HARVESTING FARM ANIMALS AND ANIMAL PRODUCTS. SENIOR FIVE

2025



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CONSTRUCT: ANIMAL PRODUCTION.
TOPIC 4: HARVESTING FARM ANIMALS AND ANIMAL PRODUCTS.
COMPETENCY:
The learner harvests optimal quality farm animals and animal products for the market.
SUB-TOPIC 4.1: PREPARATION FOR HARVESTING.
LEARNING OUTCOMES.

- The learner should be able to demonstrate understanding of various harvesting techniques for the selected animal and animal product for the market. (k, u, s, v/a,g s)

ACTIVITY: 4.1.1 **Understanding of various harvesting techniques for the selected animal and animal products.**

RESOURCES:

1.Utilize platforms like YouTube or educational websites that show step-by-step videos on the proper procedures for harvesting animals and products.

2. Internet. Online resources like open educational resources for agriculture, open genetics, khan academy and educational youtube channels. Freeman et

TASK/ WHAT TO DO:

In groups;

a) Make a field visit to a farm to observe the harvesting of a selected farm animals and animal products or watch/interact with a video simulating the harvesting of animals and animal products.

b) Make a report on harvesting animal, animal products and preparation that should be undertaken when harvesting animal and animal products

c) Present your findings to the class and record in your notebook.

4.1.1: PREPARATION FOR HARVESTING.
I.1.1.1 INTRODUCTION.

Harvesting refers to the process of slaughtering and preparing an animal for consumption or for its products. The term harvesting can also apply to other animal products. It can refer to collecting wool, mohair, honey, or milk from animals, or to harvesting offal and other by-products during the slaughtering process.

Harvesting is the end-of-life process for livestock raised for human food. It is the final step in a cycle of breeding, raising, and feeding animals to their optimal maturity or size for meat production.

Modern animal agriculture emphasizes carrying out the harvest process as humanely and stress-free as possible. Pre-slaughter stress can negatively affect meat quality, so keeping animals calm is important for both ethical and commercial reasons.

While culling also involves killing an animal, it is done to remove undesirable animals from a breeding stock to improve the herd's genetics, or to manage population size. A "market cow," or a cow being harvested for meat, is considered an asset, whereas a "cull cow" might be removed for health or performance issues.

The harvesting process is highly regulated by agencies like the USDA's Food Safety and Inspection Service (FSIS) to ensure that products are safe, clean, and accurately labeled.

4.1.1.2 ANIMAL PRODUCTS THAT CAN BE HARVESTED.

A wide variety of farm animal products are harvested for food, clothing, and other commercial uses. In some cases, the harvesting refers to a one-time slaughter process, while for other products, such as milk and wool, harvesting is a continuous process over the animal's lifetime.

FOOD PRODUCTS;

- **Meat:** The most direct and common product harvested from livestock. It includes beef from cattle, pork from pigs, lamb and mutton from sheep, and poultry meat (chicken, duck, and turkey).
- **Offal and variety meats:** Organ meats such as liver, kidneys, and heart, as well as the intestines used for sausage casings, are all harvested and consumed.
- **Milk and dairy products:** Harvested from mammals like cows, goats, and sheep, milk is a key farm product. It is processed into a vast array of dairy items like cheese, butter, yogurt, and ice cream.
- **Eggs:** The reproductive output of poultry, particularly chickens, is a globally harvested food product.
- **Fat:** Rendered fats like lard from pigs and tallow from cattle are used for cooking and can also be found in products like soap and candles.
- **Honey:** Produced and harvested from farmed bees, honey is a natural sweetener.
- **Gelatin:** This protein is derived from the bones, skin, and connective tissues of harvested animals, and is used to make candy, marshmallows, and other foods.
- **Blood:** Sometimes used to make food products like blood sausage.

NON-FOOD PRODUCTS;

- **Leather and hides:** The hides and skins from harvested animals are processed to create leather for shoes, bags, clothing, and furniture.
- **Wool, hair, and fur:** Sheep's wool is a continuously harvested product. Fur and hair from animals like alpaca, goats (mohair), and some breeds of cattle are also collected for textiles.
- **Manure:** A continuous byproduct of animal farming, manure is harvested as a valuable organic fertilizer for crops.
- **Pharmaceuticals and technical products:** Glands and organs from harvested animals can be used to create medicines and other technical products.
- **Fertilizers and feed:** Animal bones are often processed into bone meal for fertilizer, while other animal by-products are rendered into ingredients for pet food and other animal feed.
- **Biogas:** Animal waste can be harvested and processed in a bio-digester to produce biogas for energy.

4.1.1.3 PREPARATION THAT SHOULD BE UNDERTAKEN WHEN HARVESTING ANIMAL AND ANIMAL PRODUCTS.

To harvest animals and animal products properly, preparations must be undertaken with a strong focus on hygiene, animal welfare, and safety.

These preparations vary depending on the specific animal and product.

A) GENERAL PREPARATIONS FOR HARVESTING MEAT.

For the humane slaughter of livestock, proper preparation ensures high meat quality and prevents contamination.

- **Animal selection and health**: Only healthy animals should be selected for slaughter. The farm should keep records of any treatments, and withdrawal periods for medications should be observed before harvesting.

- **Stress reduction**: Pre-slaughter stress affects meat quality, making the meat tough and affecting its flavor.
- **Calm handling**: Transport and handling should be done calmly, avoiding loud noises, whipping, or other causes of fear and injury.
- **Rest**: Animals should be rested upon arrival at the slaughterhouse, with access to clean water. This helps to identify any sick or injured animals before slaughter and lessens stress.
- **Fasting**: Withholding feed for 8–12 hours before slaughter helps empty the animal's digestive tract. This minimizes the risk of carcass contamination during evisceration.
- **Cleanliness**: Ensure animals are as clean as possible before transport. The transport truck and holding pens must also be clean to prevent microbial contamination.

B) PREPARATIONS FOR HARVESTING MILK.

Hygienic milk harvesting is crucial to prevent contamination and ensure high-quality milk.

- **Routine**: Cows are creatures of habit, so establishing a consistent milking routine keeps them calm and productive.
- **Milking area sanitation**: The milking parlor, milking machines, and all equipment must be thoroughly cleaned and sanitized before milking begins.
- **Milker hygiene**: The milker should wear clean clothes, gloves, and have a hand washing station easily accessible.
- **Udder preparation**: Before milking, the milker should clean the cow's teats and udder.
  - **Strip the foremilk**: Squirting the first few streams of milk into a strip cup helps detect mastitis, an udder infection that can contaminate the rest of the milk.
  - **Use pre-dip**: Apply a disinfectant solution to the teats for 30–60 seconds, then wipe it off with a single-use paper towel to prevent bacteria from entering the milk.

C) PREPARATIONS FOR HARVESTING EGGS

Proper egg collection focuses on speed, hygiene, and preventing breakage.

- **Hygienic environment**: Keep nesting boxes clean and dry to prevent soiling of the eggs.
- **Regular collection**: Collect eggs frequently throughout the day, as often as every two hours, to reduce soiling and breakage. This also prevents exposure to high temperatures that can reduce egg quality.
- **Proper handling**:
- Use clean hands and sanitized baskets to collect eggs.
- Separate clean eggs from dirty or broken ones immediately after collection.
- **Storage preparation**: Place collected eggs in clean cartons, with the smaller end facing down, and store them in a cool, dry place to maintain freshness.

D) PREPARATIONS FOR HARVESTING WOOL AND OTHER FIBER

For quality wool or fiber, preparing the animal and equipment is key.

- **Dry animal**: The sheep must be kept dry before shearing, as wet wool is difficult to shear and can be damaged.
- **Fasting**: Withholding feed for 8–12 hours before shearing keeps the sheep's stomach from being too full, making it more comfortable to handle. This also reduces the risk of soiling the fleece.
- **Clean environment**: The shearing area, floor, and wool collection area must be clean and free of dirt, straw, and other contaminants that can damage the fleece.
- **Equipment sanitation**: Shearing equipment should be disinfected between animals to prevent the spread of infectious diseases.
- **Skirting**: Before shearing, remove any soiled wool, or "tags," from the edges of the fleece to ensure a clean final product.

E) PREPARATIONS FOR HARVESTING HONEY.

Responsible beekeeping requires careful preparation to ensure a successful harvest without harming the colony.

- **Wear protective gear**: A bee suit, gloves, and veil are essential to protect the beekeeper from stings.

SUB-TOPIC 4.2: HARVESTING OF ANIMALS AND ANIMAL PRODUCTION.
LEARNING OUTCOMES.

- The learner should be able to harvest farm animals and animal products in compliance with local and international regulations to ensure product safety and animal welfare. (k, u, s, v/a,g s)

ACTIVITY: 4.2.1 **Exploring the methods or process of harvesting selected animals and animal products.**

RESOURCES:

1.Utilize platforms like YouTube or educational websites that show step-by-step videos on the proper procedures/methods of harvesting animals and animal products.

2. Internet. Online resources like open educational resources for agriculture, open genetics, khan academy and educational youtube channels. Freeman et

TASK/ WHAT TO DO:

In groups;

1-Make a field visit to a farm to observe the procedure of harvesting selected farm animals and animal products or watch/interact with a video simulating the step by step procedures of harvesting animals and animal products.

a) Identify methods and proper process of harvesting animals and animal products.

b) Suggest factors that affect harvesting of animals and animal products.

c) How do farmers benefit from harvesting animals and animal products?

2-Present your findings to the class and record in your notebook.

4.2.1. METHODS AND PROPER PROCEDURES FOR HARVESTING ANIMALS AND ANIMAL PRODUCTS.

Proper procedures for harvesting animal products vary greatly depending on the product, from the slaughter of an animal for meat to the collection of eggs. All processes are governed by regulations and best practices focused on animal welfare, hygiene, and food safety.

Farm animals are harvested for meat, eggs, milk, and other byproducts through specific methods for each species. For animals raised for meat, the process follows a humane-slaughter protocol that involves stunning the animal to render it unconscious before bleeding. For other products, harvesting is a non-lethal, repetitive process over the animal's life.

Species-specific methods of stunning.

- **Beef cattle:** After stunning and bleeding, the hide is removed, and the carcass is eviscerated and split in half. It is then chilled for 24 to 48 hours to improve meat quality.
- **Pigs:** Stunning is most commonly done with electrical or carbon dioxide methods. After bleeding, the carcass is scalded in hot water to help remove hair before being eviscerated.

- **Poultry:** In large processing facilities, chickens are often stunned using an automated electrical water bath system or a gas system, then moved to a mechanical neck cutter.

A) HARVESTING MEAT.

The process for harvesting animals for meat, also known as slaughtering, generally involves three stages: Preslaughter handling, stunning, and bleeding. Humane handling and hygiene are critical to produce safe, high-quality meat.

i. **Preslaughter handling.**

- Before entering the processing area, animals are handled in a manner that minimizes stress. Excessive stress can negatively impact meat quality.
- Access to food is often restricted for a set period (e.g., 12–24 hours) to make evisceration easier, while access to water is maintained.
- In some large-scale operations, automated transport systems move animals from holding pens toward the stunning area.

ii. **Stunning.**

Stunning renders an animal unconscious to ensure it feels no pain during slaughter. The primary methods used include:

- Captive bolt: A device fires a rod into the animal's brain, causing immediate unconsciousness. It is a common method for larger animals like cattle, sheep, and goats.
- Electrical stunning: An electrical current is passed through the animal's brain via tongs, causing a temporary or permanent loss of consciousness. It is widely used for pigs and poultry.
- Gas stunning**:** Animals are lowered into a chamber containing a high concentration of gas, typically carbon dioxide, which renders them unconscious. This is a common method for pigs and poultry.

iii. **Bleeding.**

- After stunning, the animal is hoisted by a leg, and a cut is made to the major blood vessels in the neck or chest.
- This procedure causes rapid blood loss, ensuring death before the animal regains consciousness.

iv. **Dressing:**

The carcass is moved to a clean area for dressing, which involves skinning (or de-feathering for poultry), eviscerating (removing organs), and washing. The skin/hide should not touch the meat to prevent bacterial contamination.

v. **Inspection:**

A postmortem inspection is conducted on the carcass and organs to ensure the meat is wholesome and free of disease.

vi. **Chilling:**

The carcass is moved to a refrigerated room to quickly lower its temperature, which slows bacterial growth and improves shelf life.

vii. **Cutting and packaging:**

In a separate, clean room, the carcass is broken down into smaller cuts, which are then packaged and labeled.

B) HARVESTING EGGS.

Egg harvesting methods depend on the scale of the operation:

- **Manual collection:** In small-scale and backyard settings, eggs are collected by hand.

- **Automated collection:** Commercial egg farms use automated systems with conveyor belts that gently move eggs from the laying area to a central collection point for cleaning, sorting, and packaging.

Proper egg harvesting focuses on minimizing contamination and breakage.

- **Frequent collection:** Gather eggs at least once or twice a day. This prevents them from becoming dirty, broken, or contaminated by the hens.
- **Use clean containers:** Always use a clean basket or container to collect and transport eggs.
- **Cleanliness:** If eggs are dirty, gently brush them with a clean cloth. If washing is necessary, use warm water and avoid soaking, as this can force bacteria through the shell's pores. Never use harsh detergents.
- **Storage:** Store eggs in a cool, dry place to maintain their freshness.

C) HARVESTING MILK.

The method for harvesting milk from dairy animals, such as cows, goats, and sheep, involves milking and can be done either manually or mechanically.

- **Hand milking:** This is done by hand, with the milker applying rhythmic squeezing motions to the teats to extract milk into a bucket. It is a labor-intensive method often used in smaller operations.
- **Machine milking:** On commercial dairy farms, machines apply a vacuum and pulsation to the teats to extract milk into a sterile pipeline. This method is faster, more hygienic, and is a standard practice in the dairy industry.

Producing clean, high-quality milk requires strict hygienic procedures to prevent bacterial contamination.

- **Hygienic environment:** The milking barn and equipment must be kept clean. Personnel should wear clean clothes and use proper hygiene.
- **Animal preparation:** Before milking, clean the cow's udder and teats. A pre-dip solution can be applied to disinfect the teats.
- **Milking:** The milking process should be done quickly and calmly. Whether done manually or with machines, the equipment should be thoroughly sanitized.
- **Cooling:** After milking, the milk should be cooled to 4°C within a few hours to stop bacterial growth and prevent spoilage.
- **Transportation:** The milk is transported to a processing plant in clean, insulated containers to maintain its temperature and quality.

D) HARVESTING WOOL AND FIBER.

Harvesting fleece involves careful shearing and processing to maximize the value of the wool.

- **Shearing preparation:** Ensure the sheep are clean, dry, and calm before shearing. Fasting them overnight can reduce the contents of their digestive system, making them easier to handle.
- **Humane shearing:** Use proper technique to shear the fleece in a continuous piece, avoiding cuts to the sheep's skin. A wooden shearing board provides a clean surface that is easy to sweep between animals.
- **Fleece handling:** After shearing, "skirt" the fleece by removing dirty or matted edges, bellies, and other debris. The fleece is then rolled, graded, and packed for transport.
- **Processing:** The wool is washed (scoured) in hot, soapy water to remove lanolin and dirt. It is then dried, picked, and carded to prepare it for spinning into yarn.

E) HARVESTING HONEY.

Harvesting honey from bees involves separating the honeycombs from the hive, clearing the bees, and then extracting the honey.

- **Smoke:** A beekeeper uses a smoker to puff cool smoke into the hive to calm the bees before opening it.

- **Removal of frames:** Frames containing capped honey are carefully removed. Bees are brushed or shaken off the frames back into the hive.
- **Extraction:** The thin wax cappings are scraped off the combs with a knife. The frames are then placed in a centrifuge (extractor) that spins the honey out. For smaller operations, honey can be pressed from the comb.

Beekeeping practices focus on harvesting honey while preserving the health of the bee colony.

- **Right timing:** Harvest only honeycombs that are fully capped with a layer of beeswax, indicating that the honey is ripe and has a low moisture content.
- **Use a smoker:** A smoker can be used to calm the bees and make harvesting safer for both the beekeeper and the bees.
- **Leave enough honey:** Ensure you leave enough honey in the hive for the bees to feed on, especially if winter is approaching.
- **Extraction and handling:** Extract honey in a clean indoor space to prevent contamination and discourage other bees. Use a honey extractor and mesh strainer to collect clean honey.
- **Storage:** Store the extracted honey in food-grade jars with tight-fitting lids in a cool, dark place.

F) HARVESTING FARMED FISH.

Methods for harvesting farmed fish depend on the type of fish and the facility.

- **Seining:** A large net is used to encircle fish in a pond, which is then pulled tighter to gather the fish for collection.
- **Pond draining:** Water is slowly drained from the pond, concentrating the fish in a small catch basin where they can be collected with nets.
- **Pumping:** Specialized pumps can be used to move fish from the water into a collection tank.

4.2.2. FACTORS AFFECTING HARVESTING OF ANIMALS AND ANIMAL PRODUCTS.

The efficiency, safety, and quality of harvesting animals and animal products depend on a wide range of factors. These factors can be **biological, environmental, technological, or related to human management and handling practices.**

A) Meat harvesting.

These factors primarily impact the meat quality and the welfare of the animal prior to and during slaughter.

- **Pre-slaughter handling.**

  Stress; high stress levels in animals before slaughter can result in lower meat quality, including darker color, tougher texture, and a shorter shelf life. Factors contributing to stress include:
  - Loading and unloading.
  - Transport conditions and duration.
  - Noise and unfamiliar surroundings in the slaughterhouse.
  - Mixing with unfamiliar animals, which causes aggression.

- **Welfare during transport.**

  The design of transport vehicles and handling facilities directly affects animal welfare and stress levels. Non-slip floors, appropriate ventilation, and calm handling techniques minimize injury and panic.
- **Fast and water access.**

  Restricting feed for 12–24 hours before slaughter can simplify evisceration and prevent carcass contamination. However, providing access to water is important to prevent dehydration and stress.

- **Slaughter process.**
  Stunning effectiveness: The method and effectiveness of stunning are critical for ensuring a humane and efficient slaughter process. Ineffective stunning can lead to unnecessary suffering and impact meat quality.
- **Equipment and facility design:**
  The layout of slaughterhouses and the condition of equipment directly affect worker safety and animal welfare. Facilities with curved chutes and solid-sided fences can help keep animals calm.

B) Milk harvesting.

- **Animal health and comfort:** A cow's health is directly linked to milk yield and quality. Stress from factors like heat, overcrowding, or disease can significantly reduce milk production.
- **Milking routine and intervals:** Cows respond positively to consistent routines. Irregular milking intervals or stressful milking conditions can disrupt milk let-down and reduce yield.
- **Nutrition and diet:** The quality and consistency of the feed have a major impact on both milk quantity and its composition, including fat and protein content. Deficiencies in key nutrients can lower overall production.
- **Genetics and breed:** An animal's breed and genetic potential are key determinants of its milk yield. Selective breeding can lead to higher milk production.
- **Equipment sanitation:** For machine milking, the hygiene of the equipment is critical to prevent bacterial contamination of the milk. Poor sanitation can compromise product safety.

C) Egg harvesting.

- **Hen age and genetics:** The age and genetic strain of the laying hen influence both the number and size of eggs, as well as the thickness of the shell and internal quality.
- **Nutrition:** A hen's diet, especially its mineral and vitamin content, directly impacts shell strength and internal egg quality. A calcium deficiency, for example, can result in fragile shells.
- **Environmental conditions:** Temperature, light, and humidity in the hen house affect egg production and quality. Extreme heat can cause stress and lead to a drop in both.
- **Handling and collection:** Rough or infrequent collection of eggs can increase the rate of breakage and contamination. Automated systems must be calibrated to handle eggs gently.

D) Honey harvesting.

- **Climate and environment:** Weather patterns, including rainfall, temperature, and humidity, determine the duration and quality of nectar flow, which is a primary food source for bees.
- **Forage availability:** The abundance and diversity of flowering plants near an apiary are critical for bee health and honey yield. Habitat loss and drought can severely limit forage.
- **Colony health and management:** Strong, healthy bee colonies with active queen bees are more productive. Beekeepers must manage pests, diseases, and parasites to prevent colony collapse.
- **Pesticide exposure:** The use of pesticides and herbicides can be lethal to bees and contaminate honey, affecting both the harvesting process and the safety of the final product.

E) Fish harvesting.

- **Water quality:** For aquaculture, factors like temperature, dissolved oxygen levels, and pH directly influence fish health, growth rates, and survival.

- **Pond management:** Proper management of pond environments, including water circulation and waste removal, is crucial for preventing disease outbreaks and ensuring healthy stock.
- **Technology and equipment:** The type and quality of harvesting equipment, from seine nets to specialized pumps, impact the speed and efficiency of the harvest, as well as the welfare of the fish.
- **Market access and demand:** For fish farming to be profitable, there must be a viable market for the product, with proper processing and distribution infrastructure.

4.2.3. BENEFITS OF HARVESTING ANIMALS AND ANIMAL PRODUCTS.

Farmers benefit from harvesting animals and their products by gaining food, income from selling products like meat, milk, and hides, and by obtaining essential farm resources such as manure for fertilizer, fibre, and fuel. Furthermore, animals provide services like transport, draught power for farm work, and serve as a means of accumulating capital and diversifying economic risk.

Harvesting animals and their products provides significant benefits, including food security and nutrition, economic growth, and cultural value. However, the environmental impacts of intensive production practices, such as greenhouse gas emissions and land degradation, are a major concern for sustainability.

Food and nutrition;

Animal products are a critical source of dense nutrition for a growing global population, providing high-quality protein and essential micronutrients often lacking in plant-based diets.

- **Protein and amino acids:** Meat, milk, eggs, and fish supply complete proteins that are highly digestible and contain all the essential amino acids needed for muscle growth and repair.
- **Micronutrients:** Animal products are rich in bioavailable iron, zinc, vitamin B12, vitamin A, and omega-3 fatty acids. This is particularly important for populations vulnerable to malnutrition.
- **Food security:** Livestock and wildlife serve as a vital food source, especially for rural and poor communities. This helps to alleviate hunger and provides a buffer during times of seasonal food scarcity.

Economic and livelihood benefits;

Harvesting animals and their products is a major driver of economic growth and provides a livelihood for millions of people worldwide.

- **Livelihood and employment:** The livestock industry supports farmers, processors, and distributors. For many small-scale farmers in developing countries, animal ownership provides economic stability and income, which can be used to buy other necessities.
- **Trade and export:** The animal production sector fosters trade opportunities, with certain countries being major exporters of meat, dairy, and other animal products.
- **Diverse products:** In addition to food, animals provide other valuable products like leather, wool, fibers, pharmaceuticals, fertilizer, and fuel, which supports multiple industries.
- **Source of income:** Selling animals, milk, eggs, wool, and other animal products provides farmers with a consistent and diversified stream of revenue, which can be critical during a poor harvest or a drop in crop prices.
- **Capital accumulation:** For many small-scale farmers in developing nations, livestock represent a form of capital. They can be sold when cash is needed for a specific purpose, such as paying for a child's education, or serve as a financial buffer during a crisis.

- **Reduced reliance on external resources:** Farmers can use on-farm inputs, such as crop residues and food waste, to feed their livestock. In turn, the animals produce manure, which lessens the need to purchase expensive synthetic fertilizers.
- **Draught power:** Historically and currently, many farmers use animals like cattle, buffaloes, and horses for ploughing, planting, and transporting goods. This reduces manual labor, helps with time-sensitive tasks, and saves on the cost of machinery and fuel.

Environmental and ecosystem benefits;

Sustainable management of animals can provide positive environmental outcomes.

- **Soil health:** Grazing animals can help manage and restore grasslands by improving soil health and promoting biodiversity, which enhances carbon storage and water retention.
- **Integrated farming:** In integrated crop-livestock-fish systems, animal manure can be used as a natural fertilizer or to produce biogas, reducing the need for synthetic fertilizers and fossil fuels. Animal manure is a rich, natural fertilizer that improves soil fertility and structure. It enhances the soil's ability to retain water and nutrients, which can increase crop yields. In integrated farming systems, this creates a sustainable cycle where animals fertilize the land they graze.
- **Weed and pest control:** Grazing animals, particularly in a rotational grazing system, can control weeds on pasture land. Other animals, like geese, are used to weed specific crops. This reduces the need for chemical herbicides.

Cultural and social benefits;

For many communities, animals and their products have deep-rooted cultural and social importance.

- **Cultural heritage:** For some indigenous and rural communities, animal husbandry and hunting maintain traditional values and a cultural way of life.
- **Sport and recreation:** Hunting can be a recreational activity that connects people with nature.
- **Social connections:** Sharing wild game or processed animal products can create social bonds and strengthen community ties.
- **Risk diversification:** A farming system that includes both crops and livestock is more resilient. A crop failure can be offset by income from animal products, reducing the overall risk to the farm and the family.
- **Livelihood for women and children:** In many communities, livestock, particularly small animals like goats and poultry, are cared for by women and children. This provides them with an important source of employment and economic independence.
- **Community and cultural roles:** Animals often play a role in cultural and social events. They can be used as part of a bride price, as gifts to strengthen social bonds, or for ceremonies.

Diversified products and by-products;

- **Value-added products:** Farmers can add value to their raw products. For example, milk can be processed into yogurt, butter, or cheese, while hides can be tanned into leather. This allows for higher profits than selling the raw materials alone.
- **Waste reduction:** Animals can convert low-value or surplus food, such as crop residues and kitchen waste, into high-value food products like meat and eggs. This reduces waste on the farm.

- **Other valuable materials:** In addition to meat, milk, and eggs, farmers can harvest a range of other useful materials, including wool, fur, feathers, and fertilizer.

ACTIVITY: 4.2.2	**Exploring local and international regulations regarding farm animal harvesting and animal product safety.**
RESOURCES:	1.Utilize platforms like YouTube or educational websites that show step-by-step videos on the proper procedures for harvesting animals and products. 2. Internet. Online resources like open educational resources for agriculture, open genetics, khan academy and educational youtube channels. Freeman et
TASK/ WHAT TO DO:	In groups; 1-Use internet to search for local and international regulations regarding farm animal harvesting and animal product safety. a) Identify the local and international regulations on farm animal harvesting and animal products safety. b) Discuss the challenges and strategies of enforcing local and international regulations on animal havesting and animal products. c) Suggest the benefits of local and international regulations on farm animal harvesting and animal products safety. 2-Present your findings to the class and record in your notebook.

4.2.2.1. LOCAL AND INTERNATIONAL REGULATIONS ON FARM ANIMAL HARVESTING AND ANIMAL PRODUCTS SAFETY.

A. LOCAL REGULATIONS.

In Uganda, the regulation of farm animal harvesting and product safety is handled by several government bodies, including the Ministry of Agriculture, Animal Industry, and Fisheries (MAAIF), the Uganda National Bureau of Standards (UNBS), the Dairy Development Authority (DDA), and local governments.

FARM ANIMAL HARVESTING AND SLAUGHTERING.

- **Mandatory abattoirs and slaughterhouses:** The Public Health (Meat) Rules mandate that animals in cities, municipalities, and towns must be slaughtered in designated, licensed slaughterhouses. The Kampala City Council (KCC) Meat Ordinance, for example, specifically requires all animal and bird slaughter for public consumption to occur in licensed slaughterhouses.
- **Inspections:** Animals intended for slaughter are subject to antemortem (pre-slaughter) inspection by an authorized veterinary officer to check for disease or illness. Carcasses are also inspected postmortem to ensure they are fit for human consumption before they can be marked and released from the slaughterhouse.

- **Humane treatment:** The Animals (Prevention of Cruelty) Act outlines regulations for the humane handling and transportation of animals. Authorized officers have the power to order the destruction of an animal if it is diseased, severely injured, or in a condition that would cause it unnecessary suffering.
- **Transportation:** The movement of live animals requires a veterinary health certificate from the district veterinary officer of the animal's origin. The transportation of meat must be done in covered, approved vehicles that are kept in a sanitary condition.

ANIMAL PRODUCT SAFETY.

- **General food safety standards:** The Uganda National Bureau of Standards (UNBS) provides mandatory standards for food hygiene and safety. This includes specific guidelines for facilities involved in the manufacturing, processing, and handling of food, including animal products.
- **Dairy product regulations:** The Dairy Development Authority (DDA), established by the Dairy Industry Act, is responsible for regulating the dairy industry in Uganda. The DDA registers and licenses milk processors and traders and advises on standards set by the UNBS. It also conducts routine and impromptu inspections of milk-handling premises to test for adulterants and contaminants.
- **Meat processing and sales:** UNBS standard US 736:2019 sets hygienic requirements for butcheries and meat products. These standards cover requirements for premises, equipment, personal hygiene, and transport. Licensed butcheries cannot sell uninspected or unapproved meat.
- **Animal feed regulations:** The Animal Feeds Act of 2024 regulates the production, importation, and sale of animal feeds. This law prohibits the use of certain harmful substances and mandates that producers test their feeds to ensure they comply with UNBS standards.
- **Export standards:** In order to export meat and animal products, Uganda must meet stringent sanitary standards set by importing countries. This system includes rigorous biosecurity, vaccination schedules, and holding periods in quarantine facilities.

OVERSIGHT AND ENFORCEMENT.

- **Competent authorities:** The Ministry of Agriculture, Animal Industry, and Fisheries (MAAIF) oversees the country's animal health and product safety, with enforcement carried out by authorized veterinary and food safety inspectors at both the national and district levels.
- **Local government involvement:** Local government councils and health officials, empowered by acts like the Public Health Act, enforce regulations related to slaughterhouses and butcheries within their jurisdictions.

GENERAL FOOD SAFETY STANDARDS.

The Uganda National Bureau of Standards (UNBS) provides mandatory standards for food hygiene and safety that are both general and specific to animal products. These regulations cover hygiene during processing, product specifications, and requirements for retail and transportation.

- **Code of Practice for Hygiene:** US 28:2002 is a code of practice for hygiene in the food and drink manufacturing industry. It outlines the minimum requirements for factories and employees involved in the processing, packaging, and delivery of food for human consumption.
- **General Standard for Food Additives:** US 45:2019 specifies guidelines for using food additives, setting safety levels for use in different food products, including those derived from animals.

- **Contaminants and Toxins:** US 738 covers general standards for contaminants and toxins in both food and animal feed, ensuring harmful substances are not passed to humans through the food chain.
- **Food Labeling:** US EAS 38 sets the general requirements for the labeling of pre-packaged foods.

SPECIFIC STANDARDS FOR MEAT PRODUCTS.

- **Hygiene Requirements for Butcheries:** US 736:2019 specifies the hygiene requirements for facilities where meat is sold. It outlines requirements for the premises, equipment, operational procedures, and personal hygiene of staff. UNBS has also conducted campaigns to sensitize butchery owners on these standards.
- **Design and Operation of Abattoirs:** US 734 sets requirements for the design and operation of slaughterhouses and abattoirs to ensure humane and sanitary slaughter.
- **Meat Grades and Cuts:** US EAS 84-1:2020 specifies standards for meat grades and meat cuts, including a specific part on beef.
- **Processed Meat Products:** US EAS 955:2020 lays out the requirements for producing packaged processed meat products in factories, covering hygienic procedures.
- **Smoked Meat:** A draft standard provides specific requirements for the production of smoked meat, covering raw material quality, additives, smoking materials, and hygiene.
- **Dressed Poultry:** US EAS 953:2020 provides a standard specification for dressed poultry.
- **Transportation of Meat:** Standards require that meat be transported in clean, covered, and refrigerated vehicles to prevent contamination.

SPECIFIC STANDARDS FOR DAIRY PRODUCTS.

- **Hygiene Requirements for Milk and Milk Products:** US 163:2019 addresses the hygienic requirements for the entire dairy supply chain, from production on the farm to handling, processing, storage, transportation, and sale.
- **Raw Cow Milk:** US EAS 67:2019 specifies the requirements, sampling, and testing methods for raw cow milk.
- **UHT Milk:** US EAS 27:2019 sets the standards for ultra-high temperature (UHT) milk.
- **Sampling of Milk:** US ISO 707:2008 gives guidance on the proper methods for sampling milk and milk products.

OTHER RELATED ANIMAL PRODUCT STANDARDS.

- **Edible Insects:** With the growing market for insects, UNBS launched the standard US 2146:2020 for edible insects, urging dealers to get certified.
- **Maximum Residue Limits:** US CAC/MRL 2, adopted from international Codex standards, sets maximum residue limits for veterinary drugs in foods.

B. INTERNATIONAL REGULATIONS.

International regulations for farm animal harvesting and animal product safety are established by a framework of global organizations, standards, and agreements, most notably the World Organisation for Animal Health (WOAH), the Codex Alimentarius Commission (Codex), and the World Trade Organization (WTO). These bodies provide the principles and standards that national authorities use to create their domestic laws.

A. WORLD ORGANISATION FOR ANIMAL HEALTH (WOAH)

WOAH (formerly known as the OIE) focuses on animal health and welfare, with a mandate to reduce foodborne risks to human health that originate from animals.

- **Animal welfare during slaughter**: WOAH provides detailed standards and recommendations for animal welfare during the entire slaughter process, from arrival at the abattoir to stunning and bleeding.
- **Personnel training**: Slaughterhouse staff must be competent, patient, and trained in humane handling techniques.
- **Facility design**: Abattoirs must be designed with a one-way flow, non-slip floors, and appropriate pen sizes to minimize stress and injury.
- **Stunning and restraint**: Recommendations cover proper equipment maintenance and use for restraining and stunning animals to ensure insensibility before slaughter.
- **Disease prevention**: WOAH develops standards to prevent the spread of infectious and parasitic diseases, including zoonoses (diseases transmissible from animals to humans), that can occur during animal production and transport.
- **Transportation**: WOAH chapters detail the preparation of animals for transport, requirements for vehicles, and handling procedures to ensure animal welfare during journeys.
- **Veterinary certification**: For international trade, a country's Veterinary Services must provide health certification attesting that exported animal products meet both animal health and food safety standards.

A. CODEX ALIMENTARIUS COMMISSION (CODEX).

Codex, a joint body of the Food and Agriculture Organization (FAO) and the World Health Organization (WHO), develops and adopts international food standards, guidelines, and codes of practice to protect consumer health and ensure fair trade.

- **Food hygiene**: The Code of Hygienic Practice for Meat and the Code of Hygienic Practice for Milk and Milk Products establish internationally recognized standards for hygiene in meat processing and the dairy supply chain.
- **Hazard Analysis Critical Control Point (HACCP)**: Codex promotes the use of HACCP principles to manage food safety risks at all stages of animal product production.
- **Food additives and contaminants**: Codex sets international standards for maximum levels of substances in food, including additives, contaminants, and residues of veterinary drugs, to ensure safety.
- **Labeling**: Codex provides general requirements for the labeling of pre-packaged foods, ensuring consumers are accurately informed about the products they purchase.

B. WORLD TRADE ORGANIZATION (WTO).

The WTO's Agreement on the Application of **Sanitary and Phytosanitary Measures** (SPS Agreement) sets the framework for its members to apply food safety and animal health measures.

- **SPS Measures**: The SPS Agreement requires that measures protecting human or animal life and health must:
  - ✓ Be based on scientific principles and not be maintained without sufficient scientific evidence.
  - ✓ Be applied only to the extent necessary and not be more trade-restrictive than necessary.
  - ✓ Not constitute arbitrary or unjustifiable treatment or a disguised restriction on international trade.
- **Harmonization**: The SPS Agreement encourages countries to harmonize their sanitary measures by basing them on international standards from WOAH, Codex, and others.

- **Consistency**: Countries have the right to set their own "appropriate level of protection" (ALOP), but measures must be applied consistently.
- **Dispute settlement**: The WTO provides a system for resolving disputes if a country's SPS measures are seen as illegal barriers to trade.

HOW THESE REGULATIONS ARE APPLIED.

For a country like Uganda to export animal products, its domestic regulations must meet or exceed these international standards to satisfy the SPS requirements of importing nations. This involves a system of veterinary oversight, certified abattoirs, and a robust food safety framework that can be verified and audited by trade partners.

For example, a country importing meat from Uganda would require certification from a veterinary authority that the product complies with both domestic and international standards, including rules on slaughter, handling, and disease control. The DDA's licensing of milk processors and adherence to UNBS standards are part of Uganda's system for meeting these international expectations, especially for the potentially sensitive dairy market.

4.2.2.2. CHALLENGES AND STRATEGIES OF ENFORCING LOCAL AND INTERNATIONAL REGULATIONS ON FARM ANIMAL HARVESTING AND ANIMAL PRODUCTS SAFETY.

A. CHALLENGES OF ENFORCING LOCAL REGULATIONS.

Enforcing local regulations, especially in developing countries like Uganda, faces several significant hurdles:

- **Decentralized and uncoordinated enforcement:** Food safety responsibilities are often scattered across different government ministries and agencies (e.g., MAAIF, UNBS, local governments). This can lead to inefficient oversight, poor coordination, and irregular implementation of policies, where some areas are regulated while others are neglected.
- **Limited resources and capacity:** Enforcement bodies often lack sufficient funding, staff, and modern equipment to carry out their duties effectively. For example, UNBS is reportedly understaffed, limiting its ability to conduct nationwide inspections and market surveillance.
- **Corruption and political interference:** Corruption, bribery, and political pressure can undermine enforcement efforts. In some cases, politically connected individuals may ignore regulations with impunity, leading to a conflict of interest.
- **Informal sector and infrastructure:** A large portion of animal harvesting and trade happens in the informal sector, such as unregulated markets and small, unlicensed butcheries. This makes monitoring and compliance difficult, especially without modern infrastructure like proper slaughter facilities and cold storage chains.
- **Outdated laws and data:** Legal frameworks may be outdated and not cover modern issues like food fraud, new contaminants, or genetically modified organisms (GMOs). Furthermore, a lack of accurate, disaggregated data on livestock populations and production hinders effective planning and enforcement.
- **Lack of awareness:** Many stakeholders, including farmers, transporters, and traders, are not fully aware of food safety standards and regulations. This can be compounded by top-down policy development that excludes those most affected.

STRATEGIES FOR ENFORCING LOCAL REGULATIONS.

To address these local challenges, several strategies can be employed:

- **Strengthen institutional capacity and coordination:** Governments can create a single, well-resourced food safety authority or enhance coordination between existing agencies through formal agreements and shared resources. Allocating adequate funds for training and equipping enforcement agencies is also critical.
- **Intensify inspections and accountability:** Increasing the frequency of inspections and implementing stricter penalties can deter non-compliance. Sanctions should be commensurate with the gravity of the offense to serve as a genuine deterrent.
- **Modernize and centralize infrastructure:** Investing in modern, well-regulated slaughterhouses, processing facilities, and cold storage chains can improve hygiene and ease monitoring. Requiring slaughtering to be conducted in licensed facilities, as Uganda has tried, can help control safety standards.
- **Implement a robust traceability system:** Systems that trace animal products from farm to consumer are essential for quickly identifying and isolating contamination sources. This requires accurate data collection, which can be improved with better technology and training.
- **Empower and educate stakeholders:** Involving stakeholders—including farmers, processors, and consumers—in policy development and conducting widespread awareness campaigns can improve compliance. Providing training on best practices can lead to voluntary improvements in food safety.
- **Strengthen oversight of agro-inputs:** The enforcement of regulations on veterinary drugs, feeds, and other inputs is crucial for ensuring animal products are free from harmful residues.

B. CHALLENGES OF ENFORCING INTERNATIONAL REGULATIONS.

Countries face additional challenges when meeting international standards:

- **Inability to meet export standards:** Many developing countries struggle to consistently meet the strict sanitary and Phytosanitary (SPS) standards of importing nations, leading to bans on their products. This is especially true for meat and dairy, where importers require robust veterinary oversight and disease control.
- **Complex and evolving standards:** International standards from bodies like WOAH and Codex are often complex and updated frequently. Keeping national legislation, practices, and capacity aligned with these standards is difficult, especially for countries with limited technical expertise.
- **Cost of compliance:** Meeting international standards can be expensive, requiring significant investment in modern infrastructure, sophisticated testing laboratories, and trained personnel. For small-scale producers, these costs can be prohibitive.
- **Data and traceability gaps:** International trade requires detailed records of animal health and product origin. A lack of reliable animal identification and traceability systems can undermine trust and prevent access to lucrative export markets.
- **Perceived risk of developing countries:** Importing nations may be wary of products from countries with perceived weaknesses in their regulatory systems, even if specific consignments meet standards.

STRATEGIES FOR ENFORCING INTERNATIONAL REGULATIONS.

Strategies to improve international enforcement include:

- **Building robust national regulatory systems:** Strengthening local enforcement is the foundation for meeting international requirements. This involves building capacity, improving coordination, and aligning national laws with international standards.
- **Engage with international bodies:** Active participation in international forums like Codex and WOAH can help countries stay informed about evolving standards and advocate for their interests.
- **Leverage capacity-building initiatives:** International aid and support from bodies like the FAO can provide technical assistance, training, and funding to help developing nations build the infrastructure and expertise needed to meet global standards.
- **Prioritize export-oriented sectors:** Targeting investment in key export value chains, such as dairy or high-value meat, can help countries demonstrate compliance and build a reputation for quality. For example, Uganda's Dairy Development Authority focuses heavily on quality control for its dairy exports.
- **Invest in science and data:** Generating robust, globally representative scientific data is key to informing risk assessments and supporting trade negotiations. Investing in laboratory capacity and data collection is therefore vital.
- **Promote public-private partnerships:** Collaboration with the private sector can improve enforcement, as businesses can be incentivized to meet standards to access premium markets. Private sector engagement can also aid in data collection and traceability.

4.2.2.3. BENEFITS OF LOCAL AND INTERNATIONAL REGULATIONS ON FARM ANIMAL HARVESTING AND ANIMAL PRODUCTS SAFETY.

Both local and international regulations on farm animal harvesting and product safety offer significant benefits, though they serve different but complementary roles.

Local rules protect domestic consumers and the environment, while international standards facilitate global trade and address widespread issues like disease transmission.

A. BENEFITS OF LOCAL REGULATIONS.

Public health protection.

- **Ensures food safety**: Local rules, such as mandatory veterinary inspections at designated slaughterhouses in Uganda, prevent the sale of contaminated or diseased animal products. This protects consumers from foodborne illnesses and chronic health issues.
- **Controls zoonotic diseases**: Regulations on animal movement, as outlined by Uganda's Ministry of Agriculture, Animal Industry, and Fisheries (MAAIF), help to control the spread of diseases from animals to humans. This reduces the risk of serious health epidemics.
- **Regulates chemical use**: By controlling the use of veterinary drugs and feed additives, local standards minimize the presence of chemical residues in meat and dairy products, keeping them safe for human consumption.

Economic and market development.

- **Promotes quality assurance**: Mandatory standards for processing facilities, like butcheries, encourage hygienic practices. This leads to higher-quality products that can be sold with more confidence to consumers and at a potentially higher price.
- **Reduces losses**: By controlling the spread of disease, such as foot-and-mouth disease (FMD) and other tick-borne illnesses, regulations reduce losses for farmers due to sick animals and poor-quality products.
- **Builds consumer trust**: A robust local regulatory system ensures a reliable supply of safe food, which builds trust and strengthens the domestic market for animal products.

Environmental sustainability.

- **Manages waste**: Regulations can address pollution from concentrated livestock operations. This includes guidelines for managing manure to prevent over-fertilization, which can contaminate water sources.

B. BENEFITS OF INTERNATIONAL REGULATIONS.

Access to global markets.

- **Removes trade barriers**: By harmonizing national food safety and animal health rules, international standards—like those from Codex Alimentarius and the World Organization for Animal Health (WOAH)—minimize technical barriers to trade. This allows developing countries, such as Uganda, to access more export markets.
- **Creates transparency**: International food standards ensure that trading partners are confident in the safety and quality of imported food, which makes trade more efficient and transparent. This builds trust between countries.

Disease prevention and control.

- **Promotes animal health**: Global standards and recommendations on biosecurity and disease surveillance, like those from WOAH, help to prevent animal disease outbreaks from crossing borders. This benefits not only the trading partners but also the global food supply.
- **Controls zoonoses**: Through a "One Health" approach, international regulations help control diseases that can spread from animals to humans, including those with pandemic potential.

Consistency and fairness.

- **Ensures scientific basis**: The World Trade Organization's (WTO) Agreement on Sanitary and Phytosanitary Measures (SPS) requires that food safety rules be based on scientific evidence. This prevents countries from using unscientific food safety measures as a form of protectionism.
- **Protects consumers globally**: International standards provide a safety net, ensuring that consumers everywhere receive products that meet high standards for quality and safety. This is especially important as the global food supply chain grows more complex.

Promotes humane treatment.

- **Raises welfare standards**: International bodies like WOAH provide guidance on the humane treatment of animals during transport and slaughter. Adhering to these standards can not only reduce animal stress and injury but can also lead to economic benefits through improved productivity.