the environment if not disposed of properly
- ✔ **Standardisation culture:** Measure and dilute acaricides according the prescribed amounts on manufacturer's label

Prerequisites:

- Basic Chemistry (Solutions)
- Learning Unit 2: Prevent ruminant diseases

Key Competencies:

Knowledge	Skills	Attitudes
1. Identify and interpret the different types and uses of acaricides.	**1.** Select the appropriate acaricides for the given situation.	**1.** Detail-oriented
2. Describe techniques of spraying acaricides.	**2.** Prepare acaricides by diluting as needed and use acaricides by spraying.	**2.** Detail-oriented
3. Describe acaricide waste disposal procedures.	**3.** Dispose acaricide waste safely.	**3.** Forward-thinking

Steps:

Getting Started: What do we know and where are we going?

1. As a class, invite trainees to brainstorm responses to the following questions found in **Topic 3.2 Task 1** in their manuals:
   a. What do you know about spraying acaricides?
   b. What do you remember about acaricides from Unit 2: Preventing ruminant diseases?
   c. Do you think acaricides can be applied to pigs in addition to ruminants?
   d. How can you protect yourself during acaricide spraying?

2. Ask volunteers to share their ideas and facilitate a class discuss. Encourage critical thinking.

Problem Solving Activity

1. Divide trainees into small groups. Instruct them to discuss the following questions from **Topic 3.2 Task 2**:
   a. Why do we use acaricides? What do they prevent and treat?
   Answer: To control ectoparasites, such as mites and ticks. They prevent and treat parasitic diseases.

   b. What should you do if the concentration of an acaricide solution is too strong? Recalling from Unit 2, what is the formula for calculating this process?
   Answer: Dilute it according to the manufacturer's instructions.

Formula: $C_1V_1 = C_2V_2$

V_1 = Volume of stock solution needed to make the new solution

C_1 = Concentration of stock solution

V_2 = Final volume of new solution

C_2 = Final concentration of new solution

c. Why is it important to properly dispose of acaricide waste? What are the potential consequences?

Answer: Acaricides are made of toxic chemicals. Misuse or improper disposal could negatively impact the environment, so it is essential to dispose of the waste correctly.

2. Have groups present their ideas to the rest of the class.

3. As a class, read through **3.2 Key Facts** and tell trainees to complete the following tasks:

a. Identify additional types of acaricides for pigs, aside from the ones you already know.

Answers: Concentrates and shampoo. Liquid (Ready to Use), powders, and tablets (feed additives/boluses) are prior knowledge from **Topic 2.2**.

b. Identify additional application methods for pigs, aside from the ones you already know.

Answers: Wipes and pour-on are new methods. Spraying is prior knowledge from **Topic 2.2**.

4. Clarify any information from **3.2 Key Facts** that is unclear.

Guided Practice Activity

1. Instruct trainees to turn to **Topic 3.2 Task 3** in their manuals and work with a partner to complete the following tasks. Refer to **3.2 Key Facts** for guidance.

2. Imagine you are going to use an acaricide solution with a pig on the farm. The pig is suffering from mange mites.

a. Which type of acaricide should you use?

Answer: Permethrin

b. How much of this solution do you need if the pig weighs 90 kg?

Answer:

Dosage = 3 mL per 45 kg

45 kg * 2 = 90 kg
3 mL * 2 = **6 mL of the solution**

c. You have a solution at a concentration of 0.50 per 1 mL. You want a concentration of 0.25. How much solution do you need to add to reach the total volume calculated above?
Answer:
Formula: $C_1V_1 = C_2V_2$
V_1 = Volume of stock solution needed to make the new solution = ?
C_1 = Concentration of stock solution = 0.50
V_2 = Final volume of new solution = 6 mL
C_2 = Final concentration of new solution = 0.25

$C_1V_1 = C_2V_2$
(0.50) V_1 = (0.25) (6)
(0.50) V_1 = 1.5
V_1 = 3 mL of solution

3. Provide a sample acaricide. Trainees should read and interpret the label.
- **a.** What is the name of the solution?
- **b.** What is the recommended application type?
- **c.** Does the solution need to be diluted for a pig that weighs 50 kg? If so, calculate the final volume of the solution.

4. Your neighbour is planning to use acaricides with the pigs on his farm. Write down the precautions he should take before and after using acaricides?
Answers: Read manufacturer's label, wear PPE, properly dispose of waste material.

Application Activity

Organise a visit to a local farm with pigs. Confirm that the farmer has acaricides in stock. Ask if it is possible for the trainees to assist him or her in applying acaricides to the pigs. If not, ask if someone can demonstrate how to apply them instead. If a demonstration is not possible, contact a different farmer.

1. Before visiting the farm, tell trainees to turn to **Topic 3.1 Task 4** in their manuals and write down the procedure for using acaricides with a small group.

2. Visit a local farm with pigs.

3. Instruct trainees to verify the written acaricides procedures with the farmer.

4. Now, trainees must identify the available acaricides.

5. Trainees should observe the farmer while he/she demonstrates how to apply the acaricides to a pig.

6. With permission from the farmer, instruct trainees to take turns assisting the farmer with applying acaricides to the pigs. Be sure they wear Personal Protective Equipment (PPE).

7. Tell trainees to briefly discuss the experience with their small group and come up with any remaining questions they have about the process of applying acaricides. Encourage them to ask these questions to the farmer or another worker before leaving the farm.

Points to Remember

- When applying insecticides, do not contaminate feed or drinking water.
- Before using any pesticide, read the label for specific instructions and slaughter restrictions.
- Do not treat pigs less than 3 months old, or sows within 2 weeks before farrowing or 3 weeks after farrowing.
- To minimize acaricide resistance, do not apply the same acaricide, or acaricide within the same chemical class (particularly pyrethroids), repeatedly throughout an entire season. See product labels for use rates.
- Insecticides can pose hazards to humans, animals, and the environment.
- Always adorn PPE before manipulating chemical products.
- New animals added to the herd should be treated before coming into contact with other animals.

Formative Assessment

1. Answer the following questions:
   a. What are the advantages and disadvantages of using Ready-to-Use acaricides?
      Answers:
      Advantages: They do not need to be mixed or combined with other ingredients or diluents. They are already packaged in the application device. Simple to use.

      Disadvantages: Very expensive.
   b. List three acaricides used in Rwanda to control pig diseases:
      Answers:
      1. Taktic (Amitraz)

      2. Permethrin

      3. Ivomec

   c. List two techniques of applying acaricides in pig disease prevention.
      Possible answers: Spraying, wiping, pour-on

Further Information for the Trainer

1. RAB: Annual report, 2013
2. UWUMUKIZA Bernardine: Thesis on "Prevalence of three frequente tick bone diseases (Babesiosis, Theileriosis and Anapasmosis in Huye District", UR Umutara Polytechnics, 2011
3. WDA, CBT Training Manual: AGRAH305: PREVENTION OF ANIMAL DISEASES, Kigali, January 2015

Learning Outcome 3.3: Deworm pigs

Objectives: By the end of the learning outcome, trainees will be able to:

a. Identify wormicides and their purposes
b. Describe techniques and procedures for deworming pigs
c. Administer wormicide to pigs, using the correct procedures
d. Describe and manage proper safety and waste disposal procedures

Time Required: 5 hours

Learning Methodology:
Brainstorming, individual and group work, interviewing, field visit, practical exercise

Materials Needed:

- **Standard training materials** – flip chart, markers, tape, A4 paper
- **Measurement and application tools** – calculators, graduated cylinder, syringe
- **Samples** – sample wormicides

Preparation:

- ❑ Organise a visit to a farmer with pigs
- ❑ Preparation of the needed materials: tools and sample wormicides

Cross Cutting Issues:

- ✔ **Environment and sustainability:** Emphasize the potential impact of improper disposal of wormicides on the environment.
- ✔ **Standardisation culture:** Measure dosage with precise amounts using the manufacturer's instructions.

Prerequisites:

- ❑ Basic Chemistry (Solutions)
- ❑ Learning Unit 2: Prevent ruminant diseases

Key Competencies:

Knowledge	Skills	Attitudes
1. Identify wormicides and their purposes.	**1.** Select appropriate wormicide to prevent pig disease.	**1.** Detail-oriented
2. Describe techniques and procedures for deworming pigs.	**2.** Administer wormicide to pigs by following the correct procedures.	**2.** Methodical
3. Describe wormicide safety and waste disposal procedures.	**3.** Manage proper safety and waste disposal procedures.	**3.** Risk-aware

Steps:

Getting Started: What do we know and where are we going?

1. Instruct trainees to turn to **Topic 3.3 Task 1** in their manuals and brainstorm responses to the following questions with a partner. Think back to Unit 2: Prevent ruminant diseases.
   - **a.** What do you know about deworming?
   - **b.** What is the role of deworming?
   - **c.** What type of pig disease does deworming prevent?
   - **d.** How do farmers in your area deworm their pigs?
   - **e.** What tools, equipment, and products do they use? If you aren't sure, what do you suspect they use?
   - **f.** Do you think deworming pigs is the same process as deworming ruminants? Explain why or why not.

2. Facilitate a class discussion and ask trainees to share their responses.

Problem Solving Activity

1. Tell trainees to consider the following questions found in **Topic 3.3 Task 2** individually:
   - **a.** Why is it important to deworm pigs?
     Answer: To prevent and/or treat pig diseases.

   - **b.** What would happen if pigs were not dewormed?

Answer: They may contract a parasitic disease.

c. What is the role of wormicide in disease prevention?
Answer: Wormicide prevents, kills, and/or removes harmful parasites from causing diseases in the animals.

d. What precautions need to be taken while using wormicides? Why?
Answer: Always wear PPE and read the manufacturer's instructions to prevent and control dangerous incidents while working with chemical substances, such as wormicide.

2. Then, instruct trainees to share their ideas with a partner. Did they come to the same conclusions?

3. Encourage trainees to discuss their ideas with the rest of the class.

4. Read through **3.3 Key Facts** as a class. As you are reading, trainees should:
- ✓ Check or tick which aspects of deworming pigs are the same as deworming ruminants.
- o Circle which aspects of deworming pigs are different from deworming ruminants.
- ❖ Star any new information.

5. Compare your checks, circles, and stars with a partner.

Guided Practice Activity

1. Direct trainees to **Topic 3.3 Task 3** in their manuals. Explain that a local farmer needs a technical assistance. He has ten pigs and three of them have the following signs: poor growth, rough grey hair coat, swollen belly, and emaciation.

2. Trainees must outline the steps the farmer should take to address this problem. Include preparation and disposal steps. Use **3.3 Key Facts** for guidance if needed.
Possible/Best Answers:
Step 1: Identify the disease and its cause (parasitic disease)

Step 2: Identify the treatment method (deworming)

Step 3: Identify the wormicide type and dosage (by reading the label)

Step 4: Wear PPE

Step 5: Apply wormicide

Step 6: Properly dispose of wormicide

Step 7: Disinfect the area

3. Verify their responses. They should match or closely match the answers above.

4. You have chosen to inject Ivermectin into the pigs. Each pig weighs 99 kg.

a. Which tools do you need to measure dosage?
Answer: Graduated cylinder (for liquids), PPE, maybe a scale (for weight of animals)

b. What dosage should each pig receive?
Answer:
Dosage for injection of Ivermectin = 1 mL per 33 kg bodyweight
33 kg * 3 = 99 kg
1 mL * 3 = **3 mL of Ivermectin per pig**

c. What is the total amount of Ivermectin needed for this treatment?
Answer:
3 mL per pig (from previous question) * 3 pigs = **9 mL**

5. Give the correct responses and assist with any confusion, especially regarding the math calculations.

Application Activity

Organise a visit to a local farm with pigs. Confirm that the farmer has and uses wormicides to deworm the pigs. Ask if it is possible for the trainees to assist him or her in applying wormicide to the pigs. If not, ask if someone can demonstrate how to apply them instead. If a demonstration is not possible, contact a different farmer.

1. With the guidance of the farmer, instruct trainees to identify the available wormicides on the farm.

2. Tell trainees to ask the farmer the following questions and write his answers in the table. Have trainees add two additional questions and ask the farmer these as well.

Questions	Answers
Which wormicide do you prefer or use most often? Why?	
How often do you deworm the pigs?	
Which parasites are most common on your farm?	

3. Trainees should now observe the farmer as he demonstrates how to properly deworm a pig.

4. If permitted by the farmer, instruct trainees to take turns administering wormicide to a pig.

5. Divide the trainees into small groups. Tell them they must create a manual for deworming pigs. They should be sure to address these points in their manuals:

a. How do you know when it is necessary to deworm a pig?

b. What are the steps to deworming a pig?

c. What precautions must be taken to ensure environmental and personal safety?

6. Groups should submit their manual to you for review.

Points to Remember

- Before choosing a worming product, it is good practice to determine the pig's approximate weight.
- Don't forget to adjust the dosage depending on the size of the pig and the manufacturer's instructions.
- Under-dosing can lead to poor efficacy and over-dosing can lead to a risk of toxicity.

Formative Assessment

1. Answer the questions below:

a. What equipment is necessary to deworm pigs?

Answer: Graduated cylinder, syringe, PPE

b. Explain how to adjust the dosage for a given animal.

Answer: Read the manufacturer's instructions. Adjust based on the amount of wormicide (mL, number of tablets, etc.) per the amount of weight (kg), according to the animal's weight.

c. At what point should the ground be abandoned for pig keeping?
Answer: When the worm presence or burden becomes extreme.

2. Select True or False for the following statements:
Answers:

- ❑ **False:** It is not necessary to deworm new animals that have just arrived on the farm.
- ❑ **True:** The main drugs used in wormicides are anthelmintics.
- ❑ **False:** Breeding pigs should be dewormed once per year.
- ❑ **True:** Avermectins are highly effective in preventing infection in young piglets.

Learning Outcome 3.4: Wash pig

Objectives: By the end of the learning outcome, trainees will be able to:

a. Identify detergents to wash pigs and when to use them
b. Select detergent and materials for washing
c. Apply techniques for restraining pigs
d. Describe and perform washing procedures

Time Required: 5 hours

Learning Methodology: Brainstorming, demonstration, field visit, individual and group work, presentation

Materials Needed:

- **Standard training materials** – flip chart, markers, tape, A4 paper
- **Audio/visual materials** – computer, internet, projector, videos of farmers using different pig restraining methods
- **Sample supplies** – bucket, soap/detergent, warm water, brushes, PPE, acaricides

Preparation:

- ❑ Organise a visit to a local pig farm
- ❑ Preparation of the audio/visual materials
- ❑ Preparation of the sample materials

Cross Cutting Issues:

- ✔ **Environment and sustainability:** Use and dispose of detergents and disinfectants safely in order to prevent hazardous substances from entering the earth.
- ✔ **Standardisation culture:** Follow set procedures to wash pigs.
- ✔ **Gender and inclusivity:** Consider gender balance when creating washing groups and allocating roles.

Prerequisites:

- Learning Units 1 and 2
- Basic Sciences

Key Competencies:

Knowledge	Skills	Attitudes
1. Identify detergents to wash pigs and when to use them.	**1.** Select appropriate time and detergent to wash pigs.	**1.** Detail-oriented
2. Describe techniques for restraining pigs.	**2.** Apply techniques for restraining pigs.	**2.** Persistent
3. Describe procedures for washing pigs.	**3.** Perform washing procedures.	**3.** Methodical

Steps:

Getting Started: What do we know and where are we going?

1. Instruct trainees to turn to **Topic 3.4 Task 1** in their manuals and brainstorm responses to the following questions individually:
   - **a.** What do you know about preventing pig diseases?
   - **b.** What is the most common and regular method of preventing pig diseases?
   - **c.** People say that pigs are dirty animals. Is it true in your opinion? Why or why not?

2. Instruct trainees to share their ideas with a partner and then the rest of the class.

3. Facilitate a class discussion on why it is recommended to wash pigs.

4. Ask trainees what they expect to know and be able to do at the end of this learning topic.

Problem Solving Activity:

1. Divide trainees into small groups. Tell them to discuss the following questions found in **Topic 3.4 Task 2** of their manuals:

   - **a.** Based on your knowledge from Learning Topic 1: Maintain safety and hygiene, what materials do you think are needed to wash a pig?
     Possible Answers: Detergents, disinfectants, water, bucket, brushes

   - **b.** Pigs are active animals and easily frightened. You need to restrain one at a time in order to clean it. How could you do this? What strategies could you try?

Possible Answers: Use snares or boards. Snares are attached behind the pig's upper jaws and the worker stands directly in front of the pig to restrain its movement. Boards are used to corral and isolate pigs into certain areas for washing.

c. What do you think is the ideal temperature for washing a pig? Why?

Answers may vary. Trainees will learn the correct answer in the following Key Facts section.

2. Tell trainees to compile their answers and prepare to present them to the rest of the class. They should use the flipchart to present points.

3. After all groups have presented, facilitate a class discussion on the various ideas.

4. Direct their attention to **3.4 Key Facts.** Read through the facts as a class. Confirm or correct their responses to question 1.

Guided Practice Activity

1. Tell trainees to open their manuals to **Topic 3.4 Task 3**. They will now watch videos or observe pictures you have prepared of pigs being restrained for cleaning and other purposes. Tell them to discuss the following with a partner, referring to the terms and concepts from **3.4 Key Facts**:

a. What techniques are the farmers using?

b. What tools are they using?

c. What are the biggest challenges?

Answers will vary depending on the videos and/or pictures displayed.

2. Tell trainees to imagine that they are working on a farm and half of the pigs have mange mites. Based on what they have learned in previous topics and this one, describe the steps for washing the pigs. Work in small groups. Keep in mind:

- Materials
- Restraining techniques
- Waste disposal and/or product storage

Answer (See 3.4 Key Facts):

1. Collect materials.
2. Wear Personal Protective Equipment (PPE).
3. Select a small confined area to wash the pig.
4. Fill 4 large buckets with warm (not hot) water. Take materials to the selected area.
5. Restrain the animal.

6. Start washing; start with the feet and working up, wash with the brush after applying soap.
7. Rinse it frequently in the warm water.
8. Avoid getting water in the pig's ears and try to avoid the face altogether.
9. After washing, spray disinfectant/acaricides over pigs to reduce the risk of infection.
10. Return pigs to their living areas.
11. Clean washing area.

Return materials to their storage area. Dispose of product waste in a separate, securely closed trash bin.

3. Instruct trainees to present their group's procedures to the rest of the class. Compare each group's answers. Did any group forget a step? Were the steps completed in the correct order?

4. Verify their responses with the answers given above.

Application Activity

Organise a visit to a local pig farm. Confirm that the farmer will be available to answer questions about washing pigs. Ask if it is possible for the trainees to assist him or her in washing some pigs. If not, ask if someone can demonstrate how to wash them instead. If a demonstration is not possible, contact a different farmer.

1. Before visiting the pig farm, trainees should open their manuals to **Topic 3.4 Task 4** and work with their groups from **Task 3** to create 3 questions to ask the farmer about restraining and washing pigs.

2. Upon arriving on the farm, have trainees rotate, asking the farmer or another worker their questions, and noting the answers in the table above.

3. Then, instruct trainees to analyse the status of the pigs. They should note their findings by answering these questions:
   a. What is the individual hygiene of the pigs as well as the hygiene of the living area?
   b. Are any of the pigs suffering from a disease? If so, which one?

4. Instruct trainees to observe the farmer as he/she demonstrates how to correctly restrain and wash a pig.

5. With the farmer's permission, each group will have the opportunity to restrain and wash a pig. Facilitate the rotation of groups. Remind trainees to:
   - Wear PPE.
   - Select the detergent and use the correct dilution.
   - Select a washing area and restraining technique.
   - Store materials and/or dispose of waste after use.

6. After the field visit, facilitate a discussion with the trainees:
   a. What did they learn?
   b. What surprised them?
   c. How did their experiences compare to the information in **3.4 and 3.5 Key Facts**

Points to Remember

- Remember excessive bathing will likely cause the skin to become dry.
- Avoid getting water in the ears and try to avoid the face altogether. Don't use dish soap or anything harsh that can burn the pig's eyes.
- The desired deep body temperature for pigs is 38°C.
- Detergents are used for washing while acaricides are used for disinfecting.

Formative Assessment

1. Explain the two restraining methods used to catch pigs.
   Answers:
   - Snares/snubbing ropes: Attach the rope around the pig's upper jaw and stand directly in front of the pig. As the pig pulls back, it will become restrained. Use this technique for older pigs.
   - Boards/hurdling: Trap and corral the pig using boards or other solid barriers. Move and/or isolate pigs into cleaning areas. Cover a large pig's head with a bucket, if needed. Use this technique with pigs of any age.

2. What is the desirable body temperature of a pig?
   Answer: 38°C

3. List the materials needed to wash pigs.
   Answers: clean, warm water; bucket or basin; body brush; washing brush; soap/detergent; acaricides/disinfectant

4. Explain the difference between detergents and acaricides.

   Answer: Detergents are used for cleaning, meaning they remove organic matter, such as dirt, from the surface of the animal. Acaricides, on the other hand, are a type of disinfectant involving chemicals, used to remove harmful micro-organisms from the animal. Disinfectants should be used after detergents/washing.

Self-Reflection

1. Ask trainees to re-take the self-assessment from the beginning of the unit. They should then fill in the table in the Trainee's Manual to identify their areas of strength, areas for improvement, and actions to take to improve.

2. Discuss trainees' results with them. Identify any areas that are giving many trainees difficulty and plan to give additional support as needed. For example, before you begin the next learning outcome, use class time to go through commonly identified difficult concepts.

Note: The self-reflection will be done at the end of a unit, not at the end of every topic. This provides trainees the opportunity to identify what they understand and what they need to work on. It should take only a few minutes for them to complete.

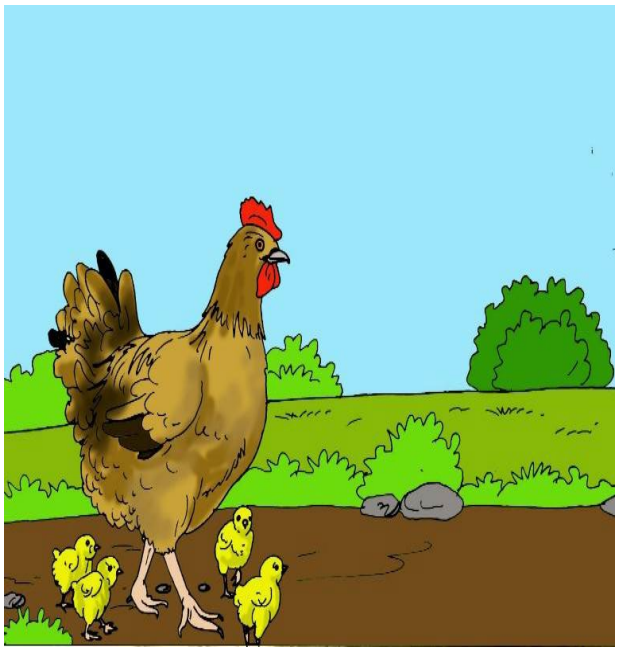
3. Ask trainees to think about what they learned from the beginning of this unit and then fill the self-reflection chart in their manuals. Highlight the areas of strength, the areas for improvement, and the actions to take to improve.

4. Collect all papers and analyse the feedback. Share the overall results with trainees and clarify information in the most commonly stated "Areas for improvement."

Further Information for the Trainer

1. Cleaning and Disinfection:
   https://thepigsite.com/articles/cleaning-and-disinfection
2. Handling and Restraining Pigs:
   http://animalbiosciences.uoguelph.ca/~gking/Ag_2350/handling.htm

Learning Unit 4: Prevent poultry disease



Learning Outcomes

By the end of the Learning Unit, trainees will be able to:

4.1 Assist to identification of diseases

4.2 Deworm poultry

4.3 Apply preventive measures

Learning Unit 4 Self-Assessment

1. Ask trainees to look at the illustrations above (in their Trainee Manuals) and discuss what they see. Based on the illustrations, what topics do they think this unit will include? After some brainstorming, share the main topics.

2. Explain that this unit is going to focus on the identification of different types of poultry diseases, as well as their causes and signs. Trainees will learn how to establish preventative measures for each type of poultry disease.

3. Ask trainees to fill out the self-assessment located at the beginning of the unit in their Trainee Manuals. Explain that the purpose of the self-assessment is to become familiar with the topics in the unit and for them to see what they know or do not know. At the end of the unit, they will do a self-reflection, which includes re-taking the self-assessment and identifying their strengths, areas that need improvement, and actions to take. The self-assessment is not a test!

Learning Outcome 4.1: Assist in identification of diseases

Objectives: By the end of the learning outcome, trainees will be able to:

a. Describe and identify the different types of poultry diseases

b. Explain the causes of different types of poultry diseases

c. Follow preventive procedures for poultry diseases

Time Required: 7 hours

Learning Methodology: Brainstorming, individual and group work, interviewing, field visit, demonstration

Materials Needed:

- **Standard training materials** – flip chart, markers, tape, A4 paper
- **Audio/visual materials** – computer, internet, projector, prepared pictures of various poultry diseases

Preparation:

- ❑ Organise visit to a local poultry farm
- ❑ Preparation of audio/visual materials
- ❑ Research photos of various poultry diseases

Cross Cutting Issues:

- ✔ **Environment and sustainability**: Emphasize negative impact of chemicals on the environment and animal health if not used properly
- ✔ **Standardisation culture**: Use accurate measurements for dosage using graduated cylinder and according to the manufacturer's label

Prerequisites:

- Basic Sciences
- Learning Unit 1: Maintain safety and hygiene
- Learning Unit 2: Prevent ruminant diseases
- Learning Unit 3: Prevent pig diseases

Key Competencies:

Knowledge	Skills	Attitudes
1. Describe the causes of different types of poultry diseases.	**1.** Identify the different causes of poultry diseases.	**1.** Detail-oriented
2. Describe the signs and symptoms of different poultry diseases.	**2.** Diagnose different poultry diseases based on their signs and symptoms.	**2.** Adaptive
3. Explain preventive procedures for poultry diseases.	**3.** Implement preventive measures for poultry diseases.	**3.** Methodical

Steps:

Getting Started: What do we know and where are we going?

1. Direct trainees to **Topic 4.1 Task 1** in their manuals. Instruct trainees to reflect on and recall the knowledge, skills, and attitudes gained in units 2 and 3.
   a. What are the four types of diseases that affect animal health?
   b. What are the general causes of each disease?
   c. What attitudes are necessary to address animal diseases?

2. Tell trainees to compare their responses with a partner.

3. Now, tell trainees to individually brainstorm responses to the following questions:
   a. Which poultry-specific diseases are you familiar with?
   b. Do you think poultry diseases—their causes, signs, and prevention methods—are like ruminants and pig diseases? Why or why not?

4. Facilitate a class discussion of their ideas and experiences.

Problem Solving Activity

1. Divide trainees into small groups. Tell them to discuss the following topics found in the **Topic 4.2 Task 2** section in their manuals:
   a. You notice that several of your chickens have fallen ill and you believe they have a poultry disease. You want to determine which type of disease it is. Based on your

knowledge from units 2 and 3, which factors and/or behaviours should you observe to determine the disease?

Possible Answers: Trainees should draw on knowledge from units 2 and 3, specifically the "signs" of diseases in those units. Answers may vary.
Weight loss, diarrhoea (with or without blood), morality rate, egg production, poor growth, inability to move, signs of discomfort

b. Why should preventative measures be taken to avoid poultry diseases on the farm? What are the consequences of poultry disease on animal health and farm production?

Answers: Preventative measures are more economically and time-efficient than treating animals which have already been affected by diseases. Poultry diseases kill animals and/or harm their health such that their production is significantly lowered or ceases.

2. Encourage trainees to share their ideas with the rest of the class and verify their responses.

3. Then, read through **4.1 Key Facts** with the trainees.

4. Ask trainees to compare the prevention measures for each type of poultry disease to the prevention measures for ruminant and pig diseases.
   a. Which measures are the same?
   b. Which measures are different?

Guided Practice Activity

1. Display pictures showing various types of poultry diseases (infectious, parasitic, nutritional and metabolic, and traumatic). In partners, trainees should follow the instructions and discuss the following questions, found under **Topic 4.1 Task 3**, for each picture:
   a. Describe what you see.
   b. What are the signs of poultry disease?
   c. According to the signs, which type of poultry disease do you think it is?
   d. What are the possible causes of this disease?
   e. How can this disease be prevented in the future?

2. Ask trainees to share their observations with the rest of the class.

3. Verify the correct diagnoses, causes, and prevention methods.

4. Tell trainees to consider the picture below.
   a. What is the chicken doing?
      Answer: Eating feed from the ground.

   b. What are the potential consequences of this behaviour?
      Answer: The chicken contracts a poultry disease, specifically a parasitic disease.

   c. What steps should the farmer take?
      Possible Answers: Feed chickens from a feeder, not touching the ground. Also, keep the birds away from freshly tilled ground and be sure to clean the coops at least once per week.

 [11]

Application Activity

Organise a visit to a local poultry farm. Confirm that the farmer or another worker is willing to be interviewed about poultry diseases on their farm.

1. Before visiting a local poultry farm, tell trainees to brainstorm five questions to ask the farmer about common poultry diseases and write them in the table under **Topic 4.1 Task 4** in their manuals.

[11] Pexels. (n.d.). *Agriculture animal beak bird* [Photograph]. Pixabay. https://pixabay.com/photos/agriculture-animal-beak-bird-1868521/

2. Trainer should review questions before farm visit.

3. Trainees should interview the farmer using the questions their groups brainstormed earlier. Tell trainees to note the responses. They should not ask the same question twice.

4. Next, instruct trainees to analyse the poultry on the farm.
   a. Do any have signs of disease? If so, what are the signs and which disease do they indicate?
   b. Confirm your observations with the farmer.

5. Answer any remaining questions regarding the types of poultry diseases.

Points to Remember

- Change the litter regularly. Never raise chickens on old litter used by a previous flock of birds.

- Use quality feed and always use feeders. Don't feed from the ground.

Formative Assessment

1. Answer the following:
   a. Name two of the common nutritional and metabolic poultry diseases.
   Possible Answers: Fatty liver syndrome, Perosis, Rickets, Caged layer fatigue

   b. What are three signs of infectious poultry diseases?
   Possible Answers: Respiratory problems, drop in egg production, diarrhoea, high mortality, scabs and/or tumours

   c. How can someone prevent traumatic poultry diseases from occurring? Be specific.
   Answer: Control physical parameters such that they do not irritate or stress the birds. Physical parameters include lighting, humidity, temperature, and ventilation. Beak trimming and removing aggressive birds are also options.

2. Circle the correct answers:
   1. Which of the following is NOT a sign of parasitic poultry diseases?
      a. Low production
      b. Inability to stand or walk
      c. Appetite and weight loss

d. Bloody diarrhoea

2. What is the cause of infectious diseases?
   a. Abnormal or aggressive poultry behaviour
   b. Insufficient nutrient absorption
   c. Harmful bacteria or viruses entering the body
   d. Worms

ⓘ Further Information for the Trainer

1. Bart Gietema (2005): The basics of chicken farming (in the tropics), First Edition
2. Mary Britton Clouse, 2010. Basic Chicken Care.
3. Allis A.A., Benton W.J., Krauss W.C. & Cover M.S. (1963). The mechanics of treating hatching eggs for disease prevention. Avian Dis.
4. ARTHUR J. (1988). Planning and managing your hatchery. Int. Hatchery Pract.
5. Agrodok Nº 4. Small scale poultry production in the tropics (1995). Agromisa, Wageningen
6. French, K. M., 1984. Practical Poultry Raising. Peace Corps, Trans Century Corporation, Washington, D.C., USA.
7. John D. Summer, Ph.D. professor emeritus: Broiler breeder production, Department of Animal & Poultry Science University of Guelph, Ontario, Canada N1G 2W1.
8. Doug Akers Pete Akers and Dr. Mickey A. Latour: Choosing a Chicken Breed: Eggs, Meat, or Exhibition; Purdue University Cooperative Extension Service, West Lafayette, IN 47907.
9. Agrodok 33, 2004, Duck keeping in the tropics, Agromisa Foundation, Wageningen.
10. Types of disease: http://www.poultryhub.org/health/disease/types-of-disease/
11. 9 ways to prevent parasites in your flock: https://www.morningagclips.com/9-ways-to-prevent-parasites-in-your-flock/
12. Important Nutritional Diseases that Affect Laying Hens https://thepoultrysite.com/articles/important-nutritional-diseases-that-affect-laying-hens
13. Cannibalism (or aggressive pecking): http://www.poultryhub.org/health/disease/types-of-disease/cannibalism-or-aggressive-pecking/

Learning Outcome 4.2: Deworm poultry

Objectives: By the end of the learning outcome, trainees will be able to:

a. Identify different wormicides and their uses
b. Calculate the needed dosage for a wormicide
c. Perform deworming according to procedures
d. Follow safety procedures while deworming animals

Time Required: 7 hours

Learning Methodology: Brainstorming, individual and group work, field visit, demonstration, photo analysis

Materials Needed:

- **Standard training materials** – flip chart, markers, tape, A4 paper
- **Sample wormicides and tools** – wormicides, syringes, PPE, graduated cylinder

Preparation:

❑ Organise a visit to a local poultry farm
❑ Prepare and become familiar with sample wormicides and related tools

Cross Cutting Issues:

✔ **Environment and sustainability**: Emphasize negative impact of chemicals on the environment and animal health if not used properly.
✔ **Standardisation culture**: Use accurate measurements for dosage using graduated cylinder and according to the manufacturer's label

Prerequisites:

- Learning Unit 1: Maintain safety and hygiene
- Learning Outcome 4.1: Identification of diseases
- Basic Sciences

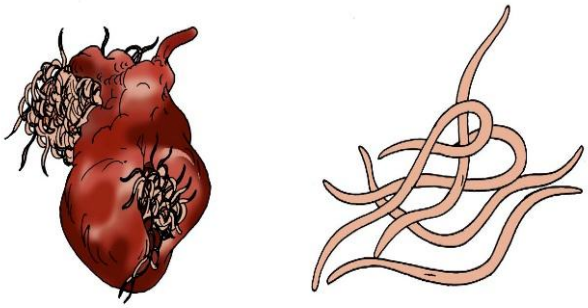
Key Competencies:

Knowledge	Skills	Attitudes
1. Describe the different types of wormicide.	**1.** Identify different wormicides and their uses.	**1.** Detail-oriented
2. Explain the procedures for preparing and administering wormicide.	**2.** Calculate the needed dosage of wormicide and administer it properly.	**2.** Methodical
3. Recognize the importance of safety procedures and precautions.	**3.** Follow safety procedures while administering wormicide.	**3.** Risk-aware

Steps:

Getting Started: What do we know and where are we going?

Ascariasis in Poultry



Mode of disease transmission

1. Assign trainees a partner. Tell them to follow the instructions and discuss the following questions found in **Topic 4.2 Task 1** of their manuals:
   - **a.** Describe what you see in the above photos to your partner.
   - **b.** What type of poultry disease is likely to affect or is already affecting the animals in these photos?
   - **c.** Based on your knowledge from **Topic 4.1**, what are the signs that indicate this type of disease?

2. Facilitate a class discussion based on their ideas.

Problem Solving Activity

1. Direct trainees to **Topic 4.2 Task 2**. Instruct them to brainstorm responses to the following questions individually:
   a. What are some of the hazards of using wormicide?
      Possible Answers: Contact with chemical substances; harmful to the environment; over- and under-dosing

   b. What can we do to prevent and/or control the hazards of wormicide?
      Answers: Wear PPE, store/dispose of waste properly, read manufacturer's instructions

2. Tell trainees to share their ideas with a small group.

3. Separate the trainees into three groups and tell them to discuss a scenario in which they want to administer wormicide to their flock of chickens, but they don't know how much wormicide is needed.
   a. What should they do?
      Answer: Read manufacturer's label for instructions.

   b. What are the consequences of over- or under-dosing?
      Answer: Over-dosing introduces too many chemicals/toxins to the chickens. Under-dosing leads to drug resistance and therefore ineffectiveness.

4. Ask trainees to compare their group's responses with the rest of the class.

5. Trainees should read through **4.2 Key Facts** with their groups.

6. Assign each group a section: Safety, Dosage, or Methods of Administration.
   a. Each group should discuss the similarities and differences between their section and the corresponding information for ruminants (unit 2) and pigs (unit 3).
   b. Groups may use additional/outside resources (books, internet, etc.) to supplement their discussions.
   c. Each group presents their section and the similarities and differences.
   d. After presenting, group members should answer any questions from the other trainees.

Guided Practice Activity

Direct trainees to Topic **4.2 Task 3** in their manuals. Tell them to discuss the following with a partner, using **4.2 Key Facts**.

1. Imagine you are working at a poultry farm and you identify that 3 of your chickens have endoparasites. The cases are severe, and you want to act quickly.
   a. Which method of wormicide administration should you use?
      Answer: Liquid injection

   b. What tools and equipment will you need?
      Answer: Syringe, graduated cylinder, PPE

2. You want to mix wormicide powder into the feed of your 60 chickens to prevent parasitic disease. The dosage is 60 g for 20 chickens.
   a. How many grams of wormicide powder will you need?
      Answer:
      20 chickens * 3 = 60 chickens
      60 g * 3 = **180 g of powder**

   b. What will you do with the wormicide waste after use?
      Answer: Either store in a separate room with the lid securely closed or dispose of it in a securely fastened trash bin. In both cases, it should not be accessible to animals.

3. Review **4.3 Key Facts** with trainees. Emphasize that they do not need to memorize the names of wormicides, but that they should be familiar with the different types and know how to use them.

Application Activity

Organise a visit to a local poultry farm. Confirm that the farmer has wormicides in stock. Ask if it is possible for the trainees to assist him or her in applying wormicides to the chickens. If not, ask if someone can demonstrate how to apply them instead. If a demonstration is not possible, contact a different farmer.

1. Upon arriving to a local poultry farm, direct trainees to **Topic 4.2 Task 4** in their manuals and guide them in completing the following tasks.

2. Identify the available wormicides on the farm.

a. What type are they (liquid, tablets, or powder)?
b. What is the dosage?
c. What tools and equipment are needed to administer them?

3. Observe as the farmer demonstrates how to administer wormicide to one or more of the chickens.

4. With permission from the farmer, facilitate groups taking turns to administer wormicide to the chickens.

5. Encourage trainees to clarify any remaining questions about the deworming process with the farmer.

Points to Remember

- Always read the manufacturer's instructions for the dosage, application method, and safety precautions.
- Under-dosing can lead to resistance to wormicides, eventually making them ineffective. Over-dosing can introduce too many chemicals into the animals' bodies.
- The best way to deal with worms is to encourage healthy chickens that resist infection through prevention efforts. Make sure they have good nutrition, especially vitamin A, B, and animal proteins.
- Keep coops, runs, feeders, and waterers clean. Rotate your birds on pasture if possible, and make sure not to keep too many birds in one area.

Formative Assessment

1. Complete the following sentences:
a. **Oral** administration of wormicides is often used in preventive or long-term medication.

b. You must use a **syringe** to apply wormicides using the injection technique.

c. Administering wormicides by mixing them in **water** requires direct supervision and must be done on the farm.

2. Answer the following questions:
a. What safety precautions must be taken when using wormicides?

Answer: Wear PPE, read manufacturer's label, store/dispose safely

b. How do you calculate dosage using tablets?

Answer:

W / U = A / X

W = Weight given

Unit = Units given

A = Actual weight of animal

X = Number of units needed

ⓘ Further Information for the Trainer

1. Williamson G., Payne W. J. A., 1978. Poultry: An Introduction to Animal Husbandry in the Tropics, Longman, London (pp. 595-652).
2. Agrodok 34, 2004, Hatching eggs by hens or in an incubator, Agromisa Foundation, Wageningen.
3. Pas Reform (2006). Guide d'incubation. Oeufs de poule (poulets de chair). Incubation Technologies.
4. De Lange G. (2009). Storage of hatching eggs. International Hatchery Practice,
5. FAO (20100), Agribusiness handbook, poultry meat & eggs.
6. Steve Merritt, et al (2010), Organic poultry production for meat.
7. Medication Calculation: http://publichealth.lacounty.gov/phn/docs/MCE%20Study%20Guiderevised6-10.pdf

Learning Outcome 4.3: Apply prevention methods

Objectives: By the end of the learning outcome, trainees will be able to:

a. Implement prevention measures on poultry farms

b. Plan and perform vaccination procedures, including transportation and storage

c. Select from and administrate various vaccination methods

Time Required: 6 hours

Learning Methodology: Brainstorming, discussion, individual and groups work, field visit, demonstration, interviewing

Materials Needed:

- **Standard training materials** – flip chart, markers, tape, A4 paper
- **Sample vaccination tools** – vaccines (liquid and oral tablets or mixing powder), syringes, needles

Preparation:

- ❑ Organise a visit to a local poultry farm
- ❑ Prepare sample materials

Cross Cutting Issues:

- ✔ **Environment and sustainability:** Emphasize handling vaccines with care and using them appropriately to create a safe, disease-free environment for poultry, other animals, and humans.
- ✔ **Standardisation culture**: Measure and apply vaccines using syringes and following manufacturer's instructions.

Prerequisites:

- Learning Unit 1: Maintain safety and hygiene
- Learning Outcomes 4.1 and 4.2

Key Competencies:

Knowledge	Skills	Attitudes
1. Describe prevention principles.	**1.** Implement prevention measures.	**1.** Detail-oriented
2. Describe vaccination planning and procedures.	**2.** Plan and perform vaccination procedures.	**2.** Forward-thinking
3. Explain different methods of vaccine administration.	**3.** Select and employ vaccine administration methods.	**3.** Methodical

Steps:

Getting Started: What do we know and where are we going?

1. Ask trainees to turn to **Topic 4.3 Task 1** in their manuals and then describe what they see in the photo above to a partner.

a. What tools are being used?
Answer: Syringe

b. What are the workers wearing? Why?
Answer: PPE (face masks, gloves, protective headwear) to protect themselves from chemicals and animal diseases.

c. What is the purpose of this process?
Answer: Vaccination is used to prevent infectious diseases.

2. Ask trainees to share their responses with the rest of the class.

Problem Solving Activity

1. Direct trainees to Topic **4.3 Task 2** in their manuals. Instruct them to individually brainstorm responses to the following questions:
a. Vaccination is one part of a disease prevention plan.
- What are other methods of infectious disease prevention?
Possible Answers: Hygiene and disinfection, chemoprevention, quarantine and isolation of new birds, proper disposal of dead animals.

- What are the potential consequences if a disease is not prevented or treated?
Possible Answers: It will spread, many animals will die, low production.

b. What are some of the challenges of obtaining and administering vaccines?
Possible Answers: Transportation from Kigali, importing, storage.

2. Have trainees share ideas with a partner.

3. With their partners, have trainees read and review **4.4 Key Facts**.
a. Discuss with your partner how the information compares to your responses in question 1.

4. Discuss the ideas as a class. Clarify any confusion.

Guided Practice Activity

1. Tell trainees to imagine they are visiting a farm and they need to administer vaccines to the chickens. Only a few birds have been affected and the farm has a low budget for vaccination. In small groups, discuss the following questions from **Topic 4.3 Task 3** in their manuals. They may refer to **4.4 Key Facts** for help.
a. What are the differences between oral and injection methods?
Answer: Oral vaccinations are more expensive and must be administered more often than injected vaccines.

b. Which administration method is the best option for this situation?
Answer: Injection

c. What steps will they need to take to organise and administer this method?
Answer: Transport vaccines to the farm, store them properly, use within a day of opening, use as needed for the appropriate size, choose between intramuscular and subcutaneous injection, wear PPE, clean and disinfect area before and after administering.

2. Now, tell trainees to imagine they are organizing poultry vaccinations for their farm as well as their neighbours' farms.

a. How should they arrange the transportation of the vaccines from Kigali to their farm?
Answer: Rent or use a truck/vehicle with refrigeration and temperature controls; keep out of sunlight.

b. Once the vaccines have arrived, how should they be stored?
Answer: According the manufacturer's instructions for exact temperature; in a separate, secured room; in a cool, insulated container.

c. What other precautions should be taken?
Answer: Be aware of timing of vaccination application (time of day, time since vaccines arrived and/or were opened); water quality – should be completely clean to ensure effectiveness of vaccines.

Application Activity

Organise a visit to a local poultry farm. Confirm that the farmer is available to answer questions about the vaccination process. Ask if it is possible for the trainees to assist him or her in vaccinating chickens. If not, ask if someone can demonstrate how to vaccinate them instead. If a demonstration is not possible, contact a different farmer.

1. Instruct trainees to ask the farmer the following questions and note the responses:

a. How often do they vaccinate the poultry on the farm?
b. Which method of vaccination do they use and why?
c. How do they transport and store the vaccines?
d. What are the challenges of vaccination?
e. What are the benefits of vaccination?
f. What other disease prevention measures does the farmer take?

g. Any other questions you have about vaccinating poultry and preventing poultry diseases.

2. Trainees should observe the farmer as he/she demonstrates how to vaccinate poultry.

3. With the farmer's permission, volunteers may vaccinate some of the poultry as well.

4. Divide trainees into small groups. Tell them to write a report about their experience at the poultry farm, including the challenges and benefits of poultry vaccination. They should submit the reports to you for review. Give feedback to each group in the next session.

Points to Remember

- Establish biosecurity measures: Wash, scrub, and disinfect your poultry house between flocks and at least once per year.
- Read the manufacturer's label for the vaccine dosage and storage instructions.
- Keep vaccines in a cool, insulated container and remove them only when needed.

Formative Assessment

1. Write responses to the following questions:

a. What precautions must be taken while transporting and storing vaccines?
Answer: Vaccines are kept in a cool, insulated area; area should be clean; once opened, vaccines should be administered as soon as possible.

b. What are three measures that contribute to disease prevention?
Possible Answers: Biosecurity measures, vaccination, chemoprevention, quarantining new animals, proper disposal of dead animals.

c. What are the differences between oral and injection administration of vaccines?
Answer: Oral vaccinations are more expensive and must be administered more often than injected vaccines.

2. You are tasked with transporting poultry vaccines from Kigali to the Karongi District. Explain the logistics of transporting the vaccines.

a. How will you transport them?
Answer: In a refrigerated, temperature-controlled truck or vehicle.

b. How will you store them?
Answer: Keep at the correct temperature and out of sunlight during transport; vaccines are stored in a separate room in a cool, insulated container.

c. How long will it take to transport them? Why is this important?
Answer: It takes about 3 hours to travel from Kigali to Karongi. You should time your trip to avoid traffic, extreme weather, and bumpy roads.

Self-Reflection

1. Ask trainees to re-take the self-assessment from the beginning of the unit. They should then fill in the table in the Trainee's Manual to identify their areas of strength, areas for improvement, and actions to take to improve.

2. Discuss trainees' results with them. Identify any areas that are giving many trainees difficulty and plan to give additional support as needed. For example, use class time before you begin the next learning outcome to go through commonly identified difficult concepts.

Note: The self-reflection will be done at the end of a unit, not at the end of every topic. This provides trainees the opportunity to identify what they understand and what they need to work on. It should take only a few minutes for them to complete.

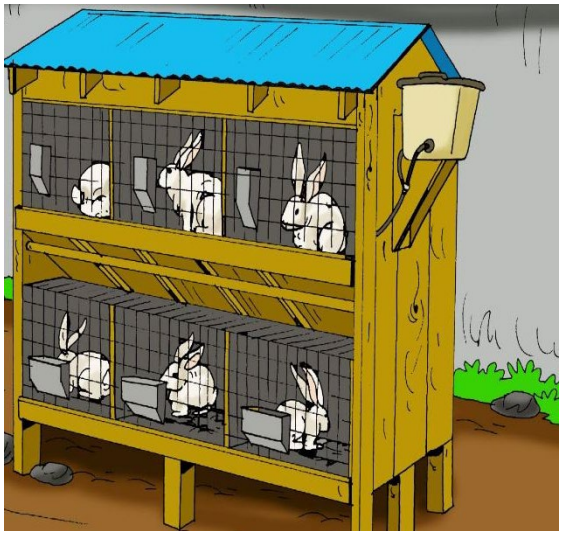
3. Ask trainees to think about what they learned from the beginning of this unit and then fill the self-reflection chart in their manuals. Highlight the areas of strength, the areas for improvement, and the actions to take to improve.

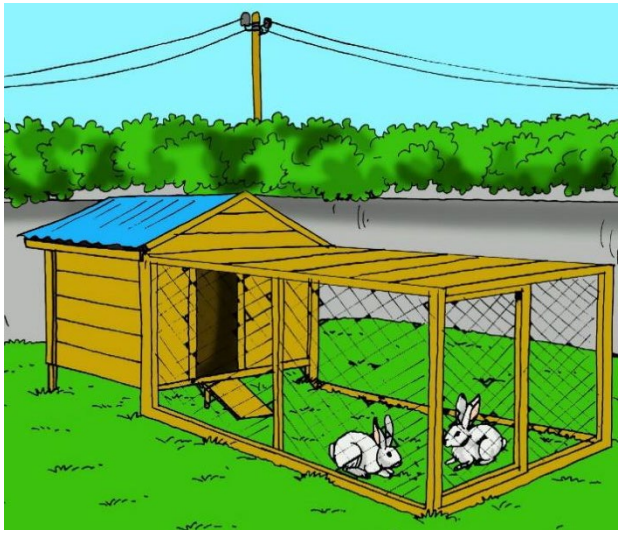
4. Collect all papers and analyse the feedback. Share the overall results with trainees and clarify information in the most commonly stated "Areas for improvement."

Further Information for the Trainer

1. Worming in Poultry – Recognising and Treating Worms: https://www.flytesofancy.co.uk/chickenhouses/Worming_Poultry.html, consulted in June 2019
2. Vaccination: http://www.fao.org/3/y5162e/y5162e04.htm
3. Best Practices for Transporting Vaccines: https://blog.smartsense.co/best-practices-for-transporting-vaccines

Learning Unit 5:
Prevent rabbit diseases





Appropriate shelters to prevent and to control rabbit diseases

Spraying rabbit with wormicide

Healthy rabbits

Learning Outcomes:

By the end of the Learning Unit, trainees will be able to:

5.1 Assist to identify disease

5.2 Control diseases

5.3 Deworm rabbit

5.4 Control predators

Learning Unit 5 Self-Assessment

1. Ask trainees to look at the illustrations above (in their Trainee Manuals) and discuss what they see. Based on the illustrations, what topics do they think this unit will include? After some brainstorming, share the main topics.

2. Explain that this unit is going to focus on the prevention of different types of animal diseases. Trainees will learn how to identify the causes and signs of diseases as well as how to control them.

3. Ask trainees to fill out the self-assessment located at the beginning of the unit in their Trainee Manuals. Explain that the purpose of the self-assessment is to become familiar with the topics in the unit and for them to see what they know or do not know. At the end of the unit, they will do a self-reflection, which includes re-taking the self-assessment and identifying their strengths, areas that need improvement, and actions to take. The self-assessment is not a test!

Learning Outcome 5.1: Assist to identify diseases

Objectives: By the end of the learning outcome, trainees will be able to:

a. Describe different diseases of rabbits

b. Differentiate signs and symptoms of rabbit diseases

c. Follow preventive procedures in rabbit farming

Time Required: 3 hours

Learning Methodology: Brainstorming, group discussion, field visit, observation, matching terms with definitions

Materials Needed:

- **Standard training materials -** flip chart, markers, tape, A4 paper

Preparation:

- ❑ Organise a visit to a rabbit farm
- ❑ Familiarize yourself with disease types from Learning Units 2, 3, and 4

Cross Cutting Issues:

- ✔ **Environment and sustainability:** Recognize the relationship between rabbits and their diseases (faeces, parasites, etc.), as well as the environmental factors involved in preventing them (cleaning with disinfectants).
- ✔ **Standardisation culture:** Diagnose diseases according to standard signs and symptoms and treat accordingly.

Prerequisites:

- Learning Units 1-4

Key Competencies:

Knowledge	Skills	Attitudes
1. Describe causes of rabbit diseases.	**1.** Identify rabbit diseases and their causes.	1. Observational
2. Describe signs and symptoms of rabbit diseases.	**2.** Differentiate signs and symptoms of rabbit diseases.	2. Detail-oriented
3. Explain preventives procedures and their importance.	**3.** Apply preventive measures.	3. Risk-aware

Steps:

Getting Started: What do we know and where are we going?

1. Ask trainees to turn to **Topic 5.1 Task 1** in their manuals. Tell trainees to recall the four types of animal diseases covered in units 2, 3, and 4. They should list them in their manuals.
Answers: Infectious, parasitic, nutritional and metabolic, and traumatic.

2. Do you think rabbits suffer from the same types of diseases? Why or why not?
Answers may vary, but essentially: yes, they do because these types of diseases can affect all animals.

Problem Solving Activity

1. Trainees should use what they already know about animal diseases to match the type of disease to its cause. Then, try to predict the signs of this disease in a rabbit.
Answers:
- Nutritional and Metabolic
    - Causes: Deficiency or imbalance of vitamins and nutrients
    - Signs: Difficulty eating; uneven teeth
- Infectious
    - Causes: Harmful bacteria and viruses living in animals
    - Signs: Sudden death; nasal discharge; fever
- Traumatic
    - Causes: Stressors or poor physical parameters in living area
    - Signs: Rapid breathing, paralysis, nervous behaviour
- Parasitic

- Causes: Parasites live in or on the animal (its host) and pass diseases to the animal
- Weight loss; lesions; rough fur coat

2. Read through **5.1 Key Facts** with trainees and have them compare their responses to question 1 to the information given.

3. Facilitate a class discussion: Are the prevention measures similar to or different from those for other animals in previous units? Encourage trainees to explain their answers using evidence from **5.1 Key Facts** and previous units.

Guided Practice Activity

1. Ask trainees to diagnose the type of rabbit disease and give the preventative measures in each of the following situations from **Topic 5.1 Task 3**:

a. Some rabbits on your farm have recently lost a lot of weight and their fur coats are unusually rough.
Answers:
Disease Type: Parasitic
Prevention: Biosecurity measures, protect feeding and drinking areas from faeces contamination.

b. Several rabbits died suddenly this week. You take the temperature of one rabbit and see that it has a fever.
Answers:
Disease Type: Infectious
Prevention: Vaccination, quarantine/isolation.

c. You notice that one of the rabbits you handled yesterday can no longer control its urination. It is peeing at unusual times and in unusual places.
Answers:
Disease Type: Traumatic (specifically broken back)
Prevention: Careful handling and restraint.

d. A few rabbits have stopped eating. You examine one of their mouths and discover the size and shape of his/her teeth are very uneven.
Answers:
Disease Type: Nutritional and Metabolic
Prevention: High fibre diet, particularly calcium and vitamin D.

Application Activity

Organise a visit to a local farm with rabbits. Confirm that the farmer will be present to give a tour of the area and answer questions about disease prevention.

1. Separate the trainees into four groups. Each group should be assigned to one of the four types of diseases: infectious, parasitic, nutritional and metabolic, traumatic. Have them open their manuals to **Topic 5.1 Task 4**.

2. Within their groups, tell trainees to observe the rabbits and do the following:
   a. Determine if any are suffering from your assigned type of disease.

b. Confirm your observations with the farmer.

3. Next, tell trainees to analyse the rabbits' living environment.
   a. Are there prevention measures in place? If so, which ones?

4. Encourage trainees to ask the farmer any remaining questions they have about rabbit diseases and their prevention.

Points to Remember

- Parasitic diseases in rabbits can be difficult to diagnose, so animals should be checked regularly.
- Preventing diseases saves time and money in the long-term, as treatment can be expensive and labour-intensive.
- Strong biosecurity measures are essential to preventing rabbit diseases.

Formative Assessment

1. Circle the correct answers:
   1. Which of the following is NOT a sign of an infectious rabbit diseases?
      a. Fever
      b. Nasal discharge
      c. Difficulty eating
      d. Sniffles

2. Which of the following types of diseases is difficult to diagnose in rabbits?
    a. Infectious
    b. Parasitic
    c. Nutritional and Metabolic
    d. Traumatic

3. Which of these is a proper preventative measure for nutritional and metabolic diseases?
    a. Adequate ventilation
    b. Keep dogs and predators away
    c. Quarantine
    d. High fibre diet

2. Write answers to the following questions:

1. Name the causes of infectious diseases.
   Answer: Harmful bacteria and viruses living in animals.

2. Name two common traumatic diseases in rabbits.
   Possible Answers: Heat exhaustion, cannibalism, broken back.

3. Explain the benefits of following preventative measures.
   Answer: More cost and time effective, and better for overall animal health.

ⓘ Further Information for the Trainer

1. Animal Health and Welfare Panel (2005). The impact of current housing and husbandry systems on the health and welfare of farmed domestic rabbits. Scientific Opinion and Report. *The EFSA Journal,* 267: 1-31.

2. Animal Health and Welfare Panel (2006). The welfare aspects of the main systems of stunning and killing applied to commercially farmed deer, goats, rabbits, ostriches, ducks, geese and quail.

Learning Outcome 5.2: Control diseases

Objectives: By the end of the learning outcome, trainees will be able to:

- **a.** Explain and follow hygiene maintenance in the rabbit spaces
- **b.** Implement rabbit disease prevention measures
- **c.** Treat rabbit diseases and isolate sick rabbits

Time Required: 4 hours

Learning Methodology: Brainstorming, group discussions, field visit, interviewing, group project, presentation

Materials Needed:

- **Standard training materials** – flip chart, markers, tape, A4 paper

Preparation:

- ❑ Organise a visit to a local rabbit farm
- ❑ Familiarity with content

Cross Cutting Issues:

- ✔ **Environment and sustainability**: Consider the environmental factors (lighting, moisture, temperature) that contribute to and/or threaten animal health. How can we control these factors without harming the environment?
- ✔ **Gender and inclusivity:** Consider gender balance while forming groups and allocating roles.

Prerequisites:

- Basic Sciences
- Learning Units 1-4

Key Competencies:

Knowledge	Skills	Attitudes
1. Explain the principles and importance of hygiene maintenance.	**1.** Follow proper hygiene maintenance in the rabbit spaces.	**1.** Forward-thinking
2. Describe disease prevention procedures.	**2.** Implement disease prevention measures to control environmental factors.	**2.** Diligent
3. Identify different types of rabbit diseases.	**3.** Treat and isolate diseased rabbits.	**3.** Attentive

Steps:

Getting Started: What do we know and where are we going?

1. Tell trainees to look at the illustrations from the beginning of this unit again. Ask them to individually brainstorm responses to the following questions found in **Topic 5.2 Task 1** in their manuals:

a. Which pictures are related to disease control?
Answer: Top right image.

b. What is being done to the rabbit?
Answer: Rabbit is being sprayed with disinfectant or treatment (maybe wormicide).

c. What do you think is the relationship between good shelter maintenance and disease control?
Answers may vary.

2. Have trainees share their ideas with a partner. Monitor their discussions and correct any major errors.

Problem Solving Activity

1. Divide trainees into small groups and tell them to discuss rabbit diseases according to the questions in the **Topic 5.2 Task 2** section of their manuals:

a. What environmental factors contribute to rabbit diseases?

b. How could we address these factors?

c. What prevention measures can be implemented for rabbit diseases?

Answers may vary. Critical thinking should be encouraged. More information will be revealed in the **Key Facts** below.

2. Based on the activity above, have trainees present their group's ideas to the rest of the class. Facilitate a class discussion.
   a. Did the groups have similar ideas?
   b. Was there an idea your group did not consider?

3. Ask the groups to read through **5.2 Key Facts** and do the following:
   ✔ Check or tick facts that confirm an idea from question 1.
   ○ Circle facts where you need more clarification.
   ❖ Star facts that relate to previous topics and units.

Guided Practice Activity

1. Now, in their small groups, direct trainee attention to **Topic 5.2 Task 3** in their manuals. Ask each group to design a rabbit hutch and living space. They should draw and label their designs. Consider the following physical parameters and the information from **5.2 Key Facts**:
   a. Temperature
   b. Humidity
   c. Lighting
   d. Ventilation

2. After designing their rabbit hutches, ask trainees what other preventative measures they can include on their rabbit farms? They should then add them.

3. Each group must now present their designed rabbit farms to the rest of the class using the flip chart.
   a. After the presentation, allow other trainees to ask questions about the designs and procedures.

Note: Trainees should use the information in **5.2 Key Facts** as well as prior knowledge of physical parameters to build their sheds. Encourage creativity, as there is not one right

answer for this task. Factors of note are sunlight, ventilation, removal of moisture, waste management, feed and water sanitation, access to moist grass and poisonous plants, preventing mould.

4. After the presentations, read and review **5.3 Key Facts** with the class. Acknowledge which facts were addressed or omitted in the presentations.

Application Activity

Organise a visit to a farm with rabbits. Confirm that the farmer will be available to answer questions about the rabbits' living space.

1. Tell trainees to turn to **Topic 5.2 Task 4** in their manuals and compare their designs and ideas from the previous activity to the layout of the rabbit space on the farm. Discuss:
   a. What aspects are similar?

   b. What aspects are different? In what ways?

2. Tell trainees to ask the farmer the following questions and write the answers below:
   a. How often does he/she inspect the rabbit cages?
   b. How often does she/he isolate sick animals?
   c. Which poisonous plants are present in the region?
   d. How does she/he prevent diseases at this farm?

3. After the field visit, lead a discussion:
   a. What did you learn?
   b. What surprised you?
   c. How did your experience compare with the information in **5.2 and 5.3 Key Facts**?

Points to Remember

- Harmful food products can cause diarrhoea, decreased coordination, central nervous system problems, breathing difficulties, tremors, coma and death.

- Excess moisture is a threat to rabbit health and should be monitored closely.

- New and sick animals should be isolated and quarantined to prevent the spread of rabbit diseases.

Formative Assessment

1. Complete the following sentences:
   a. Mould is the growth of fungi that occurs in **moist** and **warm** conditions, especially on food.

   b. Good **ventilation** removes excess moisture and heat from rabbit hutches.

   c. **Waste,** such as rabbit manure and leftover feed, should be disposed of twice per day.

2. Write answers to the following:
   a. Name three general rabbit hygiene measures:
   Possible Answers: Routine disinfection of rabbit hutch; proper cleaning; biosecurity measures; sanitary isolation.

   b. Why should new and sick animals be isolated/quarantined?
   Answer: To prevent the spread of contagious diseases.

   c. Name three poisonous plants or foods:
   Possible Answers: Eggplants; potato and sweet potato plants; tomato plants; root of mustard plants; avocado fruit, seeds, leaves, and bark; coffee/caffeine; alcohol; nuts; onions, garlics, and the chive family; large amounts of salt.

Further Information for the Trainer

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Learning Outcome 5.3: Deworm rabbit

Objectives: By the end of the learning outcome, trainees will be able to:

a. Describe the different types of wormicides
b. Measure the dosage and administer wormicide properly
c. Store and dispose of wormicide waste safely

Time Required: 4 hours

Learning Methodology: Brainstorming, group discussion, roleplay, field visit

Materials Needed:

- **Standard training materials** – flip chart, markers, tape, A4 paper
- **Sample deworming materials** – syringe, graduated cylinder, wormicides, PPE
- **Sample grooming tools** – brushes, nail clippers

Preparation:

❑ Organise a visit to a local farm with rabbits
❑ Prepare sample materials

Cross Cutting Issues:

✔ **Environment and sustainability**: Consider potential impacts of wormicides on the environment if not used, stored, or disposed of properly.
✔ **Standardisation culture**: Measure dosage precisely using a graduated cylinder and according to the manufacturer's instructions.

Prerequisites:

- Learning units 1-4
- Basic Maths and Sciences

Key Competencies:

Knowledge	Skills	Attitudes
1. Describe the different types of wormicides.	**1.** Select the appropriate type of wormicide.	**1.** Detail-oriented
2. Explain how to measure the dosage for and administer wormicides.	**2.** Measure correct dosage and administer wormicide properly.	**2.** Methodical
3. Explain the importance of storage and disposing of wormicide waste.	**3.** Store and dispose of wormicide waste safely.	**3.** Risk-aware

Steps:

Getting Started: What do we know and where are we going?

1. Think back to units 2, 3, and 4. Ask trainees to brainstorm answers to the following question found in **Topic 5.3 Task 1**:
   a. What do you already know about deworming farm animals?
   b. What products and equipment do you use?
   c. Do you think deworming rabbits is similar or different from deworming ruminants, pigs, and poultry? Why?

2. Share your ideas with the rest of the class.

Answers may vary. The goal is for trainees to access prior knowledge, so it is not necessary for them to remember every single detail from previous units. Any major errors, however, should be corrected. Encourage critical thinking.

Problem Solving Activity

1. Divide trainees into small groups. Tell them to turn to **Topic 5.3 Task 2** and imagine this situation: A farmer hands you two types of wormicide to remove worms from your rabbits. One is a liquid and one is a powder.
   a. How do you administer the liquid?
   Possible Answers: Injection, pour-on, mixing and diluting with water (Injection is the correct answer in the case of rabbits.).

b. What tools do you need?
Possible Answers: Syringe, graduated cylinder.

c. How do you administer the powder?
Answer: Mixing with feed or water.

d. What tools do you need?
Answer: Bucket to mix, measuring tool for powder (cup).

2. In addition to deworming, what other measures can we take to care for the health of rabbits? Describe what you see in the picture below to a partner.
Answers may vary. Picture below shows grooming/brushing and nail cutting.

3. Draw trainees' attention to **5.4 Key Facts.** Read through them as a class, with particular focus on **Other Rabbit Care Measures** because that is the newest information. The other facts should reflect and reinforce what has been covered in units 2-4. Ask them if they feel confident with the information. If not, review and clarify any confusion.

Guided Practice Activity

1. Put trainees in partners. Tell them that they will act out the roleplay from **Topic 5.3 Task 3**. Assign Person A to one person and Person B to the other.
a. Person A is an agriculture trainee who has discovered that their rabbits have tapeworms.
b. Person B is a farmer with 10 years of experience with rabbits.

2. Person A is asking Person B about the process and procedures for deworming their rabbits. Person B will provide accurate and complete information to Person A, referring to **Key Facts** as necessary.

3. Be sure they discuss: Safety measures, tools and equipment needed, the different types of wormicide, administration methods, waste disposal, storage, and any other advice.

4. Monitor and observe the roleplay between pairs. Tell trainees to change roles if there is enough time.

   Conversations will vary. Monitor them and correct any errors you notice.

Application Activity

Organise a visit to a local farm with rabbits. Confirm that the farmer is available to answer questions about the deworming process. Ask if it is possible for the trainees to assist him or her in deworming some rabbits. If not, ask if someone can demonstrate how to deworm them instead. If a demonstration is not possible, contact a different farmer.

1. Tell trainees to identify the available wormicides.
   a. Have them read the manufacturer's labels.

   b. Ask them to explain the dosage amount and how to calculate it.

2. Encourage trainees to ask the farmer to explain their process for deworming the rabbits. Tell trainees to take notes on the farmer's responses.

3. With permission and assistance from the farmer, trainees may work in groups to administer wormicides to the rabbits.

4. With their groups, tell trainees to write a step-by-step manual for deworming rabbits. They should include each step of the procedure and the necessary tools, equipment, and products. Submit it to the trainer for review.

Points to Remember

- Rabbits need to be dewormed every three months.
- Always read the manufacturer's label for dosage, storage, and administration instructions.
- Disinfect housing, bedding, and food & water bowls regularly, using a safe disinfectant

Formative Assessment

1. Select True or False for the following statement:

- ❑ **False:** Parasites do not pose a significant threat to rabbit health.
- ❑ **True:** Rabbits need to be brushed at least three days per week.
- ❑ **False:** PPE is optional and not necessary when applying wormicides to rabbits.
- ❑ **False:** Liquid is the only type of wormicide.

2. Complete the following sentences:

a. Rabbits need to be dewormed every **three** months.

b. You should read the manufacturer's instructions for wormicide **storage** temperature

c. Cutting nails and **grooming** are two other ways to care for rabbit health and prevent disease.

Further Information for the Trainer

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Learning Outcome 5.4: Control predators

Objectives: By the end of the learning outcome, trainees will be able to:

a. Identify and differentiate between rabbit predators

b. Control predators by implementing protection procedures

c. Maintain a safe hutch to protect against predators

Time Required: 4 hours

Learning Methodology: Brainstorming, group discussion, interviewing, field visit, observation

Materials Needed:

- **Standard training materials** – flip chart, markers, tape, A4 paper

Preparation:

- ❑ Organise a field visit to a farm with rabbits
- ❑ Make sure farmer is available to be interviewed

Cross Cutting Issues:

- ✔ **Environment and sustainability:** Explain that predators are a natural part of the cycle of life and the environment.
- ✔ **Gender and inclusivity**: Consider gender balance when forming groups and allocating roles.

Prerequisites:

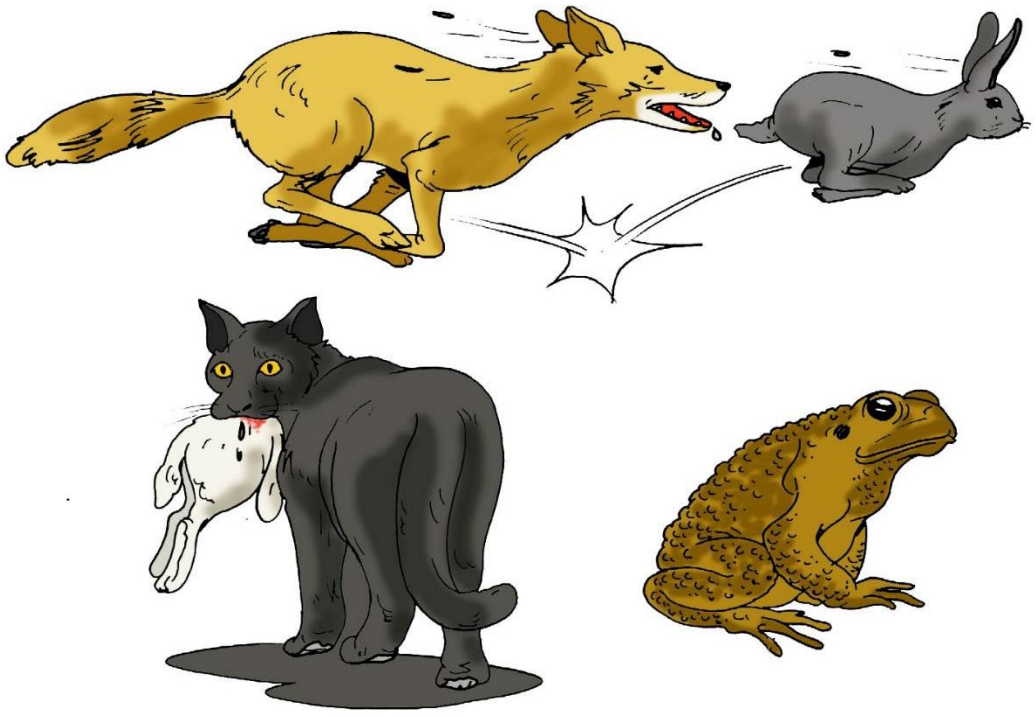
- ❑ None

Key Competencies:

Knowledge	Skills	Attitudes
1. Identify different predators.	**1.** Differentiate between carnivore, insect, and rodent predators.	**1.** Detail-oriented
2. Explain the importance of protection procedures.	**2.** Implement predator protection procedures.	**2.** Forward-thinking
3. Explain hutch hygiene and maintenance measures.	**3.** Maintain effective hutch to protect against predators.	**3.** Methodical

Steps:

Getting Started: What do we know and where are we going?



Main predators of rabbits

1. Tell trainees to observe the images above **Topic 5.4 Task 1** in their manuals and describe them to a partner.
   a. What do you see?
   b. What relationship is there between the rabbits and the other animals (predators)?

c. How can we prevent predators from killing rabbits and affecting production?

2. Encourage trainees to share their ideas with the rest of the class.

Problem Solving Activity

1. Explain to trainees that rabbits need to be protected against other animals who will kill them, which are called predators. Separate trainees into small groups and tell them to discuss the following questions from **Topic 5.4 Task 2**:
   a. What predators do you know of in Rwanda and/or your region?
   b. How can predators be prevented from killing rabbits?
   c. What might happen if there are no prevention methods against predators?

2. Direct the trainees' attention to **5.5 Key Facts**. They should then:
   ✔ The predators and controls you identified during the previous discussion.
   ○ Circle the predators and controls you had not considered for question 1.
   ? Add predators that are not included in the **Key Facts**, but that you are familiar with.

Guided Practice Activity

1. Ask the trainees to turn to **Topic 5.4 Task 3** and present this scenario to them: Imagine you have been tasked with building a rabbit hutch to protect the rabbits from predators. Specifically, the rabbits have been killed by hawks and rats. Separate trainees into small groups. They must address the following questions using **5.5 Key Facts**.
   a. Identify the method that the predators are using to kill the rabbits. How are they entering the hutch?
   b. What construction measures are needed to stop these predators?
   c. How can you prevent other predators from also attacking the animals?

2. With their groups, have trainees present their hutch construction plans to the rest of the class using the flip chart.

3. Facilitate a class discussion in which trainees compare their plans to other groups.
   a. What did you do differently?
   b. What did you do the same?

Application Activity

Organise a visit to a local farm with rabbits. Confirm that the farmer is available to answer questions about predators.

1. Ask trainees to turn to **Topic 5.4 Task 4**. With their same group, instruct trainees to prepare interview questions for a farmer with rabbits. They should include questions that address:
   - **a.** Different rabbit predators and how to identify them
   - **b.** Most common predators in this area
   - **c.** How to control or prevent predators
   - **d.** Hutch construction and maintenance

2. Trainees should interview the farmer using the questions created previously and note the answers in the table.

3. With the farmer, lead trainees on a tour of the rabbit hutch and observation of the construction as well as the materials used.

Points to Remember

- The only way to keep rabbits completely safe from predators is to keep them indoors.
- Cleaning hutches regularly prevents and eliminates harmful insects/parasites.
- Some predators can fly, and others can dig, so make sure that the hutch is protected from the side, above, and underneath.

Formative Assessment

1. Select which of the following are predators of rabbits:

- ❑ **Dogs**
- ❑ Goats
- ❑ **Rats**
- ❑ **Hawks**
- ❑ Pigs
- ❑ **Large snakes**

2. Name three aspects of hutch construction that keep predators away from rabbits.

Answers: Wire fences; wood, concrete, or wire mesh floors; raised off the ground with wooden legs

Self-Reflection

1. Ask trainees to re-take the self-assessment from the beginning of the unit. They should then fill in the table in the Trainee's Manual to identify their areas of strength, areas for improvement, and actions to take to improve.

2. Discuss trainees' results with them. Identify any areas that are giving many trainees difficulty and plan to give additional support as needed. For example, before you begin the next learning outcome, use class time to go through commonly identified difficult concepts.

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Summative Assessment

Integrated situation	Resources
The trainee will complete the following summative assessment according to the scenario: Mukarugwiza is farmer in Bugesera district, Nyamata sector, Ntarama cell. She works in the field of poultry farming. Right now, she has a health problem with her layers. She plans to sell them all and buy 50 chicks. Before introducing the new chicks, she must apply hygiene and disease prevention measures to ensure the health of her new chicks. As a professional in poultry farming, she asks you to support her in organising the hygiene and disease prevention measures. The following tasks need to be completed within 3 hours: **1. Write a proposal for the needed tools, equipment, and products:** **a.** To clean and disinfect the chicks starter house. **b.** To store the material and equipment. **c.** To monitor the physical parameters of the chicks starter house. **d.** To show the significance of hygiene measures. **2. Demonstrate the procedures for:** **a.** Selecting the appropriate tools, equipment, and products. **b.** Cleaning the chicks living space. **c.** Disinfecting the chicks living space. **3. Draft a plan for preventative procedures to:** **a.** Prevent infectious poultry diseases. **b.** Prevent parasitic poultry diseases. **c.** Prevent nutritional and metabolic poultry diseases. **d.** Prevent traumatic poultry diseases. **4. Use a sample wormicide to:** **a.** Calculate and measure the dosage for 50 chicks. **b.** Perform safety procedures. **c.** Dispose of wormicide.	PPE Papers Pen or Pencil Cleaning materials Cleaning tools Detergent Disinfectants Syringes Wormicide

Assessment Criterion 1: Quality of Process

Checklist	Score	
	Yes	No
Indicator 1: Cleaning tools and equipment are correctly identified		
Broom		
Cleaning brush		
Squeegee		
Indicator 2: Products are correctly selected		
Detergent		
Disinfectants		
Indicator 3: Cleaning tools are used according to the manufacturer's instructions		
Broom		
Cleaning brush		
Squeegee		
Indicator 4: Cleaning products are used correctly		
Detergent		
Disinfectant		
Indicator 5: Personal protective equipment (PPE) are properly selected and worn		
Equipment		
Use of equipment		
Indicator 6: Disinfectants are identified correctly		
Types		
Dilution		
Indicator 7: Disinfectants are used properly		
Application		
Spraying		
Fumigation		
Indicator 8: Material and equipment are cleaned and stored correctly		
Cleaning the material		
Storing the products safely		
Indicator 9: Material and equipment are correctly arranged		
Types		
Use		
Weight		
Strength		

Indicator 10: Stocks are replenished regularly		
Repairing		
Stock taking		
Indicator 11: Physical parameters are monitored correctly		
Ventilation		
Humidity		
Temperature		
Lighting		
Indicator 12: Biological parameters are monitored correctly		
Microbes		
Parasites		
Insects		
Predators		
Indicator 13: Chemical parameters are monitored correctly		
Air pollution		

Assessment Criterion 2: Quality of Product

Checklist	Score	
	Yes	No
Indicator 1: Appearance		
Absence of spots		
Absence of dust		
Absence of bad smell		
Absence of insects and predators		

Assessment Criterion 3: Relevance

Checklist	Score	
	Yes	No
Indicator 1: Measurement of products		
Dilution		
Quantity used		
Indicator 2: Time		
3 hours		
Indicator 3: Transportation		

Transport conditions are good		
Indicator 4: Diagnosis		
Relevant diseases are diagnosed		

Assessment Criterion 4: Safety

Checklist	Score	
	Yes	No
Indicator 1: PPE		
Choice of PPE		
Worn properly		
Indicator 2: Fish		
Properly manipulated		
Indicator 3: Cleaning		
Working area and materials are cleaned properly		

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