POULTRY PRODUCTION

Level - III

Learning Guide -67

Unit of Competence: Implementing Poultry Farm waste management

Module Title: Implementing Poultry Farm West management

LG Code: AGR PLP3 M17 LO-01-LG-67

TTLM Code: AGR PLP3 TTLM 0120v1

LO-01: Handle Poultry waste material

Instruction Sheet	Learning Guide #67

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- Interpreting work to be undertaken from work program
- Holding discussions with other workers to ensure continued smooth operation of the production process.
- Selecting, checking, and servicing tools and equipment
- Identifying hazards and implementing safe work procedures
- selecting, using and maintaining suitable personal protective equipment

This guide will also assist you to attain the learning outcome stated in the cover page.

Specifically, upon completion of this Learning Guide, **you will be able to:**

- Interpret work to be undertaken from work program
- Held discussions with other workers to ensure continued smooth operation of the production process.
- Select, check, and service tools and equipment
- Identify hazards and implement safe work procedures
- select, use and maintain suitable personal protective equipment

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described in number 1 to 7.
3. Read the information written in the “Information Sheets 1-5”. Try to understand what are being discussed. Ask you teacher for assistance if you have hard time understanding them.
4. Accomplish the “Self-check 1-5 **in page 3, 5, 10, 16 and 22**
5. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-check 1).
6. If you earned a satisfactory evaluation proceed to “Information Sheet 2”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Activity #1.
7. Submit your accomplished Self-check. This will form part of your training portfolio.

Information Sheet-1	**Interpreting work to be undertaken from work program**

1.1. Introduction

Manure and waste water storage and handling includes components and activities associated with the production facility, feedlot, manure and wastewater storage and treatment structures and areas, and any areas or mechanisms used to facilitate transfer of manure and wastewater. Handling poultry waste materials requires a combination of conservation practices, management activities, and facility upgrades designed to meet the production needs of the poultry operation while addressing environmental concerns specific to each poultry operation. Manure and wastewater storage and handling needs are highly specific to the condition and location of each facility, and differ from farm to farm.

In Handle Poultry waste materials, the following works to be undertaken is properly interpreted.

- The use and suitable PPE
- OHS procedures and precautions
- OHS hazards
- Risk assessment with suitable controls
- Suitable tools and equipment

Self-Check -1	**Written Test**

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What are the works to be interpreted in handle poultry waste materials? (4pts)

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____
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Information Sheet-2	**Holding discussions with workers**

2.1. Introduction

The poultry industry has undergone phenomenal growth over time, made possible by the continuous dedication of those individuals working in different segments of the industry, including farms, hatcheries, processing plants, and feed mills. These people are subject to occupational and environmental hazards on a daily basis. Airborne exposure, injuries, and zoonotic infections are amongst the main categories of health hazards. Farm employees, especially new and untrained ones, are usually at a greater risk. Also, those who live near to poultry farms, hatcheries, and processing plants can also be exposed to health hazards through air, water, and soil. Poultry producers are often more concerned about the health and productivity of their fl ocks than of health hazards to themselves or their employees. Thus, to be safe both employees and employers should be aware of short- and long-term consequences of occupational hazards.

The worker should have to discuss on the following activities listed below as to understoond them and practice safely to maintain their health and safety at the workplace .

- Identifying works to be undertaken
- Identifying the need for PPE
- Identify OHS Hazards
- How to minimize the exposures of worker to hazards of wastes Such as
  - ❖ Accidental hazards
  - ❖ Physical hazards
  - ❖ Chemical hazards
  - ❖ Biological hazards
  - ❖ Respiratory problems hazards
- Poultry waste utilization and management

Self-Check -2	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What is the importance of holding discussion on poultry waste management?(4pts)

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____
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Information Sheet-3	Select, check, and service tools and equipment

A good care should be taken of the tools and equipments, which would then have a long life. It is not wise to keep workers sitting idle at critical periods of work because of shortage of tools.

Rules in handling and using tools and equipments are:

- Used all tools for what they are designed or constructed.
- Clean the tools and equipments always before storing them away.
- Store them in a neat dry place

3.1. Inspecting and checking tools and equipments

The purpose of an inspection and checking is to identify whether work equipment can be operated, adjusted and maintained safely with any deterioration detected and remedied before it results in a health and safety risk. Not all work equipment needs formal inspection to ensure safety and, in many cases, a quick visual check before use will be sufficient. However, inspection and checking is necessary for any equipment where significant risks to health and safety may arise from incorrect installation, reinstallation, deterioration or any other circumstances. The need for inspection and inspection frequencies should be determined through risk assessment.

Importance selecting, checking and servicing tools and equipment

- To perform poultry waste management operation without any interruption
- In order to separating functional & un functional tools & equipment
- Ready for repaired & maintenance
- Care for environmental condition
- Disposing or sale out of depreciated/ retied equipment
- For kaizen application
- To know loss equipment
- To separate well cleaned & un cleaned tools
- To maintain personnel health and safety

3.2. Selecting tools and equipments

Poultry raising farmer/ keepers must be using the correct types of hand tools and basic equipment during their operations. Selection of tools and equipments should be based on functionality, durability, and accessibility and easy for cleaning. Thus for chicken waste management the following tools and equipments are required.

- **Farm tools:**

Figure 1. Poultry farm tools

- **Wheelbarrow:** used for collecting on and transporting waste in poultry house

Figure 2. Wheelbarrow

- **Wheeled liquid waste container**

Figure 3. Liquid waste storage container

Poultry waste spreader Tractor

Figure 4. Poultry waste spreader Tractor

Figure 5. Bucket

Figure 6. Cleaning brush

3.3. Servicing of tools and equipments

Tools and equipment shall be kept in proper operating condition and used only for the purpose for which they were designed. If proper and safe tools are unavailable, this should be reported to the supervisor.

All machineries, tools and equipments should be inspected at regular intervals, and any tool that develops defects while in use shall be taken from service, tagged and not used again until restored to proper working condition.

Self-Check -3	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What is the importance of selecting, checking and servicing tools and equipment? (1pts)
2. List at least three tools and equipments for poultry waste management(3pts)

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____
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   _____
   _____
2. _____
   _____
   _____
   _____

Information Sheet-4	Identify OHS hazards and implement safe work procedures

4.1. Health hazards

Personnel working in the poultry industry are permanently exposed to hazards. These have either a physical, chemical or biological nature. Proper management is needed to avoid accidents and to keep the staff motivated. In all cases, however, safety comes first.

The poultry industry, those individuals working in different segments of the industry, including farms, hatcheries, processing plants, and feed mills are subject to occupational and environmental hazards on a daily basis. Airborne exposure, injuries, and zoonotic infections are amongst the main categories of health hazards. Farm employees, especially new and untrained ones, are usually at a greater risk. Also, those who live near to poultry farms, hatcheries, and processing plants can also be exposed to health hazards through air, water, and soil.

4.2. Common health hazards

According to the International Labour Organisation (ILO), health hazards in poultry working environments are categorised as accidental, physical, chemical, and biological. Here are just a few examples for each category mentioned as below:

1. Accidental

Sprains and strains from slips, trips, and falls when carrying heavy loads (bags of feed), working in congested and slippery areas soiled with excreta. Eye and skin irritation from contamination of broken skin or from splashing of irritants, allergens, other hazardous fluids (disinfectants) during vaccinating/ medicating (in feed/water), mixing of feed, transporting feed/medicines, or spraying vaccines, disinfectants, and fumigating agents. Burns from exposures to hot surfaces (e.g. incubators, debeaking tools)

2. Physical

Exposure to high noise levels particularly in confinement systems. Heat exhaustion, heat-induced dermatosis, sun-induced dermatosis and cold exposure due to variable thermal conditions of year long outdoor work or high temperature/humidity in confined systems. Musculo-skeletal problems resulting from lifting and moving of animals, feed bins (bags), egg collection.

3. Chemical

Acute and chronic respiratory irritation and disease from exposure to agricultural dusts. Agricultural dusts are primarily organic (feathers, dander, microorganisms etc.), but inorganic dusts, like crystalline silica, are also found in confinement house dusts.

Immunologically mediated diseases (e.g. rhino pharyngitis, atopic asthma) and hypersensitivity (immediate and delayed) reactions (e.g. extrinsic allergic alveoli is/ hypersensitivity pneumonitis) from exposure to dusts

Acute and chronic dermal, ocular and respiratory diseases from exposure to several toxic and asphyxiating gases common especially in confinement systems including ammonia (NH3), released during microbial degradation of manure; carbon dioxide (CO2) from animal respiration, manure fermentation, and gas flame heaters; other gases include CO, H2S, CH4, S02, and NOx (manure decomposition and fuel combustion)

Exposure to disinfectants, detergents, formaldehyde, ammonia solutions, sodium carbonate and sodium hypochlorite. Formaldehyde, a suspect carcinogen, is often used as a disinfectant in hatcheries and brooder houses

4. Biological

Zoonotic diseases are transmitted from animals to humans and include bacterial, viral, fungal, and parasitic diseases. Salmonellosis, campylobacteriosis, chlamydiosis, tuberculosis, Newcastle Disease, and avian influenza are amongst the most common zoonotic diseases transmitted from poultry to humans. Poultry workers are at a greater risk of being affected by these diseases.

These and other health hazards in poultry commercial settings must be addressed through improvement in the working environment. In order to achieve this very important goal, both employers and employees are responsible. Training of employees plays a vital role in reducing the occurrence of these problems. Always know your work environment, the contaminants, and the potential hazards. Safety must always come first!

5. Respiratory problems hazards

Many studies have shown that poultry farmers have a greater risk of respiratory problems than non-farmers. For example, results of a study showed that North Carolina poultry farm workers experienced more chronic phlegm and wheezing than non-farm workers. Another study of 22 North Carolina poultry farms showed that poultry growers and catchers were exposed to high levels of dust and ammonia. Each poultry house contains its own complex mixture of dusts and gases. Nature of this mixture is dependent on numerous factors including ventilation, type of poultry, feeding system, and waste management. Dust and gas levels are usually highest in winter. Organic dust is the most common respiratory contaminant. Organic dust is a combination of dusts with bacteria or fungi (fungal spores).

Ammonia is an irritating gas present in poultry barns. The occupational threshold for ammonia is generally 25 ppm. For short-term exposure (15 minutes), the threshold is 35 ppm. An ammonia concentration of 300 ppm is immediately dangerous to life. People who have worked in poultry barns for years often can not detect levels below 50 ppm. Harmful gases in poultry houses are not limited to ammonia. H_2S, CO_2, CO, CH_4 and vapours (associated with pesticides, disinfectants, and litter treatments) are also present and can cause health problems.

Exposure to dusts and gases results in responses in the respiratory system. These responses vary from one person to another, and may affect any part of the system. Potential responses include acute or chronic bronchitis (the most common reaction), increased airways reactivity, asthma, and chronic airway obstruction.

4.3. Poultry processing plants

A typical poultry processing plant can process tens of thousands of chickens per day. Common complaints include warts, infections from bone splinters, and rashes from the chlorine water (used to wash carcasses contaminated with faeces). Employees have to do a lot of fast and repetitive movements. They often suffer from injuries caused by the knives, saws and machinery. Cuts and lacerations are continuous hazards for workers frequently handling knives. Other injuries are also common. According to an Occupational Safety and Health Administration (OSHA) study, back injuries account for 40% of all poultry processing plant injuries. Workers who cut or pull the meat from the bone use quick and repetitive motions that put pressure on their wrists and hands. This situation makes these people

vulnerable to debilitating conditions of the nerves, muscles, and tendons. Carpal Tunnel Syndrome is the most severe type of such disorders.

When the tendons passing through a narrow channel in the wrist (the carpal tunnel) are overused, they swell and press on the nerve that controls feeling in the hand. According to a 1995 report published in the American Journal of Independent Medicine, 50% of workers reported three or more ongoing problems in the upper extremities, including decreased vibration sensitivity in their fingertips, impaired pinch strength, and numbness.

4.4. Safe Working Procedures and Safe Work Practices

For the implementations of the safety management systems the organization is to establish safe procedures and safe working practices so that all the works are carried out safely and the risk of injury to workers and damage of equipment and property are eliminated or minimized. The safe working procedures and safe work practices are to be established meeting the requirement of the industries act as well as meeting the requirements of the work process.

Safe work practice is a set of guidelines established to help work men to perform a task which may not require a step by step procedure. Safe work practices are generally written methods outlining how to perform a task with minimum risk to people, equipment, materials, environment, and processes.

Safe working procedures and safe work practices tells work men how to perform a specific task so as to mitigate hazards that have been identified through the hazard identification process. They are guideline documents for the maintenance of safety in the organization. The extent of the application of the safe working procedures and safe work practices depends on the safety policy of the organization, the nature of the activities in the organization, and complexity of the operations.

The following features are helpful in implementing safe work practices at workplace:

- Providing induction training for new employees
- Training on communication and teamwork during normal and emergency situation
- Training on fire safety and emergency procedures
- Training on hazard identification, risk control, use of personal protection equipment (PPE) and first aid.

- Observation of ergonomics to reduce injuries to workers.
- Use and maintenance of appropriate tools for work and keeping them in good working condition.
- Handling, application, labeling and storage of hazardous and non-hazardous materials so the workers are not exposed to danger.
- Adherence to policies and procedures to set standard actions and reactions understandable by all and to reduce chaos in an emergency.
- Housekeeping, cleaning and waste disposal considering environment safety and health (ESH).

Benefits of safe working procedures and safe work practices

Safe working procedures and safe work practices at the work place have the following benefits.

- They provide standards for how work is to be carried out.
- They have a positive effect on quality, efficiency, and productivity.
- They prevent injury and illness by controlling potential hazards.
- They help the organization in fulfilling the statutory requirements.
- They inculcate a sense of discipline and responsibility amongst the workmen.
- They are a means by which the management and the workmen practice due diligence.
- They provide standards for (i) training and orientation of workmen, (ii) review of the work processes with the work men, (iii) completing safely the work activities, and (iv) evaluating the work performance.

Self-Check -4	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What are the common hazards in poultry waste management?

Note: **Satisfactory rating - 5 points** **Unsatisfactory - below 5 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____
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   _____
   _____

Information Sheet 5	**select, use and maintain suitable personal protective equipment**

5.1. What is personal protective equipment?

Personal Protective Equipment is any device or clothing worn by a worker to control the level of risk that cannot be controlled or eliminated by providing protection / shield between the hazard and the worker when exposed to:

- Dangerous goods, hazardous chemicals, infectious substances including blood and bodily fluids(BBF)
- Dust, fumes or particles
- Radiation (ionizing and non-ionizing), ultraviolet or solar radiation
- Noise
- Moving objects such as vehicles, trolleys and forklifts
- Flying objects when using machinery with moving parts
- Environmental factors , for example, high and low temperature

5.2. Selecting Personal Protective Equipment

PPE used at a workplace must be:

- Selected to minimize risk to health and safety
- Approved and appropriate for the task / activity
- Suitable and appropriate for the nature of the work and any hazard associated with the work
- A suitable size, fit and reasonably comfortable for the person wearing it. PPE must be appropriate to the task by providing adequate protection from the identified hazard and it must meet the requirements of relevant standards and codes of practice
- If the sharing of equipment or clothing could represent a hygiene risk the PPE should be provided for individual use, or decontaminated between uses
- The wearer must take appropriate measures to ensure that the wearing of PPE does not create a further risk to health and safety

In poultry waste management, the following PPE are required:

- **Rubber boots:**

Figure 5. Rubber boots

- **Glove:**

Figure 6. Gloves

- **Overall:**

Figure 7. Overall

- **Respiratory mask**

Figure 8. Respiratory mask

How to use or wear PPE in poultry waste management?

- Wear PPE whenever working in or around the chicken house. Use respirators, gloves, boots and coveralls to protect yourself.

Figure 9. How to wear PPE

5.3. Inspection, cleaning and maintenance of PPE

Where PPE is in use, routine inspection, cleaning and maintenance is required. These are:

- The wearer is required to inspect PPE prior to use, for signs of penetration or other damage due to impact, rough treatment or unauthorized alterations which may reduce the degree of safety originally provided
- Regularly check respiratory devices (every time before and after use), to ensure that filters / cartridges or air supply are in place and replaced as necessary. This is to ensure that the equipment is ready for use at all times. Potential hazards
- Clean/decontaminate all re-useable PPE in accordance with the manufactures instructions. However, in the absence of such instruction the item can be washed thoroughly in detergent and warm water using a soft cloth, then rinsed and dried.
- Avoid using any cleaning agents that are likely to scratch surfaces, particularly the lenses of eye protection equipment

- Store PPE in clean, sealed containers, such as plastic tubs with lids. This prevents continual exposure to air or other particulates or other environmental factors, for example, prolonged exposure to direct sunlight , that may compromise the effectiveness of the equipment (including filter / cartridges)
- Ensure that the PPE is kept clean in between usage.
- Remove damaged PPE from use, and take to the supervisor to arrange for replacement equipment

Some of the Potential hazards related with improperly cleaned or maintained PPE include

- Severe burns due to employees performing hot work while wearing greasy or oily clothing
- Impaired vision due to using eye and face protection with dirty, scratched, or fogged lenses or shields
- Skin irritation or chemical absorption due to contaminated PPE such as clothing, gloves, face pieces, gloves and boots
- Inhalation of toxic chemical due to damaged respiratory valves
- Spread of infectious diseases due to shared equipment

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Self-Check -5	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What are the important PPE used for setting shed and placement of day old chicken(2pts)
2. What are the potential hazards associated with improperly cleaned or maintained PPE? (2pts)

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____
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   _____
2. _____
   _____
   _____

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POULTRY PRODUCTION

Level - III

Learning Guide -68

Unit of Competence: Implementing Poultry Farm waste management

Module Title: Implementing Poultry Farm Waste management

LG Code: AGR PLP3 M17 LO-02-LG-68

TTLM Code: AGR PLP3 TTLM 0120v1

LO-02: Maintain waste matter storage and disposal system

Instruction Sheet	Learning Guide #68

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- Observing and following OHS procedures, practices, policies and precautions
- Servicing and maintaining waste matter removal and disposal equipment
- Using waste matter disposal systems according to environment protection authority
- Using liquid waste matter storages for irrigation practices
- Flushing and draining in-shed effluent pits
- Composting waste matter in accordance with establishment practice

This guide will also assist you to attain the learning outcome stated in the cover page.

Specifically, upon completion of this Learning Guide, **you will be able to:**

- Observe and follow OHS procedures, practices, policies and precautions
- Service and maintain waste matter removal and disposal equipment
- Use waste matter disposal systems according to environment protection authority
- Use liquid waste matter storages for irrigation practices
- Flush and drain in-shed effluent pits
- Compost waste matter in accordance with establishment practice

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described in number 1 to 7.
3. Read the information written in the “Information Sheets 1-5”. Try to understand what are being discussed. Ask you teacher for assistance if you have hard time understanding them.
4. Accomplish the “Self-check 1-5” **in page 30, 33, 40, 45 and 50**
5. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-check 1).
6. If you earned a satisfactory evaluation proceed to “Information Sheet 2”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Activity #1.
7. Submit your accomplished Self-check. This will form part of your training portfolio.

Information Sheet-1	**Observing and following OHS procedures, practices, policies and precautions**

1.1. Observing and following OHS procedures in poultry waste management

In observing and following OHS procedures, an observation checklist is used to identify what is happening concerning the waste management operations. It was a nonparticipant observation where the observer does not get involved in the activity of the group, but rather remains as a passive observer. Standard operating procedures regarding all the meat processing and waste disposal activities were listed in the checklist to see the level of compliance. Therefore, the supervisor only examines and then draws conclusions from what have been observed.

1.1.1. OHS procedures in waste application techniques

Poultry litter may not be stockpiled nearer than 100 feet to surface waters (such as streams, lakes, ponds, and swamps) or wells. There should not be any potential for spills or runoff into surface waters when applying litter. Therefore, some field buffers between litter application areas and streams or other surface waters are also advised. Reasonable buffer distances can vary greatly depending on soil type, slope of the land, and crop system, but buffers of 25 to 50 feet are commonly used. A commercial poultry litter hauler should also receive a copy of the most recent waste analysis that a producer has for the litter. This information will assist in calibrating equipment so that the litter can be applied at the proper rate to meet the crop's nitrogen needs. Waste analyses are required within 60 days before land application of the waste; however, accepted average waste data may be used to calculate litter application rates. Specific buffer and waste sampling criteria may be required in watersheds that have nutrient-sensitive waters. Check with a regional office of the DWI for current standards on specific watersheds.

Record-keeping is required of all litter applications when litter source is a farm producing more than 30,000 birds. The OHS recommends the use of division-approved forms for dry litter application. The forms are a convenient way to document proper litter application rates that are specified in the waste management plan. In this event record-keeping are very important and forms can be obtained from the poultry producer. The poultry producer should record each cleanout and document the quantity of litter removed.

1.1.2. Occupational health and safety precautions

Following OHS/OSHA

OSH Admiration requires that the poultry industry should provide their employees with a safe workplace, free from known, serious health hazards. The agency offers employers broad guidelines on their duties under OHS or OSHA:

In poultry waste management:

- Employers must institute measures to prevent exposure to recognized hazards, including the selection of appropriate PPE.
- Generally, rubber gloves, aprons, boots, and face masks may be necessary to prevent contact with wastes.
- Employers must determine what tasks require these and/or other PPE
- Work conditions must meet OHS safety standards.
- Employees should have the tools and equipment necessary to do their job safely. The poultry industry must establish safe operating procedures and explain them so that employees know what to do.
- Employers must post labels, posters or signs warning workers about potential dangers. They must also put up OSHA posters informing employees of their rights and responsibilities.
- Poultry industries that handle hazardous chemicals must have a training program for handling them safely.
- All training and safety tips must be in a language, and vocabulary, workers can understand.
- Employers, with a few exceptions, must keep records of work-related illnesses and injuries. OSHA must be notified of fatalities, hospitalizations, amputations and losses of an eye within eight hours of the incident.
- Employers can't discriminate against employees who report OSHA violations.
- If there's a violation, employers have to fix it by the deadline OSHA gives them.

Even though OSHA places the heaviest burden on employers, workers have responsibilities, too. If employers cover up work-related injury or illness cases, it's the

employee's responsibility to notify OSHA. Employees have to assess workplace safety for themselves and decide whether it's necessary to notify OSHA about a lack of safety precautions. Beyond that, if employees don't follow the safety rules, the rules are useless.

Providing training

The poultry industries must also train employees and supervisors on their roles in dealing with hazards and safety programs under the act, and responding to or investigating accidents, illness or injuries. It's also important to train workers in identifying and controlling hazards, both in their specific job and more general work-related risks.

The hierarchy of controls is part of many training programs. It ranks different safety precautions according to their effectiveness:

- Elimination: Take the hazard out of the workplace.
- Substitution: Replace the hazard.
- Engineering Controls: Keep danger away from workers.
- Administrative Controls: Reduce risk by changing how the work is performed.
- Personal Protective Equipment: wear appropriate PPE designed to the task

Workplace Safety Tips

The OSH Act has been in place since 1970, though it's seen many changes since then. That gives employers, OSHA and safety training companies plenty of experience on what principles work when spreading your safety message:

- Involve employees in planning. If workers take ownership of safety initiatives, they're more likely to take job safety seriously.
- Provide clear instructions. Don't just assume. Before employees start a new task or use new equipment, confirm that they know what they're supposed to do and how to keep themselves safe.
- Prioritize. It's important to have plans for disasters such as zoonotic disease. It's more important to focus on such important diseases, which happen more often and cause more total injuries each year.

- Keep the work area clean. Get clear wastes, waste disposal equipments and clean up house and spills. Encourage employees to do the same if they spot a problem.
- Give your employees the green light to speak up. If they have safety concerns or new safety tips, let them know they can bring their thoughts to you and get a fair hearing.
- Review employee performance. Some workers may take shortcuts or avoid precautions, figuring easier-and-quicker is better than safer. Other employees may skip out on training if they get the chance. Keep track of which workers take classes and which ones follow the rules. Cite them as an example to others.
- Keep tools, equipments and machinery in good working order. Develop a regular maintenance program for any dangerous machines in your workplace. Check that any protective devices such as machine guards are in good shape. See that any warning signs or instructions that should be posted are indeed visible.
- If your staff does use personal protective equipment, take the time to choose the right equipment in the correct sizes. Buy good, reliable PPE, rather than cutting costs and putting employees at risk.
- Provide training programs. These can be on-site, online or customized to suit your poultry industry.
- Review and update your safety precautions every year. At the start of the year, inspect your facilities. Look for out-of-date equipment or deficiencies. See whether any of your current precautions or policies is out of date. OSHA regularly updates its rules, so you need to stay current

Self-Check -1	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. List at least four workplace safety tips in poultry waste management(4pts)

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____
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Information Sheet-2	Service and maintain waste matter removal and disposal equipment

2.1. Maintaining and servicing waste removal and disposal equipment

Waste matter removal and disposal equipment and tools suffer a lot of wear and tear. Hence, it is important to maintain and service them regularly. This will help increase the service life as well as the performance of the equipment. Precautionary maintenance of tools and equipment will also help reduce unwanted expenses related to broken or faulty equipment. Small problems generally lead to bigger issues if left unattended. Perform all cleaning and repair work as soon as you see any signs of damage or neglect. This will keep your instruments from failing you at crucial moments.

In undertaking service and maintenance:

Clean your tools: Cleaning the tools regularly is essential to their proper functioning. After a day of work, your tools will be covered with some amount of dirt. It's important to clean them after you're finished using them. Although a thorough cleaning is not required on a daily basis, make sure you clean your tools regularly. When cleaning your tools, don't use chemicals that are extremely harsh. Follow the manufacturer's guidelines for proper cleaning and maintenance

Protect electrical cords. Airlines and electrical cords are prone to heavy damage since they are generally in the way of construction vehicles, and foot traffic. Other machinery like forklifts, drills, etc. can easily cut through wires. To keep the wires and airlines from getting damaged, it is important to protect them. You can cover the electrical cords with industrial strength casings or purpose-built ramps.

Lubricate tools. Whether you work with pneumatic or regular tools, it is important to lubricate them regularly. Lubricating tools helps them to perform better and reduces wear and tear of components.

Lubrication is even more important when working with air or pneumatic tools. Pneumatic tools need to be lubricated once a day before use. When moisture or condensation enters the interiors of pneumatic tools, it can cause corrosion. Corrosion can decrease the life of an

instrument. Corroded parts are difficult to repair and replace. Hence, the internal components of pneumatic tools should be coated with special air-tool oil. This oil prevents corrosion by displacing any moisture that enters the interior of the equipment.

Inspect tools regularly: Regularly inspect your tools for signs of damage and faulty functioning. Inspections should take place at the end of each construction job. Ensure that you repair them immediately if there is any damage. This will avoid any last minute hassle.

Store tools with care: Storing tools properly is of prime importance. Although tools are designed for rough use, it is important to store them properly. Cover up your tools to keep dirt and rain away from the machine. If the tools aren't used for a long time, inspect them regularly for signs of damage, wear and tear, corrosion, etc.

Self-Check -2	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What is the importance of maintaining and servicing tools and equipment?

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____
   _____
   _____

Operation Sheet 1	Maintaining tools and equipments

Procedures for maintaining tools and equipments

Step 1- wear PPE

Step 2- Clean your tools and equipment or machinery

Step 3- Protect electrical cords

Step 4- Lubricate tools

Step 5- Inspect tools regularly

Step 6- Store tools with care

Operation Sheet 2	Servicing tools and equipments

Procedures for Servicing tools and equipments

Step 1- wear PPE

Step 2- Inspect tools and equipment or machinery

Step 3- Identify the damaged parts of tools and equipment

Step 4- servicing tools and equipment

Step 5- Checking of its functionality

LAP Test	Practical Demonstration

Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within -4- hour.

Task 1. Maintain the tools and equipments of poultry waste management

Task 2. Identify the damaged waste management tools and equipment

Information Sheet-3	Poultry waste matter disposal systems

3.1. Poultry waste disposal system

The method of disposal of poultry wastes plays major role in controlling and eradication of diseases. Improper approach and carelessness of this important aspect of production process in poultry, can lead to constant emergence of disease ailments on poultry farms. This results in heavy losses in the forms of mortality and reduced productive performance. Therefore, timely disposal of wastes with efficient method is an important poultry waste management tool for raising healthy and profitable poultry.

3.2. Types of Poultry Waste

The poultry wastes produced in production process are divided into four major categories. These are listed and described as under:

- Dead birds
- Droppings or manure
- Dressing waste
- Hatchery waste

1. Disposal of Dead Birds

Disposal of dead birds is often neglected for want of time, fuel and labour in poultry farms. It is observed that in many instances, dead birds are just thrown away in open outside the farm on fallow land or at the corner of premises. Further bad part of it is that this is mostly practiced during critical periods of outbreaks, due to more number of dead bird posing difficulties for systematic disposal. On the contrary it is necessary to take extra care for systematic disposal of dead birds to control outbreak by checking spread of infection.

Figure 10. Dead chicken disposal systems

Throwing dead birds in open beyond the compound is extremely dangerous for spread of infection as they are eaten by dogs, cats, wild birds and vultures to carry disease causing organisms by mechanical route from place to place and recontamination of premises also. Further there is danger of spread of infection through air also. Therefore, disposal of dead birds should be preferably done by either of following two ways:

- They should be deeply hurried in the soil or dumped into deep manure or carcass pit where their carrion is auto-digested by hot fermentation.
- They should be fully burnt in incinerator to form ash, which is also an effective disposal.

Figure 11. Disposal of dead birds

2. Disposal of Droppings or Manure

In modern method of rearing of poultry, droppings are removed from poultry houses after removal of birds in respective lots from them. This method of disposal of droppings in the form of manure is possible in case of deep litter. But in case of battery cages droppings should be removed every day or once in two days to avoid filth in house.

The poultry droppings are converted into excellent manure, which can be applied directly to soil or may be utilized after storage for some period. The site of manure pit should be at corner of premises, preferably on downwind flow side to avoid recontamination of birds.

Figure 12. Disposal of Droppings or Manure

Forms of handling solid manure:

The solid poultry manure is handled as it is, in the form of:

a) Heap: The stacked heap on compression generates heat inside and kills microbes making the material sterile, which can be used as fertilizer.

b) Spread: Manure is scattered on ground in thin layer which dries fast and can be applied to soil.

c) **Dig in pits with compression:** Here also heat is generated making the material sterile to use as fertilize.

3. Disposal of Dressing Waste

On the farm where very few birds are dressed disposal of dressing waste is a minor problem. Because of major sale by live whole selling, difficulty of dressing waste disposal is as good as totally eliminated. When occasionally birds are dressed on farm

for domestic use or few birds are being sold by retailing, the dressing Waste should be properly disposed as under.

The non-edible-parts like head feathers and feet (shank) should be burnt which can be done easily due to their dryness. Other wet non-edible organs should be dumped into deep manure pit to fulfill compost manure through hot fermentation. The manure pit must be properly covered to avoid spread of infection by aerosol route and dogs should be prevented to root out manure for offal consumption.

Figure 13. Dressing waste of poultry

4. Disposal of Hatchery Waste

Considerable amount of waste material from hatchery is obtained which consists of infertile hatching eggs, dead embryos, egg shells from hatched eggs, dead chicks or weaklings, etc. Whatever may be best management of hatchery, it involves around 10-15 per cent loss of eggs or embryos during incubation and hatching. Hatchery waste in the form of egg shells, dead embryos, infertile eggs and died or weak chicks can be efficiently converted in hatchery byproduct meal or hatchery residue meal which can be very well used as protein source for poultry feeding. Due to this it can be said as utilization of hatchery waste instead of disposal of hatchery waste.

Figure 14. Disposal of Hatchery Waste

Handling of hatchery waste

Handling of raw hatchery by-products is difficult because of its strong off odor. To overcome this problem, various chemical treatments can be used including gaseous students. Among gaseous **sterilents methyl bromide and ethylene oxide** are commonly used. The most important point to be considered during handling hatchery waste is that it should not contain high amount of pathogens, which may pose difficulty to human health and risk for handlers. For preventing this, do not select eggs for hatching from diseased birds and remove dead embryos timely from incubator and try to keep embryonic morality at minimum possible level.

Self-Check -3	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What are the major categories of poultry wastes?

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____
   _____
   _____
   _____
   _____
   _____
   _____

Information Sheet-4	Using of poultry solid and liquid waste for irrigation

4.1. Using of poultry manure as fertilizer

The use of Poultry manure fertilizer is becoming a common practice (especially Chicken manure as fertilizer) with many farmers throughout the world as this matter content has in store various nutritional elements for various fields or crops. These nutritional elements are very effective in increasing the productivity and rapid growth of farms e.g. farms that produce vegetables. What manure basically is, its significance and various other factors related to it can be thoroughly understood under the following headings.

4.2. What is poultry manure and what are some of its components?

Chicken manure is basically a waste material which is organic in nature and comprises of urine and feces of animals which are related to poultry e.g. chicken poultry manure is a mixture of certain types of bedding material such as sawdust or wood shavings. The manure is acquired by cleaning of the poultry houses on regular basis where thin bedding layers are removed along with such manure. So the manure which is basically the waste from chicken dropping and other mixtures, when used as fertilizer is called Chicken fertilizer. Now the components or constituents found in the manure are dependent on the types of birds, their feed ration and proportions of droppings to litter, the handling systems of the manure and the types of litter. However, the most common components are Potassium, Nitrogen and phosphorus.

4.3. Why fresh manure not to be used, timing of usage and precautions involved?

It is preferred to use manure after within 120 days of the harvesting of crops. Similarly it is preferable not to use fresh manure because it may contain certain bacteria which are harmful for human health and may cause diseases. It is therefore suggest that the manure should be used after it is composted because composting not only enhances the nutrients but also avoids the risks of your exposure to different diseases. The composting procedure may involve 3 to 4 weeks after which such manure can be used as fertilizer in gardens and for crops. Always wash your hands thoroughly after they come in contact with the manure or the compost and especially before eating so that no bacteria can enter your body.

4.4. Advantages of poultry manure fertilizer in comparison with other fertilizers

Poultry manure fertilizer or a Chicken fertilizer has some of its distinct benefits in contrast to the synthetic or the inorganic fertilizers available in the market. The first benefit of their use is that they are more economical for the cause as compared to inorganic fertilizers. They have the tendency to condition the soil better than the inorganic ones. This better conditioning of the soil will result in an extra yield. Research has shown that the yields of crops like Cotton were significantly higher when a Chicken manure organic fertilizer was used. The use of Chicken manure for fertilizer not only brings economic benefits to farmers but is also less harmful to the environment in comparison to inorganic fertilizers. Not only can it be used for the fields but it can also be used as garden fertilizer. Poultry manure or a Poultry fertilizer or litter as fertilizer is basically a mix of droppings of chicken or birds like pigeon, ducks and turkey. They are generally hotter as compared to other organic fertilizers like those of cow and horse. They need to be composted first or else they have the tendency to burn plants. They are high in nutrients like Nitrogen and potassium. Horse manure is on the other hand not as rich in Nitrogen as chicken manure but is richer when compared with cow manure. So a Chicken litter fertilizer you can say is rich in some components in contrast to others but the usage of fertilizers can vary according to the crops.

Using Poultry liquid waste for irrigation

Liquid poultry waste is used for irrigation in to way

Sprinkler irrigation method

Sprinkler irrigation is a method of applying irrigation water which is similar to natural rainfall. Water is distributed through a system of pipes usually by pumping. It is then sprayed into the air through sprinklers so that it breaks up into small water drops which fall to the ground. Sprinklers provide efficient coverage for small to large areas and are suitable for use on all types of properties. It is also adaptable to nearly all irrigable soils since sprinklers are available in a wide range of discharge capacity.

Figure 16. Sprinkler irrigation

Drip irrigation method

Drip irrigation is a type of micro-irrigation system that has the potential to save water and nutrients by allowing water to drip slowly to the roots of plants, either from above the soil surface or buried below the surface. The goal is to place water directly into the root zone and minimize evaporation. Drip irrigation systems distribute water through a network of valves, pipes, tubing, and emitters. Depending on how well designed, installed, maintained, and operated it is, a drip irrigation system can be more efficient than other types of irrigation systems, such as surface irrigation or sprinkler irrigation.

Figure 17. Sprinkler irrigation

System Requirements

- Adequate buffers must exist between the spray fields and water sources
- Wastewater irrigation systems are to be designed to prevent runoff, uniformly apply the wastewater, and to meet the nutrient needs of the plants.
- Nozzle sizes of sprinklers are to be appropriate for the consistency of the manure applied (minimum ¼-inch for effluent wastewater irrigation).
- Agitation equipment shall be properly sized and of adequate numbers to properly mix effluent and solids into a slurry for irrigation.
- Traveling gun systems shall be equipped with engine powered travel drives and traveling gun speed control.

Operation and Maintenance

- Wastewater shall not be applied within 72 hours prior to a predicted storm
- Wastewater may be spread immediately after a rain if the weather prediction for the next 72 hours and the soil conditions are favorable. In no case shall the application rate of the wastewater exceed either the intake rate or the available water holding capacity of the soil. (DO NOT APPLY TO SATURATED SOILS.)
- Do not apply wastewater by irrigation when wind direction and velocity would cause drift towards residences, public areas, or roads.
- Wastewater shall be applied only to land with actively growing crops or to cultivated land with incorporation as close to the planting date as possible
- All land receiving wastewater shall be adequately treated for erosion concerns.

Self-Check -4	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What is the importance of applying poultry wastes to irrigable land?

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____
   _____
   _____
   _____
   _____
   _____
   _____

Information Sheet-5	Composting poultry wastes matter

5.1. Introduction to composting

The composting process is a complex interaction between organic waste and microorganisms. The microorganisms that carry out this process fall into three groups: bacteria, fungi, and *actinomycetes*. *Actinomycetes* are a form of fungi-like bacteria that break down organic matter. The first stage of the biological activity is the consumption of easily available sugars by bacteria, which causes a fast rise in temperature. The second stage involves bacteria and *actinomycetes* that cause cellulose breakdown. The last stage is concerned with the breakdown of the tougher lignins by fungi.

Central solutions are exemplified by low-cost composting without forced aeration, and technologically more advanced systems with forced aeration and temperature feedback. Central composting plants are capable of handling more than 100,000 tons of biodegradable waste per year, but typically the plant size is about 10,000 to 30,000 tons per year. Biodegradable wastes must be separated prior to composting: Only pure food waste, garden waste, wood chips, and to some extent paper are suitable for producing good-quality compost

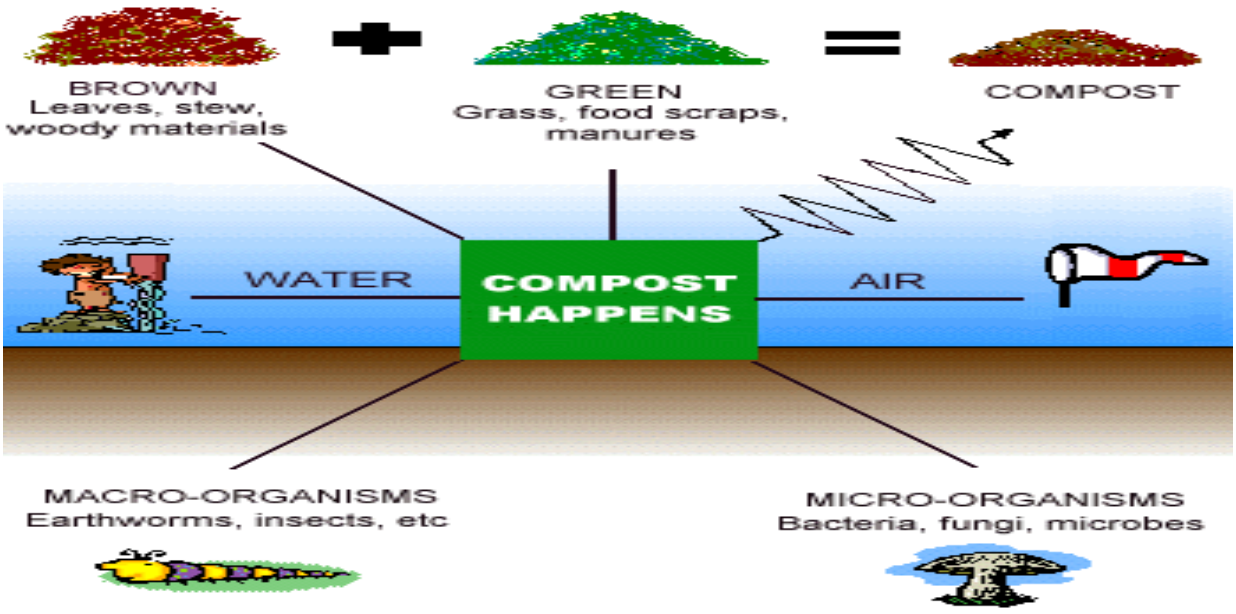

Figure 17. Composting

5.2. Composting Equipment

The composting plants consist of some or all of the following technical units: bag openers, magnetic and/or ballistic separators, screeners (sieves), shredders, mixing and homogenization equipment, turning equipment, irrigation systems, aeration systems, draining systems, bio-filters, scrubbers, control systems, and steering systems. The composting process occurs when biodegradable waste is piled together with a structure allowing for oxygen diffusion and with a dry matter content suiting microbial growth.

Biodegradable wastes must be separated prior to composting: Only pure food waste, garden waste, wood chips, and to some extent paper are suitable for producing good-quality compost. The temperature of the biomass increases due to the microbial activity and the insulation properties of the piled material. The temperature often reaches 65 to 75 degrees C within few days and then declines slowly. This high temperature hastens the elimination of pathogens and weed seeds.

5.3. Composting Methodologies

The methodology of composting can be categorized into three major segments anaerobic composting, aerobic composting, and vermicomposting.

1. Anaerobic composting

In anaerobic composting, the organic matter is decomposed in the absence of air. Organic matter may be collected in pits and covered with a thick layer of soil and left undisturbed six to eight months. Anaerobic microorganisms dominate and develop intermediate compounds including methane, organic acids, hydrogen sulphide and other substances. The process is low-temperature, slow and the compost formed may not be completely converted and may include aggregated masses and phytotoxic compounds.

2. Aerobic Composting

Aerobic composting is the process by which organic wastes are converted into compost or manure in presence of air. In this process, aerobic microorganisms break down organic

matter and produce carbon dioxide, ammonia, water, heat and humus, the relatively stable organic end-product. Although aerobic composting may produce intermediate compounds such as organic acids, aerobic microorganisms decompose them further. The resultant compost, with its relatively unstable form of organic matter, has little risk of phytotoxicity. The heat generated accelerates the breakdown of proteins, fats and complex carbohydrates such as cellulose and hemicellulose. Hence, the processing time is shorter. Moreover, this process destroys many micro-organisms that are human or plant pathogens, as well as weed seeds, provided it undergoes sufficiently high temperature. Although more nutrients are lost from the materials by aerobic composting, it is considered more efficient and useful than anaerobic composting for agricultural production.

There are a variety of methods for aerobic composting, the most common being the Heap Method, where organic matter needs to be divided into three different types and to be placed in a heap one over the other, covered by a thin layer of soil or dry leaves. This heap needs to be mixed every week, and it takes about three weeks for conversion to take place. The process is same in the Pit Method, but carried out in specially constructed pits. Mixing has to be done every 15 days, and there is no fixed time in which the compost may be ready. Berkley Method uses a labor-intensive technique and has precise requirements of the material to be composted. Easily biodegradable materials, such as grass, vegetable matter, etc., are mixed with animal matter in the ratio of 2:1. Compost is usually ready in 15 days.

3. Vermicomposting

Vermicomposting is a type of composting in which certain species of earthworms are used to enhance the process of organic waste conversion and produce a better end-product. It is a mesophilic process utilizing microorganisms and earthworms. Earthworms feeds the organic waste materials and passes it through their digestive system and gives out in a granular form (cocoons) which is known as vermicomposting. Earthworms consume organic wastes and reduce the volume by 40–60 percent. Each earthworm weighs about 0.5 to 0.6 gram, eats waste equivalent to its body weight and produces cast equivalent to about 50 percent of the waste it consumes in a day. The moisture content of castings ranges between 32 and 66 percent and the pH is around 7.

The level of nutrients in compost depends upon the source of the raw material and the species of earthworm. Apart from other nutrients, a fine worm cast is rich in NPK which are in readily available form and are released within a month of application. Vermicomposting enhances plant growth, suppresses disease in plants, increases porosity and microbial activity in soil, and improves water retention and aeration.

5.4. How to Turn Compost

How often you should turn compost depends on a number of factors including size of the pile, green to brown ratio and amount of moisture in the pile. That being said, a good rule of thumb is to turn a compost tumbler every three to four days and the compost pile every three to seven days. As your compost matures, you can turn the tumbler or pile less frequently.

Some signs that you may need to turn the compost pile more frequently include slow decomposition, pest infestations and smelly compost. Be aware that if your compost pile starts to smell, turning the pile may make the smell worse, initially. You may want to keep wind direction in mind if this is the case.

Your compost pile is one of the greatest tools you have to make a great garden. It only makes sense that you would want to make the most of it. Turning your compost can make sure you get the most out of your compost pile as fast as possible.

Self-Check -5	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Define the following composting methodologies

a) anaerobic composting

b) aerobic composting

c) Vermin-composting

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

a)

_____

_____

b)

_____

_____

C)

_____

_____

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POULTRY PRODUCTION

Level - III

Learning Guide -69

Unit of Competence: Implementing Poultry Farm waste management

Module Title: Implementing Poultry Farm Waste management

LG Code: AGR PLP3 M17 LO-03-LG-69

TTLM Code: AGR PLP3 TTLM 0120v1

LO-03: Litter Materials Utilization

Instruction Sheet	Learning Guide #69

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- Identifying requirements for litter Materials Utilization
- Identifying litter Materials Utilization that affects effluent management system
- Identifying the environmental implications of poultry effluent disposal
- Evaluating litter materials utilization recycling options with the whole farm plan.
- Analysing processing & re-use options (as feed or fertilizer) on the basis of their merits and suitability for the environment.
- Obtaining information from effluent management specialists
- Selecting cost efficient litter materials management system

This guide will also assist you to attain the learning outcome stated in the cover page.

Specifically, upon completion of this Learning Guide, **you will be able to:**

- Identify requirements for litter Materials Utilization
- Identify litter Materials Utilization that affects effluent management system
- Identify the environmental implications of poultry effluent disposal
- Evaluate litter materials utilization recycling options with the whole farm plan.
- Analyse processing & re-use options (as feed or fertilizer) on the basis of their merits and suitability for the environment.
- Obtain information from effluent management specialists
- Select cost efficient litter materials management system

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described in number 1 to 7.
3. Read the information written in the “Information Sheets 1-4. Try to understand what are being discussed. Ask you teacher for assistance if you have hard time understanding them.
4. Accomplish the “Self-check 1-4” **in page 58, 62, 66 and 73 respectively**
5. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-check 1).

6. If you earned a satisfactory evaluation proceed to “Information Sheet 2”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Activity #1.
7. Submit your accomplished Self-check. This will form part of your training portfolio.

Information Sheet-1	Identifying Litter Materials Utilization that affects effluent management system

Regarding to utilizations of poultry waste management, there are various constraints that affect effective waste management systems. These are:

Technical Constraints

The waste management sector requires solid technical expertise, knowledge and support, which is visibly absent in numerous developing countries. They also lack the human resources that have enough experience to handle waste efficiently. There are limited opportunities for one to learn about waste management in educational institutes or through on-job training programs. Because of these constraints, developing countries take the support of technologies that are available in the donor countries, which doesn't necessarily help as the equipment and facilities that are provided as foreign aid may be irrelevant, incompatible, outdated or obsolete in the recipient country.

Financial Constraints

Developing countries do not consist of many agencies that have the necessary financial support to carry out effective waste management as compared to those in developed countries. Unfortunately, solid waste management is not considered a priority and limited funds are allocated to it. Additionally, it doesn't generate revenues easily as the ability to pay for various tasks of waste management are quite low. Loans are also not given easily as there is a high risk.

Economic Constraints

It depends on the economic situation of the donor country and how much foreign aid it can allocate to the developing countries. This determines the levels of resources provided to solid waste collaborative projects. When developing countries take the support of external agencies, there will be some bias in how the facilities, equipment and consultants are selected for collaborative projects of solid waste management. Another limitation is that the solid waste equipment is usually provided from the donor agency's point of view rather than understanding what the recipient country actually needs. This develops a gap between the

technology used in the developing countries and the technological needs of the donor country.

Social Constraints

Both the developed and developing countries face certain cultural and social restrictions regarding waste which directly affects the waste management systems. There are certain norms in society that allow only a certain social group or social class of people to handle and deal with waste. This limits the size of the work force for solid waste collection and disposal. Numerous countries prohibit the direct handling of human waste and co-composting of refuse and human waste. These social constraints limit waste management in an efficient manner.

Factors affecting utilizations of waste management system

Composition and Amount of Waste

The composition of the generated waste and its amount directly influences how it can be managed. Developing countries mostly produce inert waste such as dust, sand, stones, etc., and high moisture levels due to the high usage of fresh fruit and vegetables. All this results in high-density waste, which makes it inefficient to employ systems used by industrial countries as they operate well with low-density wastes only. Additionally, when the high weight is combined with the corrosiveness caused by the water content and abrasiveness of the sand, the equipment will deteriorate quickly. Incineration isn't suitable for waste containing high moisture and the recycling typically reduces the proportion of combustible paper and plastic in waste before it reaches the treatment stage.

Accessibility for Waste Collection

If the waste is inaccessible by certain modes of transportations, either due to the slope of the area, its surface, width or congestion of the location, waste collection will be affected. If the options are limited to just roads and alleys, then you won't be able to collect waste properly. Truck scales and weighing scales must be used during the process of waste collection to keep track how much waste is collected from different areas.

Level of Public Awareness

When the public is made aware of how waste management can start from their homes first, it will greatly help the overall waste management system. You must first make them aware of various waste management techniques (discussed later in the article) and make an effort to change their attitude towards waste management. It goes without saying that the participation, attitude, and awareness of the public are a key element in determining if the waste management system of the country succeeds or fails.

Legislation and Regulations

Different government policies and regulations dictate how waste management is conducted in any country. Certain restrictions and standards lessen the technology options as well.

Self-Check -1	**Written Test**

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What are the factors affecting utilizations of waste management system

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1) _____

_____

_____

Information Sheet-2	Identifying environmental implications of poultry effluent disposal

2.2. Impact of Poultry Wastes on Environment

Water quality impacts

From the standpoint of agricultural non-point source pollution, the water quality parameters of greatest concern have traditionally been sediment and N, with lesser attention devoted to P, C and microorganisms. Each of these parameters present in poultry waste has the potential to pollute both surface and ground water. The processes by which pollution may occur are very complex. Both the presence and form of the pollutants are dependent on poultry waste management practices (method of application, rate of application, etc.). Transport of pollutants to sites where adverse impacts may be observed is governed by these as well as additional hydrologic and hydraulic variables.

Surface water impacts

Runoff and erosion are the principal processes governing surface losses of potential pollutants present in the soil-waste system. Surface water quality impacts of land-applied poultry waste therefore depend on the numerous variables which influence runoff and erosion: soil, rainfall intensity and duration, roughness characteristics of the surface, topography, and many others.

Ground water impacts

Ground water quality may be impacted due to movement of water containing pollutants present in poultry waste. The overall process of ground water pollution encompasses the sub-processes of saturated and unsaturated water flow, sorption/ desorption, diffusion, and others. Subsurface transport is thus dependent on the hydraulic characteristics of the soil-waste system as well as the amounts and forms of potential pollutants present, which are in turn dependent on transformations and management practices. The pollutants which have received the most research attention include microorganisms, soluble N forms (particularly NO3), salts, and soluble P forms.

Pathogens

Salmonellosis

Salmonella poisoning, or salmonellosis, is probably the most common bacterial affliction that humans can attribute to chickens. The infection is passed by eating chicken meat or eggs that have been contaminated with this bacterium. Salmonellosis is characterized by high fever, abdominal cramping and diarrhea, and it is especially dangerous when it affects young children, the elderly or people with compromised immune systems.

Avian Flu

This flu virus has gained particular notoriety in recent years due to fears it has the potential to lead to a global pandemic, according to experts with the World Health Organization (WHO) and Centers for Disease Control and Prevention (CDC). Chickens and other fowl are known to be carriers of this virus, showing no symptoms of illness while infected with the viral strain. The avian flu virus can be transported via the air as well as in chicken feces. Symptoms of this illness in people include high fever, coughing, aching muscles, and both vomiting and diarrhea.

E. coli Infection

Though the E. coli bacteria is more often associated with the consumption of beef products, escherichia coli infections can result from eating contaminated chicken as well. E. coli is commonly found in the intestines of humans and other mammals, but particular strains of the microorganism can cause serious illness or even death in some cases. Symptoms of infection include severe abdominal cramping, vomiting and bloody diarrhea.

Campylobacteriosis

Campylobacter is another pathogenic bacterium that can be transferred to humans by eating infected chicken meat. This microorganism is one of the most common sources of food-related poisoning in people. High temperatures are very effective in killing Campylobacter, so proper cooking methods are important to follow when preparing chicken dishes. Like other chicken-related infections, this bacterium can cause abdominal pain and diarrhea. It also can lead to Guillain-Barre syndrome, a disease that could result in paralysis. Concerns related to Campylobacter have arisen in the health community due to the identification of increased

levels of antibiotic-resistant strains of the organism. According to by the Food and Drug Administration (FDA), data from industrialized countries have demonstrated that a significant source of antibiotic-resistant food borne infections in humans is the acquisition of the resistant bacteria from animals via food.

Staphylococcus Aureus Infection

Chicken-related Staph infections are usually attributed to the microorganism Staphylococcus aureus. The organism can be passed to people via ingestion of contaminated meat, and can also be transferred as a result of physical contact with live birds. Toxins released by this bacterium can cause nausea, vomiting, abdominal cramps, and severe muscular pain. Similar to Campylobacter, this bacterium has grabbed the attention of health officials due to virulent strains that are resistant to antibiotic drugs, particularly Methicillin-resistant Staph aureus--commonly identified as MRSA--which has become a rising issue in hospital environments, according to the CDC.

Air Pollution

The concern involving chicken manure is the air pollution the manure can cause. When the manure is burned at poultry plants, the toxins that are present in the manure are released into the air in the form of toxic air emissions and toxic ash.

Self-Check -2	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What are the impacts of poultry waste on the environment?

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1)

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Information Sheet-3	**Analyzing processing & re-using of litter of (as feed or fertilizer**)

Poultry litter was used for different purpose through processing. These are:

Litter Recycling

Recycling is considered as one of the best solutions to reduce garbage or waste output and its impact on the environment. This cycling needs processing. Although it helps reduce energy usage, consumption of raw materials, and air and water pollution, it does have its drawbacks.

Using recycled poultry litter as bedding material for raising new chicks show that the recycled litter is equivalent to the new pine shavings currently used. An economic analysis of a recycling business based in North Carolina shows that this approach is profitable providing a high-quality organic-based bagged fertilizer can be produced after three uses as bedding material.

Technologies and services that capture nutrients from poultry and other animal waste streams for profitable utilization will encounter significant demand in the marketplace. Effective use of these resources will satisfy public demands for clean soil and water resources, and satisfy the producers, need for efficient removal and reclamation of biological waste streams.

The recycling technology proposed by Adherent Technologies, combined with a strong commitment to site-specific, economically viable and environmentally beneficial solutions, provides a means for reducing poultry producer reliance on application fields. Reliance on these systems has resulted in increased operating, environmental, and financial risks for producers. With stronger regulation of odor containment, nutrient application, and mortality disposal pending, these risks and the costs of waste handling will continue to increase. In addition, the success of the pen study should lead to rapid industry acceptance and commercialization of the poultry litter recycling technology.

Poultry waste as a livestock feed

Poultry litter has been used in diets for poultry, swine, lambs, ewes, lactating cows, wintering cattle and brood cows. Poultry litter and/or manure are used as livestock feed in most countries. Poultry waste used for animal feeding is obtained primarily from laying hens (caged and not caged) as well as broiler operations. Poultry litter is also used to feed livestock. Cage layer waste can be used by ruminants as a source of supplemental protein. Poultry waste in cage layer contains amino acid nitrogen that ranges from 37 to 40% of total nitrogen and that about 40 to 60% of total nitrogen in poultry excreta is present in the form of non-protein nitrogen (NPN). Uric acid, the major NPN source in poultry is degraded to ammonia by rumen microbes. According to National Research Council (NRC) (1984), the maximum inclusion rate for poultry waste in ruminant feeds is 20%. Adding broiler litter to beef cattle rations at a level of 20% or higher (as fed basis) generally meets the animal's needs for crude protein, calcium and phosphorus. The investigators reported beneficial effects of feeding corn silage to which poultry litter has been added at a level of 30%. Furthermore, poultry waste fed at levels above 35% usually covers almost the total protein requirement of sheep, and contributes substantially to the energy of the total ration. The investigator noted that the only problem encountered in feeding processed poultry waste to sheep is the toxicity derived from the high copper level in poultry diets. The body conditions of sheep fed dried poultry waste, soybean or urea as winter supplements and concluded that feeding a supplement containing dried poultry waste resulted in performance similar to that of conventional supplements containing soya bean meal. According to current investigation, the nutrient quality of heat treated poultry litter and obtained dry matter (DM), crude protein, energy, crude fibre, ether extract and ash values of 87%, 20%, 621.41 kcal/kg, 10.40%, 2.2% and 18.50%, respectively. In addition, phosphorus, calcium, sodium, potassium and magnesium values in the litter were 4.50%, 2.00%, 0.10%, 2.05 and 0.48%, respectively. The investigators concluded that poultry litter could be incorporated into animal feeds.

Poultry waste as fertilizer

The use of Poultry manure fertilizer is becoming a common practice (especially Chicken manure as fertilizer) with many farmers throughout the world as this matter content has in store various nutritional elements for various fields or crops. These nutritional elements are

very effective in increasing the productivity and rapid growth of farms e.g. farms that produce vegetables. What manure basically is, its significance and various other factors related to it can be thoroughly understood.

Chicken manure is basically a waste material which is organic in nature and comprises of urine and feces of animals which are related to poultry e.g. chicken. Poultry manure is a mixture of certain types of bedding material such as sawdust or wood shavings. The manure is acquired by cleaning of the poultry houses on regular basis where thin bedding layers are removed along with such manure. So the manure which is basically the waste from chicken dropping and other mixtures, when used as fertilizer is called Chicken fertilizer. Now the components or constituents found in the manure are dependent on the types of birds, their feed ration and proportions of droppings to litter, the handling systems of the manure and the types of litter. However, the most common components are Potassium, Nitrogen and phosphorus

It is preferred to use manure after within 120 days of the harvesting of crops. Similarly it is preferable not to use fresh manure because it may contain certain bacteria which are harmful for human health and may cause diseases. It is therefore suggest that the manure should be used after it is composted because composting not only enhances the nutrients but also avoids the risks of your exposure to different diseases. The composting procedure may involve 3 to 4 weeks after which such manure can be used as fertilizer in gardens and for crops. Always wash your hands thoroughly after they come in contact with the manure or the compost and especially before eating so that no bacteria can enter your body.

Self-Check -3	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What is the importance of poultry waste related to animal feed and fertilizer?

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1)

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Information Sheet-4	Obtaining information from effluent management specialists

4.1. Introduction

Waste management is an important component of poultry production. Unlike many of the equipment and inventory management issues, waste management is the sole responsibility of the grower. Current state regulations require growers to manage all waste materials, including litter and dead birds, to assure beneficial use of the waste, and also to prevent adverse effects to the environment. The effluent management specialist is responsible for developing rules and enforcing these acts in order to maintain employees' health and safety as well as protecting environmental pollution concerning poultry waste in particular and any wastes in general. An effluent management specialist encompasses a group of people who do one or more of the following: identify hazardous waste, ensure safe handling and disposal, and work to reduce the generation of hazardous waste.

4.1. Handling waste

What is waste management? There is more to waste management than collecting rubbish and dumping it at a landfill. Businesses routinely use hazardous materials that, when improperly handled, pose a threat to human health and the environment. These materials are found in everyday items such as solid wastes (manure, hatchery and debris or litter) and liquid waste (leftover and slaughter house. ISO 14001 provides a framework and a structured approach to handling waste. During identification and evaluation of environmental aspects, you will determine what wastes are emerging in your processes, and with operational controls you will define how the waste will be treated.

How to handle waste?

Waste management is the process of treating wastes, and it offers a variety of solutions for recycling items that don't belong in the trash. This is a process that each and every household and business owner in the world needs. Waste management disposes of the products and substances that you have used in a safe and efficient manner. ISO 14001 doesn't prescribe the steps in waste handling, and every company can approach it according to its needs, but there are some common steps in the process:

Figure 20. Steps in handling waste

Evaluate your waste: to be able to handle the waste properly, the company first needs to determine whether the waste is hazardous or not, and whether handling of that particular waste is regulated by legislation. For more information, see: Demystification of legal requirements in ISO 14001. This step is often called classification or categorization of the waste.

Store your waste: depending on the type of waste, there will be different requirements in terms of storage facilities. Waste can be in solid or liquid form, so it is important to store it according to its characteristics. Hazardous waste must be stored in a sturdy, leak-proof container that is kept closed when not adding or removing waste. Different kinds of waste may require different types of storage containers. The container must be labeled with the words “Hazardous Waste“, a clear description of the contents, and the date when the waste is first placed in the container. Containers must be stored on an impermeable surface with enough aisle space to allow for weekly container inspections.

Label the waste: nonhazardous waste doesn’t have to be labeled in any special way. On the other hand, hazardous waste labeling is often prescribed by law and in most countries;

the company must obtain a license for even generating some kinds of hazardous waste. The label for marking packed hazardous waste usually contains the following information: Information about the waste owner who packed the waste: name, address, telephone, date of packaging, name and surname of the person qualified to be responsible for that job.

Physical characteristics of the waste: powder, solid, viscous substances, pastes, sludge, liquid substance, gaseous substances

Transport and dispose your waste properly: the company is responsible for its hazardous waste forever. To help ensure that hazardous waste is transported and disposed of properly, and to reduce your liability, choose a transporter that fulfills the following requirements:

Plan for emergencies: handling hazardous waste leaves room for emergency situations caused by mistreatment of the waste or any other cause. Plan for emergencies in the following ways:

- Maintain spill and appropriate emergency response equipment in an accessible area.
- Train employees in the emergency response procedures that are appropriate for your site.
- To manage your environmental incidents, use this free online tool for ISO 14001 compliance.

Train personnel: training all employees who have any role in handling, storing, or otherwise managing hazardous waste is a necessary step for ensuring compliance with hazardous waste rules. Personnel must be familiar with each waste's hazards, appropriate safety procedures, and all aspects of compliance.

Keep records: the purpose of keeping records is to provide evidence that the waste is stored according to the procedures. The usual records to be kept are the ones of generated waste by type and amount, and records of waste deployed to an authorized organization.

Additionally, According to the poultry producers may obtain information from effluent management specialists on all relevant aspects of litter materials utilization: this information may include:

1. SAFETY

As manure decomposes, gases are released. The types of gases produced depend upon how the manure is stored. Under aerobic conditions (with oxygen present) the gases produced are not dangerous. However, when manure is stored anaerobically (no oxygen present), some of the gases produced are dangerous. When liquid manure is stored for a period of several weeks in an enclosed space, the dangerous gases can accumulate in the head space of the tank and in bubbles and dissolved gases within the manure itself. The greatest danger occurs when the manure is agitated, when this happens, the gases held in the manure are released and the concentrations can reach lethal levels within several minutes. Numerous deaths have occurred as a result of farm workers entering manure tanks and storages.

The gas that is most dangerous is hydrogen sulphide. Although it is readily detectable at low concentrations, at higher levels the gas paralyses the sense of smell, so it is possible to unknowingly encounter a dangerous situation. As the concentration increases, the hydrogen sulphide paralyses the nerves that control the diaphragm causing a person to stop breathing. When concentrations are high, a single breath of the gas can be fatal. The other gases considered to be dangerous.

Good design and safe habits can prevent accidents from happening. Long-term storage should not be in the same air space as the animals or workers. The agitation required to remove the manure from the barn can increase gas concentrations to lethal levels very rapidly. Connections between the barn and long term storage must be separated by a gas trap to prevent the gases from returning to the barn. Design the facility so that all servicing can be performed without entering the storage.

When agitating manure in-barn storage, be certain to provide maximum ventilation. All personnel should work in pairs. All people should be evacuated from the air space above the storage, animals should be evacuated if possible. Begin by pumping without agitation to create several feet of head space for the gases. Agitate below the surface and do no more agitation than is necessary.

Never enter a manure tank without proper respiratory equipment that is designed for the purpose. A purpose-built breathing apparatus with full face mask and remote air tank and hose are required-SCUBA equipment is not adequate. Always work in pairs.

2. Environmental Considerations

Poultry producers must develop an approved Nutrient Management Plan (NMP) and maintain records of poultry waste removed from the premises or land applied on-site. The amount of poultry waste or litter that may be land applied on the property of the poultry feeding operation is limited according to nutrient management guidelines established in the NMP. These guidelines only allow litter use as a beneficial fertilizer to pasture or cropland, not as a disposal system. If poultry waste or litter cannot be used according to nutrient management guidelines, the producer must see that it is removed to a location where it can be used properly. In some cases, the producer may sell the by-product to other individuals for land application or to commercial composting, chemical production or energy production facilities.

The amount of poultry waste or litter that may be land applied on the property of the poultry feeding operation is limited according to nutrient management guidelines established in the NMP. These guidelines only allow litter use as a beneficial fertilizer to pasture or cropland, not as a disposal system. If poultry waste or litter cannot be used according to nutrient management guidelines, the producer must see that it is removed to a location where it can be used properly. In some cases, the producer may sell the by-product to other individuals for land application or to commercial composting, chemical production or energy production facilities. A website www.oklittermarket.org is available to promote the marketing of poultry litter.

Prior to any land application of poultry waste or litter in the state, a certified applicator must obtain recent soil tests for each land application site and recent poultry waste or litter analyses. Land application rates must follow current Natural Resources Conservation Service (NRCS) Waste Utilization Standards. For more information on soil and litter testing, contact your local County Extension Office.

3. Registration/Certification

Poultry producers are required by law to register their operation while commercial and private poultry waste applicators must apply for an applicator’s certificate, both through the State Board of Agriculture. Annual renewals are required for producer registration and commercial applicator certificates. Private waste applicators are required to renew their

license every five years. Only certified private or commercial waste applicators can apply poultry waste to land.

4. **Education**

Both registered operators of poultry feeding operations and poultry waste applicators are required to attend poultry waste management education (collection, storage, transportations and disposal systems).

Self-Check -4	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What are the specialist recommendations on effluent waste management?

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1)

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Operation Sheet 3	Handling waste

Method of waste handling

Step 1- Evaluate waste

Step 2- store your waste

Step 3- Label the waste

Step 4- Transport and dispose your waste properly

Step 5- Keep records

Step 6- Train personnel

Step 7- Plan for emergency

LAP Test	Practical Demonstration

Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within -3- hour.

Task 1. Handle the poultry waste found in your training provider's farm?

List of references

A website www.oklittermarket.org

https://www.pca.state.mn.us/sites/default/files/p-rrr1-05e.pdf

https://www.ncdot.gov/initiatives-policies/environmental/litter-management

POULTRY PRODUCTION

Level - III

Learning Guide -70

Unit of Competence: Implementing Poultry Farm waste management

Module Title: Implementing Poultry Farm Waste management

LG Code: AGR PLP3 M17 LO-04-LG-70

TTLM Code: AGR PLP3 TTLM 0120v1

LO-04: Monitor waste matter disposal system

Instruction Sheet	Learning Guide #70

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- Observing and following Organisational OHS procedures, practices, policies and precautions
- Checking flow rates, pit levels, compost temperatures and equipment regularly
- Carrying out cleaning procedures and hygiene practice
- Monitoring reflects an understanding of the environmental duty of care.

This guide will also assist you to attain the learning outcome stated in the cover page.

Specifically, upon completion of this Learning Guide, **you will be able to:**

- Observe and follow Organisational OHS procedures, practices, policies and precautions
- Check flow rates, pit levels, compost temperatures and equipment regularly
- Carry out cleaning procedures and hygiene practice
- Monitor reflects an understanding of the environmental duty of care

Learning Instructions:

8. Read the specific objectives of this Learning Guide.
9. Follow the instructions described in number 1 to 7.
10. Read the information written in the “Information Sheets 1-3”. Try to understand what are being discussed. Ask you teacher for assistance if you have hard time understanding them.
11. Accomplish the “Self-check 1” **in page 82, 86 and 92 respectively**
12. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-check 1).
13. If you earned a satisfactory evaluation proceed to “Information Sheet 2”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Activity #1.
14. Submit your accomplished Self-check. This will form part of your training portfolio.

Information Sheet-1	Observing and following Organizational OHS procedures, practices, policies and precautions

1.1. Observing and following OHS procedures in poultry waste management

In observing and following OHS procedures, an observation checklist is used to identify what is happening concerning the waste management operations. It was a nonparticipant observation where the observer does not get involved in the activity of the group, but rather remains as a passive observer. Standard operating procedures regarding all the meat processing and waste disposal activities were listed in the checklist to see the level of compliance. Therefore, the supervisor only examines and then draws conclusions from what have been observed.

1.1.3. OHS procedures in waste application techniques

Poultry litter may not be stockpiled nearer than 100 feet to surface waters (such as streams, lakes, ponds, and swamps) or wells. There should not be any potential for spills or runoff into surface waters when applying litter. Therefore, some field buffers between litter application areas and streams or other surface waters are also advised. Reasonable buffer distances can vary greatly depending on soil type, slope of the land, and crop system, but buffers of 25 to 50 feet are commonly used. A commercial poultry litter hauler should also receive a copy of the most recent waste analysis that a producer has for the litter. This information will assist in calibrating equipment so that the litter can be applied at the proper rate to meet the crop's nitrogen needs. Waste analyses are required within 60 days before land application of the waste; however, accepted average waste data may be used to calculate litter application rates. Specific buffer and waste sampling criteria may be required in watersheds that have nutrient-sensitive waters. Check with a regional office of the DWI for current standards on specific watersheds.

Record-keeping is required of all litter applications when litter source is a farm producing more than 30,000 birds. The OHS recommends the use of division-approved forms for dry litter application. The forms are a convenient way to document proper litter application rates that are specified in the waste management plan. In this event record-keeping are very important and forms can be obtained from the poultry producer. The poultry producer should record each cleanout and document the quantity of litter removed.

1.1.4. Occupational health and safety precautions

Following OHS/OSHA

OSH Admiration requires that the poultry industry should provide their employees with a safe workplace, free from known, serious health hazards. The agency offers employers broad guidelines on their duties under OHS or OSHA:

In poultry waste management:

- Employers must institute measures to prevent exposure to recognized hazards, including the selection of appropriate PPE.
- Generally, rubber gloves, aprons, boots, and face masks may be necessary to prevent contact with wastes.
- Employers must determine what tasks require these and/or other PPE
- Work conditions must meet OHS safety standards.
- Employees should have the tools and equipment necessary to do their job safely. The poultry industry must establish safe operating procedures and explain them so that employees know what to do.
- Employers must post labels, posters or signs warning workers about potential dangers. They must also put up OSHA posters informing employees of their rights and responsibilities.
- Poultry industries that handle hazardous chemicals must have a training program for handling them safely.
- All training and safety tips must be in a language, and vocabulary, workers can understand.
- Employers, with a few exceptions, must keep records of work-related illnesses and injuries. OSHA must be notified of fatalities, hospitalizations, amputations and losses of an eye within eight hours of the incident.
- Employers can't discriminate against employees who report OSHA violations.
- If there's a violation, employers have to fix it by the deadline OSHA gives them.

Even though OSHA places the heaviest burden on employers, workers have responsibilities, too. If employers cover up work-related injury or illness cases, it's the

employee's responsibility to notify OSHA. Employees have to assess workplace safety for themselves and decide whether it's necessary to notify OSHA about a lack of safety precautions. Beyond that, if employees don't follow the safety rules, the rules are useless.

Providing training

The poultry industries must also train employees and supervisors on their roles in dealing with hazards and safety programs under the act, and responding to or investigating accidents, illness or injuries. It's also important to train workers in identifying and controlling hazards, both in their specific job and more general work-related risks.

The hierarchy of controls is part of many training programs. It ranks different safety precautions according to their effectiveness:

- Elimination: Take the hazard out of the workplace.
- Substitution: Replace the hazard.
- Engineering Controls: Keep danger away from workers.
- Administrative Controls: Reduce risk by changing how the work is performed.
- Personal Protective Equipment: wear appropriate PPE designed to the task

Workplace Safety Guidelines

The OSH Act has been in place since 1970, though it's seen many changes since then. That gives employers, OSHA and safety training companies plenty of experience on what principles work when spreading your safety message:

- Involve employees in planning. If workers take ownership of safety initiatives, they're more likely to take job safety seriously.
- Provide clear instructions. Don't just assume. Before employees start a new task or use new equipment, confirm that they know what they're supposed to do and how to keep themselves safe.
- Prioritize. It's important to have plans for disasters such as zoonotic disease. It's more important to focus on such important diseases, which happen more often and cause more total injuries each year.

- Keep the work area clean. Get clear wastes, waste disposal equipments and clean up house and spills. Encourage employees to do the same if they spot a problem.
- Give your employees the green light to speak up. If they have safety concerns or new safety tips, let them know they can bring their thoughts to you and get a fair hearing.
- Review employee performance. Some workers may take shortcuts or avoid precautions, figuring easier-and-quicker is better than safer. Other employees may skip out on training if they get the chance. Keep track of which workers take classes and which ones follow the rules. Cite them as an example to others.
- Keep tools, equipments and machinery in good working order. Develop a regular maintenance program for any dangerous machines in your workplace. Check that any protective devices such as machine guards are in good shape. See that any warning signs or instructions that should be posted are indeed visible.
- If your staff does use personal protective equipment, take the time to choose the right equipment in the correct sizes. Buy good, reliable PPE, rather than cutting costs and putting employees at risk.
- Provide training programs. These can be on-site, online or customized to suit your poultry industry.
- Review and update your safety precautions every year. At the start of the year, inspect your facilities. Look for out-of-date equipment or deficiencies. See whether any of your current precautions or policies is out of date. OSHA regularly updates its rules, so you need to stay current.

Self-Check -1	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. List at least four workplace safety tips in poultry waste management(4pts)

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____
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   _____
   _____
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Information Sheet-2	**Checking flow rates, pit levels, compost temperatures and equipment regularly**

4.2. Compost Temperature

Most of the temperature rise within the composting material is a result of the activity of the microbes in the bin. As the microorganisms work to decompose the compost, their metabolic activity generates heat, which raises the temperature of the composting material.

Temperatures between 32°C (90°F) and 60°C (140°F) normally indicate rapid decomposition is taking place in the compost heap and this is most common shortly after material has been added.

Lower temperatures signal a slowing in the composting process. However, high temperatures, in excess of 60°C, result in a reduction in the activity of the majority of microorganisms.

The microbes involved in the aerobic composting process (Compost Microbes) fall into two groups:

- Mesophilic those that are active in temperatures of (10 °C to 45 °C) and
- Thermophilic active at 45°C to 70°C.

The psychrophiles a third group of microorganisms functioning at lower temperatures, in the range 10°C to 20°C (14°F to 68°F), do not play a significant role in hot composting but will be involved in keeping cold composting ticking over during in the winter in the UK and areas with a similar climate.

During the hot thermophlic stage efforts should be made to ensure that the composting material is kept aerated and moist, additional moisture should be added in the form of water or compost comfrey tea. Providing air and moisture are at levels which ensure biological activity is necessary to hold the high temperatures required to destroy weed seeds, pathogenic microorganisms, the eggs of parasites and fruit flies, some of which, have been shown to survive in composting material at temperatures as high as 57°C for several days.

If checked regularly the temperature of the decomposing material provides an indication as to when the pile should be turned to aerate to restore the microbial activity necessary to maintain the required temperature of for as long a period as possible.

It has been found that during the thermophilic stage up to 87% of the organisms present in the sampled heaps were in the spore forming Bacillus species, with one species Bacillus stearothermophilus predominant at temperatures of over 65°C. However, there are a wide range of thermophilic bacteria and fungi that have been isolated from compost during the thermophilic stage. Although the heap will be repopulated when it cools it is desirable avoid temperatures of over 65°C to maintain a broad population of microbes to ensure decomposition of the composting material.

The estimated optimum “hot” temperature varies in the published works between 45°-55°C and 55°-59°C while others favour 60°- 65°C.

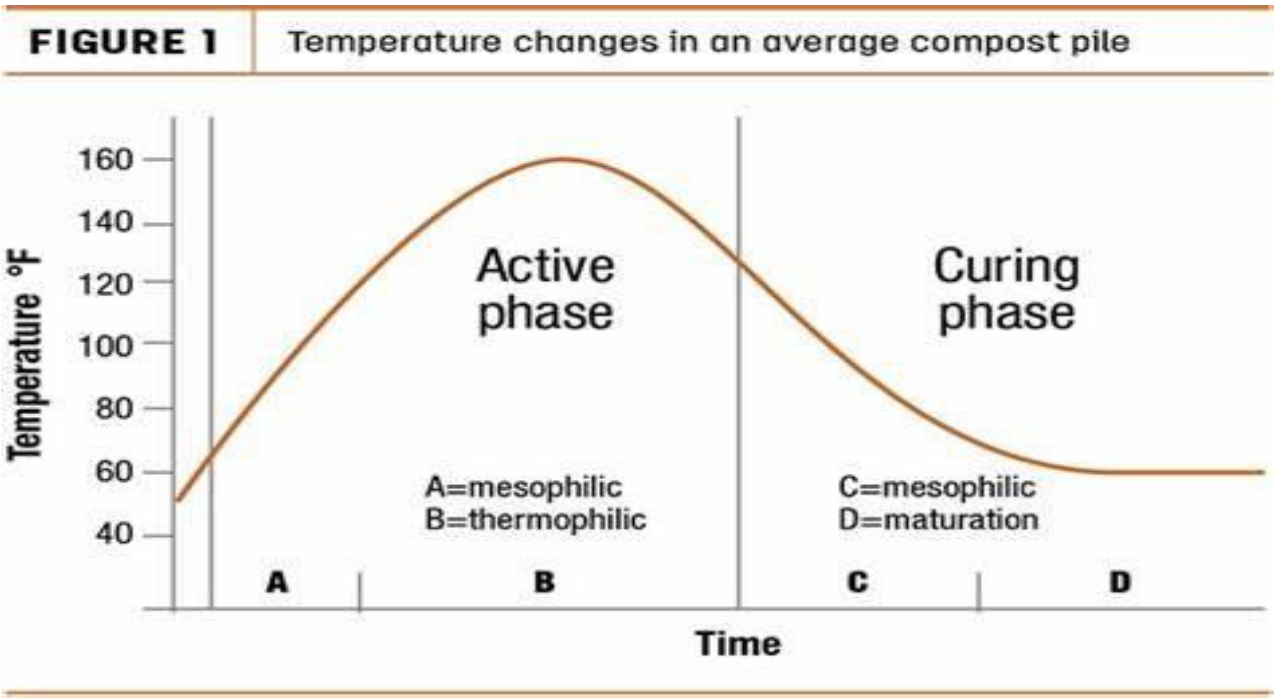

Figure 21. Range of temperatures in compost pile

4.3. Pit level or Holding Units

Holding units are containers, bins or structures for holding organic materials in place during the composting process. Portable units may be made from light-weight materials, such as welded wire or hardware cloth, chicken wire on a wood frame, or old wooden pallets tied together, while permanent units can be made from landscape timbers, concrete blocks or bricks. Manufactured holding units are also available. Holding units differ from turning units in that organic materials within holding units are usually not turned while turning units are built to make turning easy.

Regardless of the type of structure you choose, make certain it is well-ventilated for good air circulation throughout the composting materials. Also, the ideal size for the structure is 3 ft. X 3 ft. X 3 ft. If the bin is higher or wider than 3 feet, aeration becomes a problem and the composting process occurs more slowly.

Self-Check -2	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What is the appropriate temperature for composting(4pts)

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

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Information Sheet-3	Carrying out cleaning procedures and hygiene practice

3.1. Introduction

Cleaning and disinfection are central to any biosecurity program. A good broiler house cleaning and disinfection program will help minimize the adverse effects of disease, optimize bird performance and welfare, and provide assurances on food safety issues. Diseases and infections have always been a major concern to the poultry industry. Fortunately, microbial contamination can be prevented and controlled using proper management practices and modern health products.

Microorganisms are everywhere! Some are relatively harmless, while others can cause disease. Some pose a lethal threat to one species of animal while remaining harmless to another species. Some organisms are easily destroyed, while others are very difficult to eliminate. The moral is, Treat all microorganisms as if they are a severe threat to the chick's livelihood.

Three terms are commonly used to describe microbial control:

Sterilization: Destroying all infective and reproductive forms of all microorganisms (bacteria, fungi, virus, and the like).

Disinfection: Destroying all vegetative forms of microorganisms. Spores are not destroyed.
Sanitation: Pathogenic organisms are present but are not a threat to the birds' health.

Many producers have the impression that they create a "sterile" condition because they use disinfectants, when they may only achieve a sanitized condition at the very best. The most important thing to remember when striving for a sanitized environment is that cleanliness is essential.

3.2. Personnel hygiene:

- Wash hands with soap and water before and after handling eggs chicken and spraying disinfectant.
- Use outerwear and boots in poultry farm.
- Use respiratory mask
- Never eat or smoke while spraying disinfectants

3.3. Hygiene of floors and equipments

The poultry equipment in the poultry farm should be cleaned as the required standards. General cleaning of poultry house, equipment and other materials should be done on a continuous basis. Proper cleaning removes most germs and is always done before using disinfectants. This applies to all areas, including floors, walls, equipment, and personnel.

It is extremely important to remove as much organic matter as possible from surfaces being disinfected. After removing dust, chick down, droppings, tissue residues, and such, thoroughly clean surfaces, using warm water and appropriate cleaning aids. Focus on selecting the proper detergent to produce the cleanest environment possible with variations in water hardness, salinity, and pH. A thorough rinsing with enough clean, sanitized water completes the cleaning process and removes most lingering residues of detergents, organic matter, or microbial germs. Only after facilities are thoroughly clean do you treat surfaces with an appropriate disinfectant solution. Not all disinfectants are suited for every situation.

To maintain **cleaning and hygiene practice**, the Aviagen recommends:

1. **Establish a plan**

Any good poultry house cleaning and disinfection program will start with a plan, detailing dates and times, along with the labor and equipment needed, and this should be established prior to depleting the farm.

2. **Control insects**

Wearing appropriate protective equipment, spray the poultry house interior with a locally recommended insecticide as soon as the flock is removed and while the house is still warm. A second treatment with insecticide should be completed before fumigation.

3. Remove dust

Remove all dust and cobwebs from interior surfaces and equipment.

4. **Pre-spray**

Again, wearing appropriate protective equipment, spray detergent solution throughout the broiler house interior to dampen any remaining dust. Close the curtains in open-sided poultry houses first.

5. Remove equipment

Remove all equipment from the house and raise automatic feeders and drinkers.

6. Remove and dispose of litter

Litter must be removed to a distance of at least 3.2 km (2 miles) and disposed of in accordance with government regulations.

7. Wash

Use a pressure washer with a foam detergent. Ensure the detergent is compatible with the disinfectant to be used. Rinse with hot water. Poultry houses should be washed using a pressure washer and foam detergent, compatible with the disinfectant to be used, and then rinsed with hot water.

Figure 22. Best practices for poultry house cleaning and disinfection

8. Disinfect

Use an approved disinfectant that is effective against specific poultry bacteria and viruses. Follow manufacturer's instructions at all times. Most disinfectants are not effective against

sporulated coccidial oocysts, and selective coccidial treatments should be used by trained staff only. It is always worth remembering that disinfectants are ineffective in the presence of dirt and organic matter and should not be applied to wet surfaces, as this will result in dilution.

9. Fumigate

Where permitted, formalin fumigation should be completed by trained personnel, following safety legislation and guidelines. Fumigate as soon as possible after disinfection; surfaces should be damp and the house warmed to a minimum of 21C (70F) and a relative humidity of greater than 65 percent. Seal the house for 24 hours. Prior to permitting any re-entry, ventilate the house to reduce formalin levels to 2 ppm. Repeat fumigation after the litter has been spread.

3.4. Poultry hatchery hygiene and its management

The hatchery is a central place where the hatching egg is transformed into a one day old chick, during 21 days. The environment of a poultry hatchery is very susceptible to contamination by microorganisms which can adversely affect hatchability of the eggs and can result in embryonic deaths. Streptococcus species, E. coli, Staphylococcus species, Pseudomonas species and Aspergillus fumigates are mainly isolated from hatchery and it adversely affects chick quality and cause embryonic deaths. Poor standards of hatchery hygiene may lead ultimately to an explosion of pathogenic organisms resulting in severe economic loss. Hence hatchery hygiene is an important factor in healthy poultry production.

Source of contamination: Eggs: Even eggs look like clean in appearance it may carry thousands of bacteria. One rotten egg which explodes in the setter or hatcher has the capacity to contaminate many other eggs or chicks, trays, tray carriers, trollies and fans. Contaminated eggs will lower the hatch and produce chicks with poor liability and growth.

Consequences of contamination

- Low hatchability
- Poor chick quality
- Embryonic mortality
- Poor growth rate
- High disinfectant costs

- High labour costs

HATCHERY HYGIENE: Hygiene at the layer farm Hatchery hygiene begins at the layer farm. As the eggs are laid they are quickly challenged by microbes found on the floor, litter, droppings. Transfer of eggs with un sanitized hands to contaminated trays or cartons, adds to the microbial load on eggs. Rough handling of eggs added possibility to crack shells and accessing of microbes inside. Presence of rodents, birds, flies and other insects may also contaminate the eggs.

Recommendations:

- Use only disinfectants chemically compatible with the cleaning product.
- Washed with alkaline products (based on potassium hydroxide), to remove mainly fat and protein
- The water should be warmer than the egg contents throughout the cleaning

Monitoring of hatchery hygiene

Implementation of the hygiene program in a hatchery is not only sufficient to ensure to produce a healthy chick but also is fallow in breeding farm, broiler farm, processing unit, transport. The entire person who involve in this process should be aware of all measures, facts and procedures of hygiene. A collective approach is the only way to ensure best hygienic condition in the hatchery.

Routine microbiological assessment of the hatchery is necessary to monitor the hygiene status of hatchery and it can best done by assessing air quality in different area of hatchery including setter and hatcher (air exposure plate method) and by swab sampling of surface area and culturing on trypticase soy agar (or blood agar) and MacConkey agar plates and Sabrourade Dexrose Agar.

Assessing microbial load on fluff sample can also give the view of hatchery hygiene. It helps in

- Implementation of best cleaning and disinfection program
- To ensure the use of best disinfectant at in the hatchery
- To find out point of contamination in the hatchery

Self-Check -3	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

2. What is the appropriate temperature for composting(4pts)

Note: **Satisfactory rating - 3 points** **Unsatisfactory - below 3 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

_____

_____

_____

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POULTRY PRODUCTION

Level - III

Learning Guide -71

Unit of Competence: Implementing Poultry Farm waste management

Module Title: Implementing Poultry Farm West management

LG Code: AGR PLP3 M17 LO-05-LG-71

TTLM Code: AGR PLP3 TTLM 0120v1

LO-05: Conduct hygiene and administration activities

Instruction Sheet	Learning Guide #71

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- Cleaning equipment in accordance with manufacturer's specifications
- Cleaning and storing attachments and other ancillary equipment
- Disposing all containers, leftover fluids, waste and debris from the operations
- Completing all required records and documentation

This guide will also assist you to attain the learning outcome stated in the cover page.

Specifically, upon completion of this Learning Guide, **you will be able to:**

- Clean equipment in accordance with manufacturer's specifications
- Clean and store attachments and other ancillary equipment
- Dispose all containers, leftover fluids, waste and debris from the operations
- Complete all required records and documentation

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described in number 3 to 20.
3. Read the information written in the “Information Sheets 1-4”. Try to understand what are being discussed. Ask you teacher for assistance if you have hard time understanding them.
4. Accomplish the “Self-check 1” **in page 101, 103, 105 and 108 respectively**
5. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-check 1).
6. If you earned a satisfactory evaluation proceed to “Information Sheet 2”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Activity #1.
7. Submit your accomplished Self-check. This will form part of your training portfolio.

Information Sheet-1	Cleaning equipment in accordance with manufacturer's direction

1.1. Following manufacturer's specifications, organisational procedures and regulations

Instructions and directions of organisational procedures and regulations provided by supervisor must be followed and if we have any question we can ask when necessary. And also employee must observe and follow Enterprise policies and procedures in relation to workplace practices in the handling and disposal of materials. Information included in a Material Safety Data Sheet aids in the selection of safe products, helps you understand the potential health and physical hazards of a chemical and describes how to respond effectively to exposure situations

Any employee who works in industry which raises poultry or any farmer who raise his own stock must follow the following instruction and direction in cleaning of all poultry equipments:-

- Enterprise policies and procedures
- Manufacturer instructions
- Material safety data sheets (MSDS)
- OHS standards and procedures
- Specifications for tools and equipment
- Standard Operating Procedures (SOP)
- Verbal directions from manager or supervisor
- Work instructions and standards

The MSDS is a detailed informational document prepared by the manufacturer or importer of a hazardous chemical. It describes the physical and chemical properties of the product.

MSDS's contain useful information such as:

- Flash point
- Toxicity
- Procedures for spills and leaks
- Storage guidelines

SOP is a set of step-by-step instructions compiled by an organization to help workers carryout complex routine operations. SOPs aim to achieve efficiency, quality output and

uniformity of performance, while reducing miscommunication and failure to comply with industry regulations

A Work Instruction is a detailed sequence of steps that an employee needs to follow each time she/he performs a task. The purpose of a Work instruction is to organize steps in a logical format so that an employee can easily follow it independently.

It is important for you to follow directions and work instructions provided by your supervisor when you are working. If you don't follow instructions and directions, you will not be successful at your job and you will result in loss of materials and product, customer complaints, or liability issues. You have to listen to your supervisor's verbal or written directions and follow them for your job to be complete.

1.2. Cleaning tools and equipment

Tools and equipment have to be clean and safe for efficient work of employee. So any poultry farmer or employee in poultry farm has to keep sanitation of his work site tools and equipment; which mean that he has to clean his work area after completing his task by doing these he can keep healthy himself and his staff members. Cleaning refers to removal of dirt, filth or unwanted substances matter from the materials, tools and equipment.

- Tools and equipment are cleaned, maintained and stored according to manufacturer specifications and supervisor instructions.
- Whenever we are going to our work area we have to take our equipment materials and tools safely.
- After completing our task, we have to replace them to their place (store) safely without any damage on the equipment and ourselves by cleaning and maintaining if necessary.

Cleaning, disinfection and general sanitizing of the breeder house, the immediate area around the house and all equipment, is an essential part of a biosecurity program. All pathogens are protected to some extent by organic material such as old litter, dust and spilled feed. Also, disinfectants and fumigants are much less effective in the presence of such organic material, and so obviously the breeder house and equipment must be thoroughly cleaned before sanitization occurs.

Regular cleaning and disinfection is substantially important "to keep pathogens away" from your chicken and for maintenance of good health. Special attention should be given to avoiding incursion of infectious agents from outside the farm. Similarly, adequate bio-

containment plan is needed to control the spread of pathogens within the same premise. It also enforces the use of adequate method; disinfectant (chemical) or physical measures (burning/burying) to reduce the risk of contamination. The type of disinfectant, mode of application, type of material and dimension determines the outcome of disinfection. The following procedures illustrate specific matters of good farm hygiene. Clean regularly poultry premises, feeding and watering equipment and farm compound.

Use a clean water source to water chickens. Regularly test the portability of drinking water by Public health laboratory through conducting bacteriological and chemical tests with satisfactory results. Make sure your feed resource is safe from possible contamination.
Keep feed stuff dry to avoid growth of fungus and bacteria. Make sure that feed containers (sacks) are safe (new items are preferable). Avoid movement of feed containers between farms. Disinfection kills almost all bacteria, fungi, viruses, and protozoa. It reduces the number of microorganisms to make equipment and surfaces safer for use.

Figure 23. Cleaning of poultry house and equipments

In general cleaning of equipment in accordance with manufacturer's specifications, organisational procedures and regulations may include:

1. **Cleaning equipments**
   - Follow manufacturer's instructions for use, cleaning, disinfection, drying, and storage of cleaning tools
   - Inspect brushes and other cleaning equipment for damage after each use, and discard if necessary
   - The use of single-use cleaning tools is recommended. If reusable tools are used, they shall be disinfected at least daily.
2. **Rinsing equipments**

Rinsing following cleaning is necessary to remove loosened soil and residual detergent:

- Rinse all devices thoroughly after cleaning with water to remove residues which might react with the disinfectant/sterilents
- Perform the final rinse of lumens of intravascular/intrathecal devices with commercially prepared sterile, pyrogen-free water (note: distilled water is not necessarily sterile or pyrogen-free)

3. **Drying equipments**

Drying is an important step that prevents dilution of chemical disinfectants which may render them ineffective and prevents microbial growth:

- Follow the manufacturer's instructions for drying of the device
- Devices shall be air-dried or dried by hand with a clean, lint-free towel
- Dry lumens with compressed medical grade or HEPA-filtered air at a pressure specified by the device manufacturer. Use a regulator to control pressure
- Dry stainless steel devices immediately after rinsing to prevent spotting.

1.3. Hatcher and Setters hygiene

Eggs are incubated 21 days (18 days in setter and 3 days in hatcher). A specific Temperature and humidity are maintained in both to provide ideal conditions for incubation. These conditions are also optimal for growth of many pathogenic microorganisms. Better hygiene and cleaning program can prevent the growth of these microorganisms. Cleaning is most critical part of hatchery hygiene. Removal of organic debris is the best way to keep the microbial load to a minimum.Chick room and wash room biosecurity

- All equipment (Trays, crates and baskets) washed with alkaline detergents
- Temperatures should be higher (50-60°C), but not so high as to damage the plastic.

- Use acid, non-foaming detergent to remove mineral deposits (lime scale) Chick distribution
- Chicks should be placed in new boxes containing unused chick papers or chick pads.
- Vehicles and equipments used for transporting chicks for distribution should be cleaned and disinfected after each use.

Recommendations:

- Remove all the typical debris
- Cleaning should be done with a universal cleaner
- After cleaning, rinse with water and allow drying
- Use disinfection that covers a broad spectrum with residual action
- Fumigation with formaldehyde cannot be done between 24 and 96 hours of embryonic development due to its carcinogenic nature.

  Feeding watering equipments

Figure 24. Cleaning of hatchery and its room

Self-Check -1	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What is cleaning? (3pts)
2. What is the importance of cleaning tools and equipment? (3pts)

Note: **Satisfactory rating - 4 points** **Unsatisfactory - below 4 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____
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   _____
2. _____
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   _____
   _____

Information Sheet-2	Cleaning and storing equipments

2.1. Storage of equipments

After completion of the work all materials, tools and equipment they has to be cleaned, sanitized, disinfected, maintained, and stored properly. The tools and equipment should be stored in a safe, dry place/ ventilated and away from animals reach, and placed on wooden racks or shelve in order to prevent direct contact with soil. Tools should be stored in a dry and secure place. They should be stacked neatly so that they can easily be counted. Stack different items and items of different sizes separately.

Storage system has to accommodate the inflow of inputs of materials and brought components from outside source and the in processing inventories. The systems efficiency may be compared and assessed in terms of unit cost (per volume or weight) of moving machine through storage sites or storage areas over a given period of times. It usually takes into accounts the elements of labor, space and equipment need and cost. The design, size and location of store house must be integral parts of a wider system and management strategy.

Any storage system is compromise between the use of space and the use of time.
There are three ways of storing

- ✓ **Fixed location:** found immediately without a complex system of recording can be considerable waste space
- ✓ **Random location**: space is better utilized but good and elaborate record have to be kept about where materials are
- ✓ **Zoned location:** where partial goods product grouped are randomly stored.

Tools are issued to the workers every morning by the storekeeper, and returned in the afternoon after completion of works. The supervisors need to ensure that the workers are issued the correct type of tools according to the work activities they will be carrying out. The storekeeper is responsible for keeping full records of the tools and controlling the issue of tools to the workers. The total number of tools on site needs to be counted and reported regularly back to project management. The size of the store depends on the quantity of tools to be stored. When the work site is very isolated, the store has to be well stocked and will therefore be larger.

Self-Check -2	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Where or in what condition/ place tools and equipment to be stored? (3pts)
2. Discuss and list three ways of storing tools and equipment. (3pts)

Note: **Satisfactory rating - 4 points** **Unsatisfactory - below 4 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____
   _____
   _____
   _____
2. _____
   _____
   _____
   _____
   _____

Information Sheet-3	Disposing all containers, leftover fluids, waste and debris from the operations

3.1. Introduction

The disposal of poultry wastes (leftover fluids, waste and debris) plays major role in controlling and eradication of diseases. Improper approach and carelessness of this important aspect of production process in poultry, can lead to constant emergence of disease ailments on poultry farms. This results in heavy losses in the forms of mortality and reduced productive performance. Therefore, timely disposal of wastes with efficient method is an important poultry waste management tool for raising healthy and profitable poultry.

3.2. Solid waste management (manures and debris)

Manage waste products to keep them from getting out of control. Dispose of the waste properly. Waste includes containers, equipment parts, hoses, tires, trash, and other leftover man-made debris. Leftover waste or debris can pose a risk to water quality if left uncontrolled. In addition, a cleaned-up job site provides much more favorable visual impression. Keep garbage in a container to collect all trash for proper disposal. If left uncontrolled, garbage and waste may pose a risk to water quality.

3.3. Liquid waste management

In the leftover liquids management:

Empty waste containers once they get full. Doing this will keep waste in check and help prevent leakage, which protects water quality from pollution. Secure the waste bin after work hours to prevent accidentally tipping it over or vandalism. Do not bury or burn the waste and trash on the job site. The remnants may wash into nearby water bodies and create pollution problems.

Proper handling of fluids and wastes will protect water quality and emergency of disease.

Remember the five C's related to fluid and waste management:

- **Check** equipment and the job site frequently for fluids and waste.
- **Contain** any stored fluid and waste on-site with suitable containers.
- **Control** leaks and waste material before it gets out of hand.

- **Clean-up** and dispose of spills and waste promptly.
- **Contact** the supervisors when required.

Self-Check -3	**Written Test**

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What are the five C's related to fluid and waste management? (3pts)

Note: **Satisfactory rating - 4 points** **Unsatisfactory - below 4 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____
   _____
   _____
   _____

Information Sheet-4	Completing records

Why keep records?

Personnel working in the poultry industry are permanently exposed to hazards. These have either a physical, chemical or biological nature. Proper management is needed to avoid accidents and to keep the staff motivated. In all cases, however, safety comes first.

The poultry industry, those individuals working in different segments of the industry, including farms, hatcheries, processing plants, and feed mills are subject to occupational and environmental hazards on a daily basis. Airborne exposure, injuries, and zoonotic infections are amongst the main categories of health hazards. Farm employees, especially new and untrained ones, are usually at a greater risk. Also, those who live near to poultry farms, hatcheries, and processing plants can also be exposed to health hazards through air, water, and soil.

Therefore, keeping accurate and up-to-date records is vital to identifying the potential hazards in poultry waste management and set the appropriate safety measure. This enables the workers to maintain their health and safety at the workplace and help them to practice the work safely.

Why keeping records?

The purpose of keeping records is to provide evidence that the waste is stored according to the procedures. The usual records to be kept are the ones of generated waste by type and amount, and records of waste deployed to an authorized organization.

Methods of record keeping

In waste management, the waste handler took the record either by hand or computer depending on the management system. Traditionally, growers have kept records of their chickens including waste management are taken by hand. In many cases, a hand recording system is still useful for many growers. Yet, the use of computers and computer software has expanded on farms in recent years because of better record accuracy. The farm manager

decides on the system that best fits his/her situation. Advantages to both hand records and computer records are listed below;

1. Hand-Recording System

    - low initial out-of-pocket expense
    - easy to start
    - requires only pencil & paper

2. Computer Recording System

    - more accurate & faster retract
    - tax deductible as an expense
    - much easier to create analysis

Self-Check -4	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What is the importance of record keeping? (3pts)

Note: **Satisfactory rating - 4 points** **Unsatisfactory - below 4 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

_____

_____

_____

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