Poultry Production

Level-III

Learning Guide-36

Unit of Competence: Clean and Fumigate poultry Farm and shed

Module Title: Cleaning and fumigating poultry farm and shed

LG Code: AGR PLP3 Mo9 LO1-LG-36

TTLM Code: AGR PLP3 TTLM 0120v1

LO 1: Prepare to clean shed

Instruction Sheet	Learning Guide #36

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

- Interpreting and confirming requirements for the work to be undertaken with supervisor.
- Identifying occupational Health and Safety (OHS) hazards.
- Implementing risks assessment and suitable controls.
- Selecting, use and maintain suitable personal protective equipment.
- Identifying the environmental implications of cleaning shed.
- Taking responsible action and outcomes assessment.
- Raising and removing equipment from the shed without damage for cleaning.
- Removing feed and watering equipment from shed Clean and sanitize to remove contamination.
- Covering electrical switch boards and other equipment.
- Implementing bio security procedures with in cleaning and fumigation.

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 and confirm requirements for the work to be undertaken with supervisor.
- Identify occupational Health and Safety (OHS) hazards
- Implement risks assessment and suitable controls
- Select, use and maintain suitable personal protective equipment
- Identify the environmental implications of cleaning the shed are,
- Take responsible action and outcomes assessment
- Raise and removed equipment from the shed without damage for cleaning.
- Remove feed and watering equipment from shed
- Cover electrical switch boards and other equipment

- ❖ Implement bio security procedures with in cleaning and fumigation.

Learning Instructions

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below in page 3.
3. Read the information written in the information “Sheet 1---Sheet 10.
4. Accomplish the “Self-check 1, Self-check 2, Self-check 3, Self-check 4, Self-check5, Self-check6, Self-check 7, Self-check8, Self-check 9 and Self-check 10” in page -7, 10, 13,19,22,25,30,36,38 and 42 respectively.
5. If you earned a satisfactory evaluation from the “Self-check” proceed to “Operation Sheet 1” in page -43.
6. Do the “LAP test” in page – 43 (if you are ready).

Information Sheet-1	Interpreting and confirming requirements for the work to be undertaken with supervisor

1.1 Interpreting and confirming the work

Any activates in poultry work should require to be interpreted and confirmed in a proper and safe manner .Creating a suitable working environment is required to confirm the work in a proper manner so a safe and suitable environment should be created .If any problems in countering during confirming cleaning activities of shed making a deep analysis based on the work require for farther activates and make a clear information on it.

Before confirming the work preconditions has to be taken this are:

- Putting on all necessarily PPE
- Setting of proper procedures and guide line for the work to be confirmed
- Having every tools, equipment and materials where ready to the work
- Creating safe and suitable environment
- Dismantling and sealing equipment and materials if necessary
- Electrical equipment must remove or sealed or the power shall turn off
- Dusty environment could happen so sprinkling of water is necessarily before the work

Having arranging all the things now you can confirm the work in a safe and proper manner. After completing any work directed by supervisor any work outcome and work problems have to be interpreted.

Creating pre- operation and operational activates to confirm the work

Pre-Operation actives

1. Confirm that Cleaning &Disinfectant equipment is clean and ready for operation.

2. Ensure that water levels are correct, temperature of wash water is at target temperature (90ºF minimum), chemical supply lines for detergents and sanitizes are connected, concentrations are at suppliers (equipment) recommendations, and that fresh water supply line is open.

3. Record and sign operation log noting date and time, temperature of wash and rinse, detergent concentration, and chlorine concentration in rinse.

Operation/ confirming the work

1. Introduce washable flats, pallets, and dividers into washing system after all pre-operation checks are successfully completed.

2. Maintain operating log noting:

A. Temperature of wash and rinse waters

Detergent, anti-freeze (if any) and chlorine concentrations, and c. condition of wash water from excessive foaming and build-up of egg. Note: Systems using manual addition of detergents will require frequent monitoring for detergent and chemical strength compared to systems using online monitoring of detergent concentration. Chlorine in rinse must be at or above 50 ppm and less than 100 ppm.

3. Visually inspect after Cleaning &Disinfection to confirm that the materials are free of or other organic soil. If not clean, use a brush on observed areas and repeat the cleaning and sanitation cycle to completely remove any observed organic matter.

4. Make corrective changes as required to operate system within established ranges for temperature and chemical concentrations.

5. At mid-shift, drain wash-water tank and perform mid-shift cleaning.

6. Repeat Pr-operational checks before starting operations

Self-Check -1	Written Test

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

1. List out confirming the work preconditions? (5 points

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

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

Answer sheet

Name: _____ Date: _____

Short Answer Questions

1.

- _____
- _____
- _____
- _____

Information Sheet- 2	Identifying occupational Health and Safety (OHS) hazards

1.1. Identify OHS hazards, and implementing suitable controls

OHS Hazards during poultry productions

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.

According to the International Labor Organization (ILO), health hazards in poultry working environments are categorized as accidental, physical, chemical, and biological. Here are just a few examples for each category mentioned by this organization

Physical

- Exposure to high levels of noise.
- Long-time exposure to heat and cold.
- Skeletal problems resulting from lifting and moving of animals, feed bins (bags), egg collection.
- Dust

Chemical

- Respiratory problems resulting from exposure to dust, which is composed of feathers, dander, micro-organisms, etc.
- Respiratory, skin, and eye diseases due to exposure to gaseous chemicals.(e.g. NH3, H2S, CO2, and CH4.
- Exposure to disinfectants, detergents, formaldehyde and pesticides.

Biological

- Zoonotic diseases .These diseases are transmitted between birds and humans & they also are transmitted from animals to humans and include bacterial, viral,

fungal, and parasitic diseases. Among this the most commons are salmonellosis, campylobacteriosis, chlamydiosis, bird flue and avian influenza are among the most. Poultry workers are at a greater risk of being affected by these diseases.

Implement control majors

Implementation measure where set depending of rules and regulation of poultry farm many farm could be prevented or their impacts reduced by wore proper personal protective equipment (PPE) and following OHS requirements among this **OHS requirements are:**

- Using of relevant protective clothing and equipment,
- Use of tooling and equipment,
- Workplace environment and safety handling of material,
- First aid kit
- Hazard control and hazardous materials and substances.
- Using gowns, rubber boots of appropriate size, goggles, gloves etc,
- Following OHS procedure designated for the task
- Checking and fulfilling required safety devices before starting operation

Self-Check -2	Written Test

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

1. Write at list five health hazards in poultry working environments. (5 points)

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

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

Answer sheet

Name: _____ Date: _____

Short Answer Questions

1.

- _____
- _____
- _____

_____

Information Sheet- 3	Implementing risks assessment and suitable controls

3.1 hazard

Hazard: - A hazard is anything that has the potential to harm the health or Safety of a person.

3.2 Risk

Risk: - Risk is the significance of the hazard in terms of likelihood and severity of any possible injury.

Safety The provision and control of work environment systems and human behavior which together give relative freedom from those conditions and circumstances which can cause personal injury, disease or death, or property damage.

A hazard: A hazard is anything that has the potential to harm the health or Safety of a person.

Risk: Risk is the significance of the hazard in terms of likelihood and severity of any possible injury.

Work plays a central role in people's lives, since most workers spent at least eight hours a day in the workplace, whether it is on a farm observation(poultry feeding, watering or cleaning), in an office, factory, etc. Therefore, work environments should be safe and healthy. Yet this is not the case for many workers. At the time of poultry health control program many risks and hazards may be occurred It includes

- hazardous noise
- dust
- solar radiation
- veterinarian chemicals
- zoonotic diseases

Figure, for hazard indication

Recognizing, assessing and controlling risk

At the time of poultry health control program many risks and hazards may be occurred it includes

- hazardous noise
- dust
- solar radiation
- veterinarian chemicals
- zoonotic diseases

So all the above and other risks must be recognized assessed and control in early stage

Self-Check -3	Written Test

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

1. Write the d/t b/n hazard and risks? (5 points)

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

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

Answer sheet

Name: _____ Date: _____

Short Answer Questions

1.

_____

_____

_____

_____

Information Sheet- 4	Selecting, use and maintain suitable personal protective equipment

1.2. Selecting, using and maintaining Suitable personal protective equipment's

Personal protective equipment (PPE) refers to any specialized equipment or clothing worn by farmers and ranchers for protection against health and safety hazards. PPE does not prevent accidents, but it does prevent or reduce injury and even fatalities when used. The protective clothing and equipment must always be:

- appropriate for the particular hazards
- maintained in good condition
- properly stored when not in use, to prevent damage or loss
- Kept clean, fully functional, and sanitary.

There are different types of materials, tools and equipment and supplies to perform different activities in poultry raising activity. Therefore, identifying, selecting, using and maintaining to the working activity are very important aspect in poultry work.

Basic Types of PPE

The strict controls will not necessarily eliminate all the risks associated with most job tasks and this is where the need for PPE must be evaluated. A hazard assessment can help identify which specialized PPE will be required. However, the following basic types of PPE should be made available in worksite.

Eye and face protection

To provide protection during exposure to hazards like flying particles, metal or sparks, liquid chemicals, caustic liquids, light radiation, i.e., welding, lasers. Eye protection should always be worn where there is potential for injury to the eyes or face from small particles, toxic chemicals, flying particles, large objects, thermal or radiation hazards, an lasers.

According to the types and extent of hazards, different PPE should be worn. These must always remain clean and free of contaminates.

Goggles

Goggles offer good protection against front and side impact. Unvented or indirect vented chemical splash goggles provide protection from chemical vapors and liquids.

Hearing protection: - To provide protection during exposure to high pitch and loud noise levels. Exposure to high levels of noise may result in hearing loss. PPE should be worn when the noise level is 85 decibels or greater averaged over an eight-hour period. Most hearing protection devices have a noise reduction rating (NRR) that indicates the amount of protection provided. In general, look for NRR of 25 or greater.

Hand protection: - To provide protection during exposure to potential hazards such as sharp objects, abrasive surfaces, temperature extremes, and chemical contact.

Selecting proper gloves is very important since the hands are used to handle hazardous materials. In addition, traumatic injuries such as cuts, sprains, and punctures may occur. With the wide rangeof hazards, there are also a wide range of gloves that may be used as PPE. Chemical-resistant gloves are always recommended when working with

pesticides and chemicals. Chemical-resistant aprons add protection from body absorption of hazardous chemicals.

Padded cloth gloves

Protects hands from sharp edges, slivers, dirt, and vibration. Not acceptable for handling hazardous materials.

Metal mesh gloves

Better protection than cloth gloves against sharp edges and cuts. Not acceptable for handling hazardous materials.

Rubber gloves

Offer protection when working around electricity.

Heat-resistant gloves

Offers protection from heat and flames.

Vinyl/neoprene gloves

Protects hands against toxic chemicals. Selecting the right glove is critical in handling the varying level of chemical toxicity. See link below for description of protective material used in gloves.

Nitrile protective gloves

Provides good protection when using many different pesticides.

Barrier laminate gloves

Offer the best chemical resistance in gloves designed to handle hazardous chemicals. Avoid cotton-lined or rubber gloves that absorb chemicals that result in continued absorption.

Head protection: - To provide protection to potential hazards such as falling objects, striking against low-hanging objects, electrical hazards, or chemical application.

Chemical-resistant hats with added wide brim

Offers protection when applying pesticides but may not be compatible with certain types of respiratory PPE.

Respiratory

Protection: - Respirators are used to prevent the exposure to air contaminated with harmful dusts, fumes, mists, gases, smokes, sprays, or vapors.

All respirator usage, including disposable respirators, air purifying respirators, and air-supplied respirators, require annual fit testing and testing and training prior to use.

Foot protection - To provide protection for situations with the potential of injuries such as falling or rolling objects, chemical or liquid exposures, piercing objects, and where feet are exposed to electrical hazards.

Latex/rubber footwear

Resists chemicals and provides extra traction on slippery surfaces.

Electrical hazard footwear

Insulated with tough rubber to prevent shocks and burns from electricity.

Nitrile footwear

Resists animal fats, oils, water, chemicals, and pesticides.

Body Protection- PPE includes safety vests and suits and should be used for tasks that can cause body injuries from extreme temperatures, flames and sparks, toxic chemicals, insect bites and radiation. Ensure that they are clean and free from cuts and burns. Always get a good fit to ensure full body protection.

Chemical-resistant coveralls and aprons

Coveralls and aprons (single-use or reusable) worn over regular work clothing offer additional protection when diluting, mixing, or applying pesticides. Pesticide labels may require them for certain pesticides.

We have to consider the followings:

- Protective clothing should be selected to prevent skin contact with contaminated materials or environments.

Consideration should be given to the type of work being performed by the worker when selecting personal protective clothing

Self-Check -4	Written Test

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

1. Write at list five Personal protective equipment (PPE)? (5 points)

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

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

Answer sheet

Name: _____ Date: _____

Short Answer Questions

1.

- _____
  _____

Information Sheet- 5	Identifying the environmental implications of cleaning shed

1.3. Identifying the environmental implications of cleaning the shed

During cleaning the shad there are different waste material or product which will be produced and could affect the environment directly or indirectly main waste material and other things which will produced at the poultry are the following

- litter
- Poultry dung
- plant debris
- plastic
- broken objects
- dead chickens
- Ammonia gas
- Feathers, foul smell and high noises

These waste materials which are produced in poultry have to be removed from the site on regular manure properly;

Disposable materials properly buried in deep enough trench and should be covered with quicklime and then with soil or use Burning. But Burning is the most difficult because the Fumes and smoke may be a problem to the surrounding environment. Mud holes should be frequently filled or exclude the animals away from it quickly.

❖ **N.B. Never dispose waste materials everywhere.**

Work site 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; which mean that he has to clean his work shed after completing his task by doing these he can keep healthy himself and his staff members.

Self-Check -5	Written Test

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

1. Write at list five directly or indirectly main poultry waste material? (5 points)

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

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

Answer sheet

Name: _____ Date: _____

Short Answer Questions

1.

_____

_____

Information Sheet- 6	Taking responsible action and outcomes assessment

6.1 Taking responsible action and outcomes assessment

a) Suitably isolated geographical location is recommended.

b) Poultry establishments should be located and constructed to provide adequate drainage for the site.

c) Poultry houses and hatcheries should be designed and constructed (preferably of smooth impervious materials) so that cleaning and disinfection can be carried out effectively.

d) The establishment should be surrounded by a security fence to prevent the entry of unwanted animals and people.

e) A sign indicating restricted entry should be posted at the entrance to the establishment.

Additional safety measures for poultry farms

a) Establishments should be designed to house a single species and a single production type. The design should also consider the 'all-in all-out' single age group principle.

b) Poultry houses, and buildings used to store feed, eggs or other material, should be constructed and maintained to prevent the entry of wild birds, rodents and arthropods.

c) Where feasible, feed should be delivered into the farm from outside the security fence.

Visitors entering the poultry buildings should wear disposable overalls or clean overalls provided by the farm that are capable of being laundered and boots which can be cleaned and disinfected.

All visitors must use the same high hygiene standards as farm staff e.g. hand washing on entering and leaving the poultry house.

A footbath is a very simple form of safety measures that helps prevent the potential spread of disease. Organisms have the potential to survive for several days or weeks in the dirt stuck to the bottom of your shoes. Footbaths can eliminate these organisms.

Depending on the amount of traffic on your farm, it may be necessary to have more than one footbath. Be sure that materials are provided at every footbath. Do not share scrub brushes between separate footbaths.

☞ **Manage human contact with birds**

- ✓ Always start work with the younger stock and finish with the oldest.
- ✓ Check where your visitors have been - have they been in contact with poultry in the last 3 days or have they recently been overseas?

Prevent anyone who has had recent contact with other poultry from working with your flock until they have followed strict biosecurity measures as required for your property

Self-Check -6	Written Test

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

1. Write at list five Taking responsible action and outcomes assessment. (5 points)

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

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

Answer sheet

Name: _____ Date: _____

Short Answer Questions

1.

- _____
- _____

Information Sheet- 7	Raising and removing equipment from the shed without damage for cleaning

7.1 Cleaning

Cleaning is the process of removing unwanted substances, such as dirt, infectious agents, and other impurities, from an object or environment. Cleaning occurs in many different contexts, and uses many different methods. Several occupations are devoted to cleaning.

Cleaning -is a two-step process

Step 1. Dry cleaning

•Using a broom, brush, shovel, rag or compressed air to remove dust, soil and dry organic material

Remember! Dry cleaning should not be used for cleaning poultry housesinfectedwithair-borndiseasessuchas: Avian houses infected with air borne diseases such as: Avian Influenza or Newcastle it may through in air of the virus and increase the risk of spreading the disease

Step2 Wet cleaning step

- Using detergent/soap and water soaktheareaandscrubtoremove
- remaining and scrub to remove remaining organic material as well as dirt and grease

Disinfectants are chemicals that Slow disease agents activity multiplication and their growth slow disease agents activity, multiplication and their growth or -Kill disease agents

Disinfection is the least reliable step of bio security, depends on many factors such as:

- the quality of cleaning
- the hardness of water
- Quality and suitability of disinfectant
- correct dilution and application

Common types of disinfectants

Disinfectants are divided into several groups based on their chemical structure

Like:

- ✓ Halogens (iodophors and chlorines, halamid®, dettol®)
- ✓ Alcohols
- ✓ Oxidizing agents (hydrogen-peroxide, hyperox®,virkon®)
- ✓ Phenols (fenix®, Prophyl 75®) eos(e®,opy5®
- ✓ Aldehydes (glutheraldhyde –TH4®, formalin)
- ✓ Quaternary ammonium compound (Timsen®Medisep®)

Major guidelines during cleaning poultry sheds

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.

Self-Check -7	Written Test

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

1. Write at list types of cleaning? (5 points)

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

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

Answer sheet

Name: _____ Date: _____

Short Answer Questions

1.

- _____
- _____

Information Sheet- 8	Removing feed and watering equipment from shed Clean and sanitize to remove contamination.

8.1 Clean water and feeding systems

Drain, clean and disinfect the water system. Water pipes should be cleaned at least once per flock to remove any bio film that may have built up. If physical cleaning is not possible, use high levels (140 ppm) of chlorine.

- ✓ Flush water lines with clean, fresh water prior to flock placement.
- ✓ Empty, wash and disinfect all feeding equipment.
- ✓ Empty bulk bins and connecting pipes and brush out. Clean out and seal all openings.
- ✓ Wherever possible, fumigate.

9. 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.

10. 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.

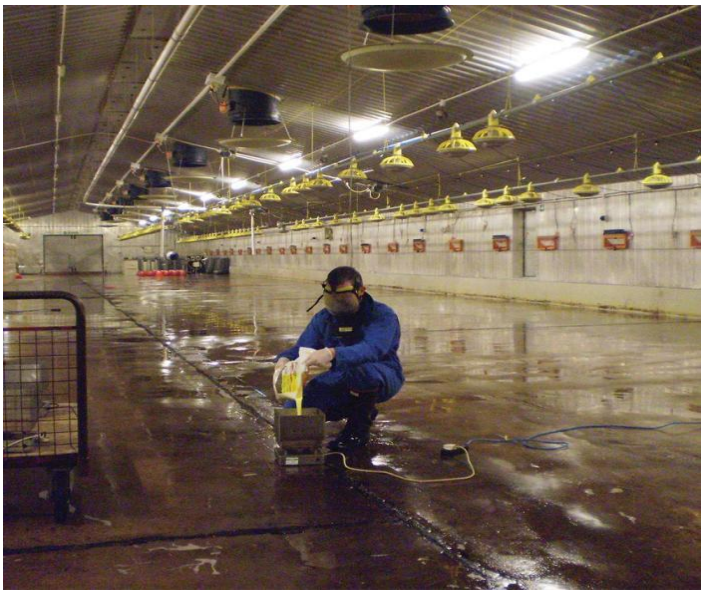


Figure-1, cleaning operation

Methods of cleaning materials, tools and equipment

Cleaning is broadly achieved through mechanical action and/or solvent action; many methods rely on both processes.

- Washing, usually done with water and often some kind of soap or detergent
  - Pressure washing, using a high-pressure stream of water
- Abrasive blasting, typically used to remove bulk material from a surface, may be used to remove contaminants as well
- Acoustic cleaning, the use of sound waves to shake particulates loose from surfaces
  - Ultrasonic cleaning, using ultrasound, usually from 20–400 kHz
  - Megasonic cleaning, a gentler mechanism than ultrasonic cleaning, used in wafer, medical implant, and industrial part cleaning

- Carbon dioxide cleaning, a family of methods for parts cleaning and sterilization using carbon dioxide in its various phases
- Dry cleaning of clothing and textiles, using a chemical solvent other than water
- Flame cleaning of structural steel with an oxyacetylene flame
- Green cleaning, using environmentally friendly methods and products
- Plasma cleaning, using energetic plasma or dielectric barrier discharge plasma created from various gases
- Sputter cleaning, performed in a vacuum by using physical sputtering of the surface
- Steam cleaning, in both domestic and industrial contexts
- Thermal cleaning, in industrial settings, involving pyrolysis and oxidation
- Wet cleaning, methods of professional laundering that avoid the use of chemical solvents

Figure-2, cleaning methods

Cleaning agents are substances (usually liquids, powders, sprays, or granules) used to remove dirt, including dust, stains, bad smells, and clutter on surfaces. Purposes of cleaning agents include health, beauty, removing offensive odor, and avoiding the spread of dirt and contaminants to oneself and others. Some cleaning agents can

kill bacteria (e.g. door handle bacteria, as well as bacteria on worktops and other metallic surfaces) and clean at the same time. Others, called degreasers, contain organic solvents to help dissolve oils and fats.

Different cleaning agents are used depending on the item to be cleaned, the cleaning method and the type of soiling found on the item. There are four main types of cleaning agents used in commercial kitchens:

1. Detergents
2. Degreasers
3. Abrasives
4. Acids

Detergents

Detergents are the most common type of cleaning agent and are used in home and commercial kitchens. They work by breaking up dirt or soil, making it easy to wash it away. The detergents used in commercial kitchens are usually synthetic detergents made from petroleum products and may be in the form of powder, liquid, gel or crystals.

Degreasers

Degreasers are sometimes known as solvent cleaners and are used to remove grease from surfaces such as oven tops, counters and grill backsplashes. Methylated spirits or white spirit were commonly used as degreasers in the past. Most food businesses now try to use non-toxic, non-fuming degreasers in their operations to prevent chemical contamination.

Abrasives

Abrasives are substances or chemicals that depend on rubbing or scrubbing action to clean dirt from hard surfaces. In commercial kitchens, abrasives are usually used to clean floors, pots and pans. Abrasives should be used with care as they may scratch certain types of materials used for kitchen equipment such as plastic or stainless steel.

Acids

Acid cleaners are the most powerful type of cleaning agent and should be used with care. If they are not diluted correctly acid cleaners can be very poisonous and corrosive. Acid cleaners are generally used to remove mineral deposits and are useful for descaling dishwashers or removing rust from restroom facilities.

Always follow cleaning with sanitizing:

Cleaning is only the first step to a germ-free kitchen. Cleaning is done using detergent, but it doesn't kill bacteria or other microorganisms that can cause food poisoning. To kill bacteria and ensure a clean workplace, you must follow cleaning with sanitizing. Effective cleaning and sanitizing also helps to:

- ✓ prevent pests from entering your business
- ✓ prevent cross-contamination
- ✓ prevent allergic reactions caused by cross-contamination

Figure-3, cleaning under pressure

Self-Check -8	Written Test

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

1. Write at list five Methods of cleaning materials, tools and equipment? (5 points)

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

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

Answer sheet

Name: _____ Date: _____

Short Answer Questions

1.

- _____
- _____

Information Sheet- 9	Covering electrical switch boards and other equipment

9.1 Covering electrical switchboards and other equipment

During cleaning electrical switchboard and other equipment s should require to be covered and sealed properly this will important for:

- To avoid sudden outbreak of power
- It avoids contamination of equipment s
- Avoid electric contacts
- Easy to perform the work
- Avoid rusting of metal materials

Apply safe operating procedures regarding to:

- Electrical safety
- Machinery movement and operation
- Working in proximity to others and site visitors

Apply emergency procedures on:

- ✓ Emergency shutdown and stopping of equipment
- ✓ First aid application and site evacuation. Electrical safety
- ✓ Machinery movement and operation

Working in proximity to others and site visitors

Self-Check -9	Written Test

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

1. Write at list five during cleaning electrical switch board properly? (5 points)

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

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

Answer sheet

Name: _____ Date: _____

Short Answer Questions

1.

- _____
- _____

Information Sheet- 10	**Implementing bio security procedures with in cleaning and fumigation**

10.1 General hygienic measure

It is very important to keep the chance of infection on by contacts with sources of infections to a minimum. Germs can be spread via animals and via people. Infection is also possible through contact with infected objects such as crates or cars. All kinds of diseases can be transferred by birds, vermin, insects and other parasites. Remember that feed and dirty drinking water can also carry germs.

The following measures are important to prevent disease.

- Keep the chickens housed instead of letting them roam around freely.
- Do not locate the farm near other farms; keep it at least 100 m away.
- Only allow visitors that have been disinfected thoroughly near the chickens.
- Clean drinkers and feeders regularly.
- Clean the housing after getting rid of the old, non-laying hens.
- Remove all installations from the housing.
- Soak off all the dirt and clean it well.
- Clean the chicken house well with lots of water and let it dry completely.
- Disinfect the empty housing with disinfectant.
- Control rodents (mice and rats) and flies.
- Remove dead birds immediately from the chicken house.
- Renew the litter regularly. Get rid of old litter immediately.

When disease has broken out in your area, it is especially important to carry out these measures well.

If you want to place new, bought stock (for example cocks) with your own home-bred birds, it is a good idea to keep the new birds separate for some time. If a contagious disease appears, the chance of infection will be less than if you immediately place the new birds with the old stock.

A. A sanitation program for poultry raisers includes:

- ✓ Do not expose your flock to birds from other flocks.
- ✓ Buy chicks from known sources.
- ✓ Buy chicks from pull rum-clean flocks.
- ✓ Keep young chicks away from older birds.
- ✓ Burn or bury dead birds.
- ✓ Allow no contaminated equipment to be brought on your premises.
- ✓ Keep visitors away from your poultry houses or ranges.
- ✓ Keep chickens that have left the premises from getting back into the flock.
- ✓ Dispose of sick chickens.
- ✓ Should disease appear, seek authoritative advice promptly.
- ✓ Use preventative and control medications with extreme caution.
- ✓ Treat droppings as potential disease spreaders
- ✓ Try to eliminate rats, lice, and other pests.
- ✓ Handle vaccines properly. Follow the manufacturer's directions.
- ✓ Keep different species of fowl segregated.
- ✓ Do not sell birds known to be diseased.
- ✓ Clean poultry buildings carefully and thoroughly.
- ✓ Enforce a strict program of sanitation and quarantine

B. Other health management practices

- ❖ Buy poultry replacement stock from a reliable, diseases-free source.
- ❖ If possible, keep birds of only one age on the farm. Use an all-in, all-out program. (Bring all the birds onto the farm at one time and remove them all at one time.)
- ❖ Keep pests and flying birds out of the poultry house.
- ❖ Provide the proper ventilation in the poultry house.
- ❖ Control predators such as rats and mice.
- ❖ Feed balanced rations to prevent nutritional diseases.
- ❖ Keep feeders and waterers clean.

- The workers engaged in poultry farm should change their clothes, footwear and head gear at or before entry into the poultry farm.
- The poultry farm should be fenced.

Visitors should be restricted, as far as possible. In case they visit they should change the footwear and clothes, or be disinfected, before visiting the farm

Self-Check -10	Written Test

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

1. Write at list five measures are important to prevent disease? (5 points)

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

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

Answer sheet

Name: _____ Date: _____

Short Answer Questions

1._____

_____

_____

Operation sheet-1	Cleaning and disinfection of poultry Shed

Steps/procedures

- Put on all the necessary PPE
- Remove old litter
- Dry cleaning after removal of litter
- Wet cleaning with caustic soda/liquid soap/ bleaching powder and water under pressure
- Blow lamping of non-inflammable excess/material
- Spraying of disinfectant (fumigation)
- Repair of cracks and crevices
- White washing of house
- Cleaning and disinfection of water system, feeding system and all the equipment in use
- After cleaning the house must be left empty for at least 15 days.
- Preparation of brooders 24hrs before arrival of chicks
- Add at least 5 cm new litter material for the first time, the litter should be clean and dry.

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 5 hours.

Task 1: Cleaning and disinfection of poultry Shed**?**

List of Reference Materials

- ✓ CAB International 1987, Manual on poultry production in the tropics Wallingford, Oxon, United Kingdom
- ✓ French, K.M. 1984, Practical Poultry Raising Peace Corps, Trans- Century Corporation, Washington D.C.
- ✓ G.C Banerjee (2000) A text book of Animal Husbandry. 8th ed Oxford & IBH publishing CO. Pvt.ltd, New Delhi / Calcutta, India

Poultry Production
Level-II

Learning Guide -37

Unit of Competence: Clean and Fumigate poultry farm and shed

Module Title: Cleaning and fumigating poultry farm and shed

LG Code: AGR PLP3 Mo9 LO2-LG-37

TTLM Code: AGR PLP3 TTLM 1219v1

LO 2: Clean shed and surrounds

Instruction Sheet	Learning Guide # 37

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

- Avail bling, service and prepare machinery for operation
- Removing and disposing litter
- Flushing and service drinker and tanks
- Empty and clean feed storage house/Silos
- Mixing chemicals, detergents and disinfectants according to instructions.
- Safely handle and apply chemical agents.
- dry-cleaning electrical equipment
- Managing run-off from cleaning activity according to the waste management procedures.
- Ensuring and completing checks to that all cleaning and hygiene processes to standard

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:

- Available, service and prepare machinery for operation
- Remove and dispose litter
- Flush and service drinker and tanks
- Empty and clean feed storage house/Silos
- Mix chemicals, detergents and disinfectants according to instructions.
- Safely handle and apply chemical agents.
- dry-clean electrical equipment
- Manage run-off from cleaning activity according to the waste management procedures.
- Ensure and complete checks to that all cleaning and hygiene processes to standard

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below in page 46 and47.
3. Read the information written in the information “Sheet 1- 9”.
4. Accomplish the “Self-check 1, Self-check 2, Self-check 3, Self-check 4, Self-check 5, Self-check 6, Self-check 7, Self-check 8, and Self-check 9” in page -50, 54, 57, 59, 62,65,67,69, and 73 respectively.
5. If you earned a satisfactory evaluation from the “Self-check” proceed to “Operation Sheet 1,” in page -74.
6. Do the “LAP test” in page – 75 (if you are ready).

Information Sheet-1	Avail bling, service and prepare machinery for operation

Machinery and equipment where serviced and prepared regularly under based on the schedules of the farm .Any faulty item were identified and serviced

Main ten of machinery and equipment

Whenever every machinery and equipment used in poultry production enterprise, its maintenance should be kept for future sustained and durability. These can be achieved through the following point.

- Be sure to keep owners' manuals for specific maintenance instructions
- Check if every machine and equipment is stalled in proper ways.
- Check whether all equipment locate at a site
- Monitoring if all wires are properly connected in electrical machine
- Turn off switch unless it is no way of service.
- Clean equipment before service
- Repair malfunctioned machine
- Sanitize and disinfect machine and equipment after services.

Attached is a schedule outlining what to check on a daily, weekly, monthly and biannual basis? For further maintain use or read the manufacture's instruction accordingly.

Recording systems for machinery use

There are two general types of machinery records, the first is a cost record to permit the calculation of machinery costs for individual machines and the second is a record of scheduled repair and maintenance. Table is a machinery record form which emphasizes cost information but it also contains space for recording all repair and maintenance activities. Entries on this form can be made daily or weekly for non powered machines which receive little use during the year. For machines which require fuel and daily servicing and receive heavy use, many managers apply another procedure.

Each machine carries a form to record daily fuel and oil consumption and minor repairs. These forms are collected weekly or monthly and the total for each item are entered on a form.

The bottom of the form contains spaces for recording the fixed costs as well as total of the variable costs. This information can be used to calculate the machine cost per hour.

Self-Check -1	Written Test

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

1. List out Main ten of machinery and equipment. (12 points)

Note: **Satisfactory rating - 12 points** **Unsatisfactory - below 12 points**

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

Answer sheet

Name: _____ Date: _____

Short Answer Questions

1.

- _____
- _____
- _____

_____

Information Sheet-2	Removing and disposing litter

Disposing: - is removal or riddance of wastes, excess, scraps, manure, etc, under proper method. Is simply removal of excess or unwanted material safely? Tools and equipment should be stored and disposed according to the manufacturer's specifications, enterprise procedures and regulations. This is used to increases life span of tools and equipment and avoids scarcity of tools and equipment at critical periods.

After completion of all farm establishment activities all containers, leftover fluids, waste and other unwanted materials should be disposed safely and appropriately. Waste materials which may be toxic to human beings or pollutants environmental conditions should be properly disposed to minimize hazards.

Removal of hatchery waste: is a very important consideration, and an efficient method of disposal must be planned. Vacuum disposal systems are now becoming fashionable, and space needs to be available for this equipment. Some areas within the hatchery do not lend themselves to the use of water under pressure, e.g. the top surfaces of incubators and hatching machines, electrical equipment and controls, ledges, tables and other horizontal surfaces. These surfaces readily collect dust and debris in which microorganisms multiply rapidly and should therefore be reduced to a minimum. The remaining horizontal surfaces must be cleaned regularly. For this purpose, a commercial industrial vacuum cleaner may be used. Disinfection may then be performed using a disinfectant solution in spray form .For cleaning measures of this kind, an aerosol generator is useful. It follows from the above that routine fumigation alone is no longer sufficient. Nevertheless, fumigation using formaldehyde (formalin) has proved to be a very effective means of destroying microorganisms on eggs, egg cases, setters, hatching machines and fiber chick boxes, provided that these items have been subjected to preliminary cleaning.

Figure-4, how litter is sprayed on the field

Waste materials include;

- ❖ Manure
- ❖ Moldings fed
- ❖ Scratch feeder/ watered
- ❖ litter and broken components,
- ❖ Bedding materials.

These may be recycled, re-used, returned to the manufacturer, or disposed of according to enterprise work procedures.

Classification/Type:-

There are two types of wastes.

A. Solid wastes disposal (plastic bottle, scratch paper, poultry dung)

B. Liquid wastes disposal(industry released waste)

-To remove waste and unwanted material safely from work site

-To clean work site suitably and make it attractive

Importance of disposal

- Minimizes and reduces the risk of accidental injury to staff, clients, visitors, and the local community

- Helps provide an aesthetically pleasing atmosphere
- Reduces odors
- Reduces the likelihood of contamination of the soil or ground water with chemicals or microorganisms

Recycling of nutrients in deep litter system

- The dropping from chicken when mixed with litter synthesizes Riboflavin (Vitamin B2) and Vitamin B12 by the chemical and bacterial actions.
- The built-up litter also contains niacin, phosphorus, potassium, magnesium, sodium and calcium.
- Deep litter bird often pecks and eats a small quantity of litter material which contains above nutrients. This phenomenon is known as recycling.
- Even if the poultry feed is slightly deficient in some of the nutrients, the deep litter birds will not show any deficiency symptoms due the recycling of nutrients.
- In cage rearing the recycling of nutrients is completely absent.

So, all the nutrients including calcium, phosphorus and sodium must be balanced meticulously in poultry ration

Self-Check -2	Written Test

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

1. List out Waste materials include. (5 points)
2. List out two types of wastes. (5 points)

Note: **Satisfactory rating - 10 points** **Unsatisfactory - below 10 points**

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

Answer sheet

Name: _____ Date: _____

Short Answer Questions

1.

- _____
- _____
- _____

_____

Information Sheet-3	Flushing and service drinker and tanks

Filters and flushing drinker lines and tanks can be cleaned on the places with or without dismantling based on its nature of the material.

Flushing tanks and lines are often done with an approved anti-algal chemical included, and treated water may be allowed to stand in lines prior to flushing.

- Flushing can dislodge algae and particles that can block valves in drinkers and cause flooding.
- Flushing also requires checking in-line filters for efficiency of operation.

Tables for cleaning equipment

Table 1. Cleaning operations for tankers

Process	Time in min.	Temperature	Concentration	Flow
		Ambient		
Pre-rinse	5	150 ^{O}F	1.5–2.5%	70 gal/min
Caustic wash	7	Ambient		
Rinse	3	Ambient		
Sanitizer	2	Ambient	1500–2500 ppm	

Table 2. Cleaning operations for line

Process	Time	Temperature	concentration	flow
		Ambient		
Pre- rinse	5min.	150 ^{o}F	1.5–2.5%	70 gal/min
Caustic wash	10min.	Ambient		
Rinse	5min.	Ambient		
Sanitizer	2min.	Ambient	1500–2500 ppm	

Self-Check -3	Written Test

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

1. Define Flushing? (12 points)

Note: **Satisfactory rating – 12 points** **Unsatisfactory - below 12 points**

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

Answer sheet

Name: _____ Date: _____

Short Answer Questions

1.

- _____
- _____
- _____

_____

Information Sheet-4	Empty and clean feed storage house/Silos

Clean water and feeding systems

Drain, clean and disinfect the water system. Water pipes should be cleaned at least once per flock to remove any bio film that may have built up. If physical cleaning is not possible, use high levels (140 ppm) of chlorine.

- ✓ Flush water lines with clean, fresh water prior to flock placement.
- ✓ Empty, wash and disinfect all feeding equipment.
- ✓ Empty bulk bins and connecting pipes and brush out. Clean out and seal all openings.
- ✓ Wherever possible, fumigate.

9. 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.

10. 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

Self-Check -4	Written Test

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

1. Define Fumigate? (10points

Note: **Satisfactory rating – 10 points** **Unsatisfactory - below 10 points**

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

Answer sheet

Name: _____ Date: _____

Short Answer Questions

1.

- _____
- _____
- _____

_____

Information Sheet-5	Mixing chemicals, detergents and disinfectants according to instructions

Cleaning agent is very dangerous unless we properly utilized under the guide lines and instructions. Every cleaning agent has information on the pack how to use and how to apply including with safety handling and their effect if not properly utilized.

Reading the label of disinfectants

- Before using any disinfectant the label MUST be red and understood.
- The label gives you valuable information.

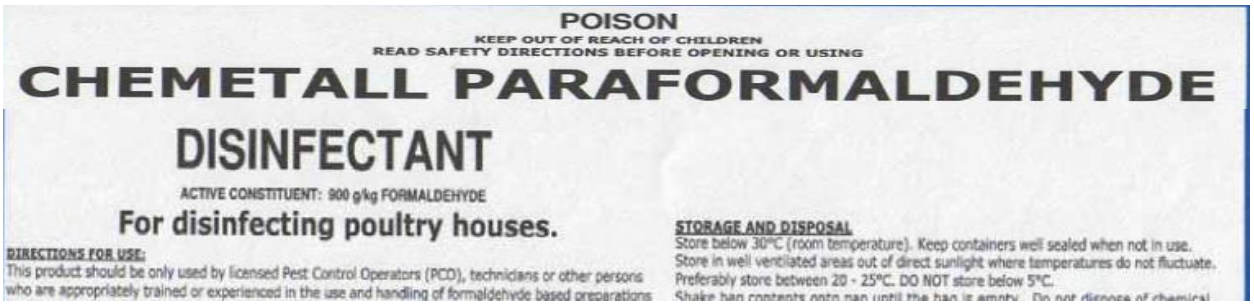


Figure-5 , Indications of chemical poison

Disinfectants are Dangerous!

- Disinfectants are dangerous chemicals = poisons
- we have to be careful when we use disinfectants

Disinfectants might cause poisoning:

- Acute (fast) toxicity with certain disinfectants may cause: dizziness, nausea and itchy eyes or skin

- Chronic (slow) toxicity may occur gradually over many years AI Technical Unity ears, may cause: permanent disability because the body has become very sensitive AI Technical Unit.

Self-Check -5	Written Test

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

1. Write the Disinfectants are Dangerous!? (6 points)

2. Write the Disinfectants might cause poisoning? (6 points)

Note: **Satisfactory rating – 12 points** **Unsatisfactory - below 12 points**

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

Answer sheet

Name: _____ Date: _____

Short Answer Questions

1.

- _____
- _____

2.

_____

- _____

Information Sheet-6	Safely handle and apply chemical agents.

Safe handling and applying of chemicals is very important for the users. Chemicals are very dangerous even can lost the lives of the person if not properly utilized. Chemicals like disinfectants are applied after being cleaning or removing clearly seen wastes so make it direct contact that make effective sanitation.

Following the following guide lines is very crucial:

- Every chemical has a proper guidelines where posted on or labeled on the pack .
- Before using the chemicals we should to follow the procedures and guidelines to avoid risk factors.
- Wore the PPE before any operation will reduced the problems of toxic chemicals.

Chemicals can enter your body through 3 ways:

- through the lungs when breathing or smoking
- through the mouth when eating and drinking
- through the skin and eyes

Remember!

When handling chemicals you need to make sure you wear the right clothes and equipment for your protection

How dangerous a disinfectant is?

Depends on:

- The type of substance and what it is made of
- The speed and the way it enters the body
- The amount of substance that enters the body

Ninety percent of hatchery sanitation is dependent on design of the premises, good management of the hatchery and of supply flocks, cleanliness, and a programme whereby dust is removed and prevented from reaching the hatching areas. The remaining 10% requires the additional hygienic measures provided by fumigation and disinfection.

- A disinfectant, whether used as a solution, gas or aerosol, cannot compensate for faulty cleaning or for a hatchery which is inadequately designed to permit a thorough cleaning programme.
- Hygiene control in a hatchery is essentially a result of cleanliness complemented by disinfection.
- To date, formaldehyde has been the fumigant recommended for use in hatcheries due to its efficacy and ease of application. However, the use of this product presents a serious hazard for human health and safety, and it is possible that the use of formaldehyde will be further restricted, if not prohibited, at some time in the future.
- Suitable alternative sanitizes must therefore be found for use in the hatchery environment, including for disinfection of incubating eggs. When eggs are properly washed, sanitized and dried, the level of bacterial contamination on the shell is greatly reduced.

Inadequate egg-washing can allow microorganisms to enter the egg

Self-Check -6	Written Test

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

1. Write the Chemicals can enter your body through 3 ways? (5 points)

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

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

Answer sheet

Name: _____ Date: _____

Short Answer Questions

1.

- _____
- _____
- _____

_____

Information Sheet-7	dry-cleaning electrical equipment

During cleaning electrical switchboard and other equipment s should require to be covered and sealed properly this will important for:

- To avoid sudden outbreak of power
- It avoids contamination of equipment s
- Avoid electric contacts
- Easy to perform the work
- Avoid rusting of metal materials

Apply safe operating procedures regarding to:

- Electrical safety
- Machinery movement and operation
- Working in proximity to others and site visitors

Apply emergency procedures on:

- ✓ Emergency shutdown and stopping of equipment
- ✓ First aid application and site evacuation. Electrical safety
- ✓ Machinery movement and operation
- ✓ Working in proximity to others and site visitors

Self-Check -7	Written Test

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

1. List the Apply emergency procedures? (5 points)

2. Write the Apply safe operating procedures? (5 points)

Note: **Satisfactory rating – 10 points** **Unsatisfactory - below 10 points**

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

Answer sheet

Name: _____ Date: _____

Short Answer Questions

1.

_____

_____

_____

2._____

_____

Information Sheet-8	Managing run-off from cleaning activity according to the waste management procedures

8.1 Managing of Run-off from cleaning activity

Particular attention should be paid to the areas under the ventilator and extractor fans, under feed bins, access routes, door surrounds and gutters.

Ideally, the poultry house should be surrounded by an area of concrete or gravel (1-3 meters/3-10 feet in width). If this is not possible, the area around the house must be free from vegetation and machinery and equipment and have a level, well-drained surface Other considerations such as the layout of farms, erection of fences, and construction of drainage, all weather roads, equipment for decontamination; bulk feed installations, change rooms, exclusion of rodents and wild birds, and the interior finishes in houses. Structural bio-security can be enhanced in the intermediate term with appropriate capital investment.

Self-Check -8	Written Test

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

1. Write Managing of Run-off from cleaning activity? (5 points)

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

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

Answer sheet

Name: _____ Date: _____

Short Answer Questions

1.

_____

_____

Information Sheet-9	Ensuring and completing checks to that all cleaning and hygiene processes to standard

9.1 Cleaning

Cleaning refers to removal of matter from a surface on which it is not acceptable. Soil surface should be contact with a cleaning agent for adequate time and sufficient pressure should be applied, if required, to remove the soil. Cleaning involves two steps: wash step and rinse step. Equipment should be carefully selected and, washed, and maintained before they can be sanitized.

9.2 Sanitation

Sanitation is the processes of destruction of micro-organisms on surface after washing and rinsing. The purpose of sanitizing is to reduce the microbial count to a safe level. It is achieved through heat and application of chemical compounds. Both cleaning and sanitizing from the basis of poultry health treatment program sanitation and their purposes are: 1). Reduce health hazards by avoiding contamination 2). Prevent the spread of diseases, and food & water contamination, 3). Control abnormal odors, and Create conducive environmental conditions 5). Disposing wastes materials to dispose waste material following waste disposal instruction is the first thing it include

- Enter information as waste is added to container
- Keep waste containers closed
- Keep soil waste separate from liquid waste
- Do not place incompatible wastes in same container

Place leaking containers in secondary container and call the ORCBS as soon as possible for disposal Checklists identify areas and items that need scheduled housekeeping, inspection and maintenance.

- Hygiene:

- Before the birds are put in their housing, clean it thoroughly, especially the floor.
- Limit contact between the birds and faeces as much as possible.
- Keep the drinkers and feeders clean.
- Make sure there are no wet spots in the litter

9.3 Carryout interactions with other staff, farmers and customers

Other than any day to day interaction between livestock fish Experts and workers, workers with workers, there should be interaction (communication) between this part (livestock and fish producing planting material) and to whom these products are going to be forwarded, mostly this “traditional interactions” can be in practice are infarction with customers (product users) and also with other staffs (knowledgeable and skilled persons) from different organizations related to the demand of livestock and fish products.

9.4 Management and Environmental Factors

-Feed quality - Lighting program • Air quality and ventilation • Water quality

-Space (floor or cage, feeder, drinker) • Sanitation • Vaccination and medication programs • ---Weather • Season • Geographic location

-
- Store animals carcasses in an appropriate freezer walk in cooler/or refrigerator
- Autoclave and /or incinerate infectious wastes
- Place autoclaved biohazard waste bags in an opaque bag prior to disposal

Majority of the disease in poultry farm are raised from improper cleaning and disinfecting

Self-Check -9	Written Test

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

1. List Management and Environmental Factors? (10 points)

Note: **Satisfactory rating – 10 points** **Unsatisfactory - below 10 points**

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

Answer sheet

Name: _____ Date: _____

Short Answer Questions

1._____

_____

_____

Operation sheet-1	Cleaning and disinfection of poultry Shed

Objectives:

- Prevention and controlling of poultry disease
- To produce clear and safe environment
- To produce healthy chicken

Steps/Procedures

- Put on all the necessary PPE
- Assembled all necessary tools, equipment and material
- Remove old litter and web combs
- Dry cleaning after removal of litter
- Start cleaning from the roof ,then walls and floors lastly
- Wet cleaning with caustic soda/liquid soap/ bleaching powder and water under pressure
- Cleaning of tanks, line with anti-fungal
- Do on place of cleanings for fixed machines and equipment
- Remove \rinse the disinfectants
- Fumigate the shade with potassium permanganate for 24 hr
- Aired the shade
- Repair of cracks and crevices
- After cleaning the house must be left empty for at least 15 days.

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 8 hours.

Task 1. Clean and disinfect of poultry Shed?

List of Reference Materials

MAGWOOD S.E & MARR H. 1964. The effect of airborne bacterial populations on contamination of eggs and embryo surfaces. Poult. Sci., 43,1567-1572. 16. - Studies in hatchery sanitation.

A simplified method for assessing bacterial populations on surfaces within hatcheries. Poult. Sci., 43, 1558-1566.

CAB International, 1987. Manual on poultry production in the tropics Wallingford, Oxon, United Kingdom

French, K.M. 1984, Practical Poultry Raising Peace Corps, Trans- Century Corporation, Washington D.C.

G.C Banerjee , 2000. A text book of Animal Husbandry. 8th ed Oxford & IBH publishing CO. Pvt.ltd, New Delhi / Calcutta, India

Poultry Production

Level-II

Learning Guide -38

Unit of Competence: Clean and Fumigate poultry farm and shed

Module Title: Cleaning and fumigating poultry farm and shed

LG Code: AGR PLP3 Mo9 LO3-LG-38

TTLM Code: AGR PLP3 TTLM 1219v1

LO 3: Fumigate shed

Instruction Sheet	Learning Guide # 38

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

- Determining need for fumigation from supervisor's instructions, production/hygiene management plan, or management practice.
- Preparing fumigant and apparatus
- Sealing and fumigate shed to ensure maximum exposure of the fumigant to disease-causing organisms.
- Air shed to ensure evacuation of toxicants prior to re-entry of staff and re-installation of 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:

- Determining need for fumigation from supervisor's instructions, production/hygiene management plan, or management practice.
- Preparing fumigant and apparatus
- Sealing and fumigate shed to ensure maximum exposure of the fumigant to disease-causing organisms.
- Air shed to ensure evacuation of toxicants prior to re-entry of staff and re-installation of equipment

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below in page 78.
3. Read the information written in the information "Sheet 1- 4".
4. Accomplish the "Self-check 1, Self-check 2, Self-check 3 and Self-check 4" in page - 82, 85, 92, and 100 respectively.
5. If you earned a satisfactory evaluation from the "Self-check" proceed to "Operation Sheet 1" in page -101.
6. Do the "LAP test" in page – 101 (if you are ready).

Information Sheet-1	Determining need for fumigation from supervisor's instructions, production/hygiene management

1.1Requirements for proper fumigation

The following requirements must be met if maximum germicidal activity is to be Obtained from formaldehyde:

a) Temperature: the maximum effect is achieved in the temperature range of 24-38°C.

b) Humidity: this is essential for maximum effect, and a 'wet bulb' reading of 20°C or Higher is recommended.

c) Time: the time required to kill the microorganisms depends on the temperature, The humidity and the concentration of formaldehyde.

d) Concentration: the use of potassium permanganate to liberate formaldehyde gas is Desirable, as this produces an instantaneous expulsion of gas, giving maximum Concentration.

To produce the fumigant, potassium permanganate should be mixed with formalin in a ratio (w/v) of 2:3. When the correct ratio of formalin and potassium permanganate is Used, a dry brown powder remains after the reaction is completed.

1.2 Recommended application rate

An application rate of 53 ml formalin and 35 g potassium permanganate per m3 of Space is recommended. These amounts are effective in fumigation for 20 min at the Recommended temperature and humidity. To calculate the amounts of chemicals Necessary, the internal dimensions (i.e. length x width x height) of the incubator, Fumigation cabinet or fumigation room should be measured. The space occupied by Trays of eggs or articles to be fumigated need not be taken into consideration.

1.3 Neutralization of formaldehyde gas

Formaldehyde gas may be neutralized in 10-15 min using ammonium hydroxide at an Amount equal to half the volume of formalin used.

1.4 Precautions

Formalin will lose strength unless maintained at room temperature in a tightly sealed container; it should not be stored for long periods, as a white precipitate (paraformaldehyde) will form. If this occurs, the precipitate should be thoroughly mixed in before use. If storage is necessary, formalin should be kept in small, completely filled containers. When mixing with potassium permanganate for fumigation, always add the formalin to the potassium permanganate, never the reverse. Formaldehyde at bactericidal concentrations is very irritating to the eyes, nose and throat. Hatchery personnel should use a respirator and avoid unnecessary exposure to the gas. An appropriate container should be used to release the gas. The sides of the container

2. CLEANING AND DISINFECTING POULTRY SHED

2.1 Disinfectant and Disinfection

Disinfectants: compounds used to kill bacteria and parasites are called disinfectant. The terms disinfectant, germicides, bactericidal agents, are based upon the effects of the commonly used concentration on the vegetative cells of pathogenic bacteria.

Disinfection: It means act of destroying the cause of an infection. Since the causative agents of many diseases are extremely small and may remain indefinitely in dust, cracks and crevices of buildings disinfection must be carried out carefully to eradicate common enemies of life such as bacteria, viruses, moulds and eggs of insects from contaminated premises.

2.1 Methods of Action by Disinfection

These are grouped into three:

(1). Destruction of bacterial cell or disruption of its organization.

(2). Interference with energy utilization.

(3). Interference with synthesis and growth.

2.2Types of Disinfectants:

(1). Sunlight. It is often a valuable disinfectant if surfaces are exposed directly for a sufficient duration. It loses its power to kill germs after it passes through thin film of water, dust or ordinary glass. Nevertheless, well lighted houses for animals are of great importance. The disinfecting action of it is due to ultraviolet rays.

(2). Heat

I. **Hot air**. It is an effective means of disinfection but often an expensive one, hence is limited to laboratories.

II. **Hot water**. Almost all utensils can be disinfected by immersion in boiling water for a little more than 5 minutes. It is not satisfactory way for disinfecting floors as it loses its heat soon.

III. **Fire**. Almost all utensils can be sterilized with fire. It adds to the total destruction of bacteria and spores, therefore a best means of disposing infected carcass and litter.

IV. **Steam**- It is a satisfactory mean of disinfection but being expensive, its use as disinfectant is chiefly limited to dairies for milking utensils. It is used under 15 lbs. pressure.

(3). Chemicals as Disinfectants

Kill Germs by

Hydrolytic/Burning actions on cells. E.g. Acids/alkalis etc.

Oxidation action on protoplasm of cell. E.g. pot. Permanganate, Hydrogen peroxide

Protein Coagulation in protoplasm of cell. E.g. Alcohol, Formaldehyde etc.

Disruption of cell wall and cell membrane. E.g. phenol, cresols, Polymixin etc

Self-Check -1	Written Test

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

1. Mention Types of Disinfectants?(5 points)
2. Write Methods of Action by Disinfection?(5 points)

Note: **Satisfactory rating - 10 points** **Unsatisfactory - below 10 points**

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

Answer sheet

Name: _____ Date: _____

Short Answer Questions

1._____

_____

2._____

_____

Information Sheet-2	Preparing fumigant and apparatus

Fumigation Formaldehyde has been used for many years as an effective fumigant. The environment during

Fumigation is critical to its efficiency, and these are the points to follow:

Increase relative humidity to 70-80%.

Heat house to 21°C (70°F) as formaldehyde gas has a high temperature coefficient.

Wash down all surfaces or place pans of water in the house, so increasing the relative humidity and gaining maximum benefit from both the gaseous actions of formaldehyde and its condensation into a polymerized form. The house should be sealed and left to cool for 24 hours after fumigation, thus promoting uniform condensation.

Fumigation Methods

Formalin and potassium permanganate this method produces a violent chemical reaction that generates considerable heat and releases formaldehyde gas. Use 1 liter formalin per 25m3 (40 fl oz / 1000 ft3) in the ratio of three parts formalin to two parts of potassium permanganate. Because of the violent chemical reaction, never use more than 1.2 liters of formalin in any one container. The container should have deep sides (at least 3 times the depth of the chemicals, with a diameter equal to the height) to prevent the mixture bubbling over. The formalin must be placed on concrete or metal, and not on shavings or any other inflammable material. In practice, first calculate the cubic capacity of the house, e.g. 55 m x 10 m x 3.1 m = 1705 m3 (60,210 ft3)

This would require

- 68.2 litters of formalin
- 60 containers
- 45.36 kg of potassium permanganate

Place 760 g (27 oz.) of potassium permanganate into each container, preferably with two operators for safety. Start at the far end of the house placing as quickly as possible 1.2 liters of formalin into each container. Operators should wear a respirator throughout the entire procedure

- Sterilization - The destruction of all infective and reproductive forms of all microorganisms (bacteria, fungi, virus, etc.).
- Disinfection - The destruction of all vegetative forms of microorganisms. Spores are not destroyed.

Sanitation - The reduction of pathogenic organism numbers to a level at which they do not pose a disease threat to their host

When disinfecting takes care of:

1. concentration of the disinfectant
2. time of the disinfecting
3. correct temperature and humidity
4. proper use of the ventilation system
5. people’s safety

Figure-7, Fumigation

Self-Check -2	Written Test

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

1. Write Fumigation Methods? (10 points)

Note: **Satisfactory rating - 10 points** **Unsatisfactory - below 10 points**

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

Answer sheet

Name: _____ Date: _____

Short Answer Questions

1. _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____

Information Sheet-3	Sealing and fumigate shed to ensure maximum exposure of the fumigant to disease-causing organisms

3.1 When disinfecting takes care of:

1. concentration of the disinfectant
2. time of the disinfecting
3. correct temperature and humidity
4. proper use of the ventilation system
5. people's safety

When all rooms, spaces and equipment are clean, and the equipment is drying in the cleaning area, disinfection should be commenced within 24 h. No single disinfectant is best for all purposes; to choose the right disinfectant, one must consider the characteristics of the wide variety of products available.

All disinfectants - whether sprays, foams, aerosols or fumigants - work best at temperatures above 68°F (20°C). The temperature for chlorine- and iodine-based disinfectants should not exceed 110°F (43°C). When these products are used, the house should be soaked with water again, prior to disinfection, and the relative humidity of the air should be high (65-80%). The use of pressurized sprays (500-1,000 psi [35-70 x 105 Pa]) is advisable to help force disinfectants into wood pores, cracks and crevices. Disinfection is performed in the same order as wet cleaning, i.e. by moving from the back to the front of the house, and from top to bottom. One U.S. gallon (3.8 1) of diluted disinfectant is ordinarily applied to approximately 100-150 sq. ft (10-15 m2) of surface area. Cage surface is included in this calculation by adding 30% to the total calculated area (floor, ceiling and walls) for disinfection. Usually, sufficient disinfectant is sprayed on every surface so that the small drops reach the lower parts of the walls and the concrete floor is wet.

For the disinfection of buildings, it is advisable to use formalin 4% end solution (commercial formalin 37.5% solution diluted 1:8 in water) with propylene glucol. The propylene glycol is essential to enable the formaldehyde to penetrate pores, cracks and spaces between metal plates where joints are riveted or welded together. The best procedure is to disinfect equipment in special premises and then return it to the rearing area when disinfection is complete. Small equipment, and equipment which can be dismantled, may be placed in a special plastic or stainless steel bath or container (containing a solution of iodic, phenolic or quaternary ammonium compounds) for no more than 2 min. In tropical countries, poultry house equipment may be placed in the sun after cleaning for further disinfection. Electrical equipment (waterproofed), egg handling equipment and other large equipment should be disinfected in accordance with the recommendations provided by the manufacturers of the equipment and the disinfectant. Fuse boxes should be disinfected by hand, using a cloth soaked in disinfectant. All fuses should be removed before disinfection.All accessory decontamination equipment (e.g. rakes, shovels, scrapers, brushes, trucks, tractors, manure spreaders and bucket loaders) should be cleaned and disinfected after use and stored in a secure location. The water system should be decontaminated using commercial disinfectants, carefully following the recommendations. Dismantled tubes should be filled individually with a water disinfectant and soaked for 24 h. Water pipes which cannot be dismantled should be filled with commercial disinfectant through the pressure tank, left for 24 h, and then flushed through with fresh water, using the highest pressure available.279 Disinfection of silos should be generous, using 6% formaldehyde with propylene glucol. Disinfection of dirt floors is virtually impossible. In situations where dirt floors cannot be concreted, fumigation can be performed (under a nylon or polythene cover sheet) using methyl bromide at a rate of 100 g per m3 for 24 h. alternatively, disinfectant could be applied to the floor at a rate of 4 l per 10 m2. Formaldehyde gas used on dirt floors is effective only on the surface, as fumigation is unable to affect pathogens at a depth of more than 2 cm (19,20). The efficacy of a disinfectant depends on the duration of contact with the soiled environment. Most

disinfectants are dissolved in water and contact lasts until the applied disinfectant solution is dry. The contact time of disinfectants has been increased severalfold with the advent of foaming techniques. Foam takes a lot longer to dry and, consequently, the antimicrobial activity of the disinfectant is greatly increased (12). Ultra-violet (UV) radiation is not an effective method of destroying microorganisms in poultry production environments. UV light can disinfect by damaging the nucleic acid of pathogens, but this is only effective when the source of light is positioned close to the surface to be treated; the surface must be free of dust and exposed to direct rays (12).

The question is often asked: how long should a house be left unoccupied between batches? The answer should be that, once the full cleaning and disinfection procedures have been followed, there is no merit in the building staying empty.

However, experience shows that security is increased if the time between completion of cleaning/disinfection and the introduction of new birds is not less than 14 days.

Before entering a disinfected area or touching disinfected equipment, all personnel must change into clean clothes and clean, disinfected rubber boots, and must wash and disinfect their hands. Clean overalls must hang on the 'disinfected' side of the barrier, and personnel must wear these whenever crossing to this side of the barrier. Used overalls must be removed and placed on the 'dirty' side for washing. Boots or shoes used on the 'dirty' side must be removed, and new rubber boots put on, when passing the barrier into the 'disinfected' area. Before entering the 'disinfected' zone, personnel must stand in a boot disinfectant bath for 20 sec, during which time they may wash and disinfect their hands. Only when these procedures have been completed can personnel enter the premises and take part in the work. General guidelines for disinfectant use the instructions of the manufacturer should always be followed when using any disinfectants. This ensures economy, efficacy, and human and flock safety. Careful attention to mixing is important. Each disinfectant is the result of careful formulation; any addition of detergents, surfactants or insecticides to a disinfectant without the approval of the manufacturer could dangerously reduce the efficacy of one or more of the products contained in the mixture. Like all farm chemicals, disinfectants are often

poisonous and invariably highly concentrated. They should be stored in closed containers, away from feed, feed additives and medication, and out of the reach of children. When spraying or fumigating, appropriate protective clothing should be worn.

280 The importance of cleaning prior to disinfection cannot be over-emphasised.

The ability of disinfectants to function in the presence of organic matter varies. Some disinfectants may be inactivated by extremes of pH or by soap residues.

Hot disinfectant solutions penetrate and disinfect better than cold solutions. This is especially important in areas where there are many cracks and crevices.

Care should be taken to ensure that the disinfectant is not corrosive to the surface to which it is to be applied. If a disinfectant is used as a drinking water sanitiser, the disinfectant must be removed prior to the administration of a live vaccine in the water. Like any poultry health product, disinfectants are only effective if used correctly. Proper use of disinfectants can greatly improve sanitation at a reasonable cost, while improper use is a certain waste of time and money. Formaldehyde and formalin are dangerous chemicals which present serious health and safety hazards. Formaldehyde fumigation may soon be unlawful in some countries (e.g. Israel and the United States of America). The provision of gas masks, protective clothing and rescue plans is essential.

Procedure following a disease outbreak following a disease outbreak, the affected building should be closed and isolated from all visitors. Bedding, litter and all areas in intimate contact with the stock should be sprayed with a strong disinfectant (e.g. formalin or phenolic). The litter should then be removed from the building and may be burnt or buried to prevent subsequent contact with livestock. Portable equipment and fittings should be treated as described above, preferably within the building; these should then be taken outside and aerated. The house should be treated as suggested above. Where an earth floor is present, it is wise to remove the top 10-15 cm and to disinfect or fumigate with methyl bromide orsodium hydroxide (NaOH).

The areas immediately outside entrances to the building should be treated with disinfectant, and footbaths should be provided. Hygiene and disinfection must be placed high on the list of priorities for control of infection following a disease outbreak (7). The

factors affecting the efficacy of disinfection are detailed below. Choice of disinfectant whenever possible, the product chosen should have been proved to be effective against the relevant disease organisms in an independent test, preferably conducted by a governmental or similar institution.

Self-Check -3	Written Test

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

1. Mention when disinfecting takes care? (12 points)

Note: **Satisfactory rating – 12 points** **Unsatisfactory - below 12 points**

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

Answer sheet

Name: _____ Date: _____

Short Answer Questions

1._____

_____

_____

_____

_____

_____

_____

Information Sheet-4	Air shed to ensure evacuation of toxicants prior to re-entry of staff and re-installation of equipment

Shades required to be aired after cleaning the operation. Wet objects where dried and chemicals which are toxic will let to evacuate from the cleaned are. There are differ systems and facilitate could be used to air the shade this are:

- Opening of doors ,windows and other facilitate
- Blower were applied
- If the environment is cold heater where used to dry the wet objects
- Letting the wind to in in the shade
- Exposing to the sun drying

Ventilation

- Air movement within the house is important to prevent smothering.
- Chickens need more fresh air per unit of body weight than any other farm animal.
- Wide open sides or windows are important in hot climates.
- Air movement should not be blocked by bushes or other buildings.
- Drinking excessive amounts of water may be a cause of wet droppings

Cleaning and disinfection of farm equipment's:

- Feeding pans and drinking equipment used in the caged area should be kept clean daily.
- Scrubbing should be done and then application of hot water followed by disinfection with an effective disinfectant.

- Make sure all equipments that had contact with the poultry, lawn, garden and poultry equipments are washed and disinfected before taken to another place. The same should be followed where some equipment are to be brought into the farm.
- Keeping the cages clean prevents pathogens from accumulating and causing health problems. Cages should be disinfected at regular intervals. They may be left in the sun and then they may be disinfected but it is essential to remove manure before disinfecting cages. Disinfectant will not work if there is still manure present on items.
- Newly purchased equipments should be thoroughly washed with soapy water or otherwise should be disinfected before use.
- Newly purchased cages should also be subjected to washing with soapy water or should be disinfected.
- Poultry equipments such as egg crates, cages, shovels or rakes, should not be shared between family or neighbouring farms. Plastic or metal equipment may be preferred over wooden material.
- Change feed and water daily.

Cleaning and disinfection of poultry houses:

Housing cleaning is the most arduous phase of bio-security and it can be divided in two type.

- **Hatchery Design and Management** Good design and management will assist in maintaining a clean hatchery. Ensure that there is good separation between clean hatchery areas (e.g. egg store and incubation rooms) from dirty hatchery areas (e.g. hatcher rooms, take-off and poultry handling areas, hatchery waste disposal areas and hatcher tray washing room). Figure 2 shows a typical work-flow diagram for a hatchery. Ideally, the hatchery layout will be such that personnel, eggs and equipment do not have to move from dirty to clean areas. In large hatcheries, the use of different personnel to work in hatching and incubation

areas is a good method of reducing traffic between the clean and dirty areas. Each work team would have a separate entry into the hatchery, canteen/rest rooms and toilets so that they would not have to cross into the other area of the hatchery. The use of different colored work clothing can also help demarcate clean and dirty area personnel. A compulsory shower before entry to the hatchery and the provision of company work clothes and footwear can reduce the risk of hatchery personnel bringing contamination into the hatchery. The hatchery ventilation system should be designed so that the air moves from clean areas of the hatchery to dirty areas. The air pressure in clean rooms should be slightly higher than the dirty rooms so that the likelihood of ingress of micro-organisms is reduced. The hatchery building should be designed to make cleaning easy. Floors, walls and ceilings should be smooth and waterproof to allow easy cleaning and light colored to show up dirt. Joints between vertical and horizontal surfaces should have a “coving”, where the right angle joint is replaced with a radiussed curve joining both surfaces. This facilitates cleaning and disinfection. All spaces and voids in the hatchery should have access points large enough to allow easy cleaning and disinfecting. Ideally, this would include the inside of ventilation ducts and drainage channels.

i) Complete or terminal house cleaning: This is practiced after removal of flock and the following points should be given consideration.

- After removing the flock, remove the left over feathers, droppings, letter etc. It should be then followed by complete disinfection of the shed. Firstly the house should be fumigated and then it should be subjected to an effective disinfection. Keep the shed empty for a minimum period of 10 days before arrival ofnew flock.
- Before introduction of new flock it should be ensured that there should be no extra moisture in litter, otherwise chances of fungal growth are more.

ii) Partial/concurrent house cleaning: This type of cleaning is done while the birds remain inside the house with following considerations:

- Thoroughly clean the fans and it should be a regular feature.
- Sweep the house from top to bottom.
- Remove the caked litter from the house.
- Place the clean litter in the house.
- Regularly disinfect the brooder guards, feeders, jugs, drinking water containers using iodophores and 5% sodium hypchlorite. Other chemical effective like sodium dodecyl sulphate, formalin and iodine compounds may also be used.
- Regularly sanitize the drinking water.
- Proportion of disinfectant added must be displayed at the entrance of each shed/ hatchery.

v) Personnel hygiene:

- Specific over all clothing for employees must be provided.
- Wash hands thoroughly before and after entering the farm area. Washing of hands can be done with soap or detergents with contact time of 10 minutes.

- Wear clean clothes or coveralls while working with birds in the farm. The clothes should be washable with laundry detergent. Preferably for this purpose detergents or oxidizing agents (sodium hypochlorite dilute to give 2-3% available chlorine or vircon @ 2% with contact time of 10 minutes) and alkali (sodium hydroxide 2% solution or sodium carbonate anhydrous 4% solution with 10-30 minutes contact time) can be used. Dirty clothes should be washed with detergent and hung out to dry in the sun).
- Since disease in poultry can be transmitted easily through boots, therefore, boots should be used after cleaning and disinfection. The best approach would be disinfecting footwear before and after working with birds or keeping a separate pair of shoes to work around birds and changing into other shoes when leaving the premise. The person should use coveralls, which can be

- When the care personnel needs to attend to chickens or other poultry (e.g. collecting eggs, feeding or watering, change of bedding or repair of fencing material), a change of clothes/ boots should be required.
- Medical checkup of all workers coming in contact with livestock and feed should be done.

Self-Check -4	Written Test

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

1. Write Shades required to be aired after cleaning the operation? (6 points)

Note: **Satisfactory rating – 6 points** **Unsatisfactory - below 6 points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Answer sheet

Name: _____ Date: _____

Short Answer Questions

1._____

_____

_____

_____

_____

Operation Sheet-1	disinfecting takes care poultry sheds

Procedure/steps

- put on/wear your protective clothes,
- concentration of the disinfectant
- time of the disinfecting
- correct temperature and humidity
- proper use of the ventilation system
- people'ssafey

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 --- hour.

Task 1- disinfecting takes care poultry sheds?

List of Reference Materials

1. MAGWOOD S.E & MARR H. 1964. The effect of airborne bacterial populations on contamination of eggs and embryo surfaces. Poult. Sci., 43,1567-1572. 16. - Studies in hatchery sanitation.

A simplified method for assessing bacterial populations on surfaces within hatcheries. Poult. Sci., 43,1558-1566.

CAB International, 1987. Manual on poultry production in the tropics Wallingford, Oxon, United Kingdom

French, K.M. 1984, Practical Poultry Raising Peace Corps, Trans- Century Corporation, Washington D.C.

G.C Banerjee , 2000. A text book of Animal Husbandry. 8th ed Oxford & IBH publishing CO. Pvt.ltd, New Delhi / Calcutta, India

Poultry Production

Level-II

Learning Guide -39

Unit of Competence: Clean and Fumigate poultry farm and shed

Module Title: Cleaning and fumigating poultry farm and shed

LG Code: AGR PLP3 Mo9 LO4-LG-39

TTLM Code: AGR PLP3 TTLM 1219v1

LO 4: Complete hygiene and administration tasks

Instruction Sheet	Learning Guide # 39

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/additional equipment.
- Appling insecticides as required by the organisation and the harvest strategy.
- Completing all require 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/additional equipment.
- Apply insecticides as required by the organisation and the harvest strategy.
- Complete all required records and documentation

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below in page 105.
3. Read the information written in the information “Sheet 1-4”.
4. Accomplish the “Self-check 1, Self-check 2, Self-check 3, and Self-check 4” in page -111, 115, 120, and 128 respectively.
5. If you earned a satisfactory evaluation from the “Self-check” proceed to “Operation Sheet 1” in page -129.
6. Do the “LAP test” in page – 130 (if you are ready).

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

1.1 Cleaning equipment based on procedures and regulations

Effective cleaning and disinfection program are vital in the poultry hatchery. These program control key organisms, such as Salmonella spp., Pseudomonas spp., Proteus spp., E. coli, Staphylococcus spp., Streptococci spp. and Aspergillus spp. and concentrate on four key areas of concern: the egg, surfaces which can contaminate the egg, air-borne contaminants, and movable equipment and personnel.

Washing is necessary prior to disinfection, as the presence of organic matter (e.g. soil, dust, feathers and litter) protects harmful organisms from the action of chemical disinfectants. In some instances, this organic matter will actually inactivate certain types of disinfectants. An adequate supply of water is therefore necessary for the cleaning of hatching areas and machines, the chick boxing area, and some permanent and movable equipment. Cleaning of floors, walls and equipment requires adequate and suitably located drainage for waste water. Incubators must be cleaned after each transfer of eggs. This can be accomplished by scraping, vacuuming and mopping the floors, and wiping down wall areas and fan blades at the same time. Exterior surfaces require damp mopping at least once a week. The top surfaces of incubators should never be used for storage. Once yearly, each machine should be emptied and thoroughly cleaned. To avoid incubator contamination, eggs should be transferred before egg pipping starts.

The following procedures provide minimum steps for the Cleaning &Disinfection of plastic, washable, egg handling materials.

- Alternative procedures/methods to accomplish C&D objectives may be used contingent upon specific.

Disinfectants Follow manufacturer’s directions for concentration and for contact time when using approved disinfectants.

- Disinfectants should be applied to clean surfaces.
- Each operator should evaluate drying time post disinfectant application to ensure prescribed contact time is achieved.
- If surfaces and ambient temperature are below freezing, either heat the surfaces to prevent freezing, use heat blankets around liquid containers, or add up to 40% propyleneglycol in water when mixing solutions.

Cleaning means removing the scale and the bio film. The bio film is a polysaccharide layer, caused by adding vitamins, medication etc. through the water. It harbor mainly enter bacteria (Salmonella, E. coli,) and impedes the good functioning of medicine, vaccines, etc. It will, as scale, block the nipples and reduce the water flow. Chlorine (that gets neutralized by organic matter) will not remove the scale and not even penetrate the bio film. Removing the biofilm is only possible by OXIDATION. Stabilized hydrogen peroxide will do the job! In combination with organic acids, it will also remove scale. And, if the products do not contain heavy metals (like silver nitrate), it can also be given during production, avoiding a new build up and sanitizing the drinking water. All this without leaving residues in the neither meat nor eggs. CID 2000® is such a product.

1.2 Maintaining hygiene standards Hygiene is a set of practices performed to preserve health. According to the World Health Organization (WHO), "Hygiene refers to conditions and practices that help to maintain health and prevent the spread of diseases." Many people equate hygiene with 'cleanliness,' but hygiene is a broad term. Disease is always a hazard in poultry rearing with the establishment of large farms the risk of disease increases. The first requirement for good hygiene is effective cleaning with good cleaning one can eliminate more than 90% of all disease. The following hygienic measures are used to protect poultry against diseases.

1. Isolation of the farms. Locate them as far away from other poultry farms as practical.
2. No admittance of visitors. The poultry house has to be closed properly. If any person is to be admitted to the poultry house he must be made to change his footwear and clothes and should disinfect his hands.

3. Get feed in bulk transport or in proper houses.
4. Prevent entry of wild birds into poultry house.
5. Keep one category of poultry on the farm at any one time and if possible keep birds of one age. Young chicks are more sensitive to diseases than older birds. Microorganisms can be transmitted easily from adults to chicks and vice versa.
6. Prevent children, dogs, cats or other animals from entering poultry house.
7. Poultry house personnel should not be allowed to keep poultry at home.
8. All poultry equipment in the poultry house should be cleaned and disinfected before use .
9. Good housing solid floor e.g. cement and smooth walls are essential for cleaning and disinfection.
10. All insects' rats and mice should be destroyed since they are carriers of diseases. Rats are vicious predators of young chicks.
11. Good ventilation is essential to maintain temperature and humidity.
12. Use of healthy stock all the time is very important.
13. A scheme of vaccination based on sound veterinary advice is essential.
14. Cull all sick birds at the first sign of disease.

15. An immediate removal of dead birds is necessary and all dead birds should be disposed of either by burning or by burial.
16. Avoid overcrowding and overheating of the birds.
17. Buy chicks or hatching eggs from pull rum free flocks.

Give well balanced and adequate feed from a reputable mill or give fresh home mixed concentrate.9Provide a footbath of disinfectant at the entrance of poultry houses

1. Cleaning Equipment based on specifications and organizational procedures

1.1. Important terminology

Cleaning is the removal of dirt and organic substances from surfaces of tools and equipment's. Through the cleaning procedures, high numbers of microorganisms (90% and more) present on the mentioned objects will be removed. However, many microorganisms stick very firmly to surfaces, in particular in tiny almost invisible layers of organic materials

and will not entirely be removed even by profound cleaning but persist and continue multiplying.

Inactivation of those microorganisms requires antimicrobial treatments, carried out through hot water or steam or through the application of disinfectants. Disinfectants are chemical substances, which kill microorganisms but should not affect human health & chicken through hazardous residues and not cause corrosion of equipment.

The first step in equipment cleaning is to physically remove scrap, i.e. coarse solid particles, with a dry brush or broom and shovel. This is usually referred to as “dry Cleaning”. Using large amounts of water to remove this material would be extremely wasteful and eventually cause drains to clog and waste water treatment facilities to become overloaded.

More profound clean-up procedures require water in sufficient quantities. Manual Cleaning using brushes or scrapers is widely applied in small-scale operations although labor and time-intensive.

Cleaning techniques

Cleaning the premises of ration formulation refers to the physical removal of organic matter, thus exposing the pathogens to the killing power of the disinfectant. Organic materials such as soil, reminded fed (like straw or hay wheat bran), and manure inactivate some disinfectants or protect microorganisms from the disinfectant’s active ingredients.

A. dry cleaning

A dry cleaning followed by a wet cleaning. The process of dry cleaning removes the organic material before the wet cleaning occurs. With the dry cleaning residual dirt, debris, stains, and organic matter, which might neutralize the disinfectant, must be removed first. Bedding, feed, and manure and any carcasses must be removed. Vermin such as rodents, insects, or any other animal need to be trapped and removed from the facility. The facility should be swept out Loose dirt, litter, broken eggs, cobwebs, dropped feathers, dried milk, trash, debris and any other material must be swept out or removed from the facility’s interior. The sills and floor should be hand scraped if necessary to remove any caked-on manure, food, or debris.

Scrape, scrub, and clean all permanently attached equipment such as waterers, feeders, etc. Removable equipment such as brooder guards, jugs, hand feeders, mangers, grooming equipment, or anything not attached should be taken outside to allow thorough cleaning and subsequent disinfection. All floors, light fixtures, fan blades, and louvers must be cleaned. Burned out light bulbs should be replaced and other bulbs should be cleaned. Lots of elbow grease may be required.

B. Wet cleaning

Wet cleaning involves the use of water and usually a soap or detergent. Soaps and detergents are good cleaning agents. They help penetrate and break up stubborn materials and are mildly germicidal, but they are not suitable for use as disinfectants. The soap or detergent used must be compatible with the disinfectant that will be used in the subsequent disinfection process.

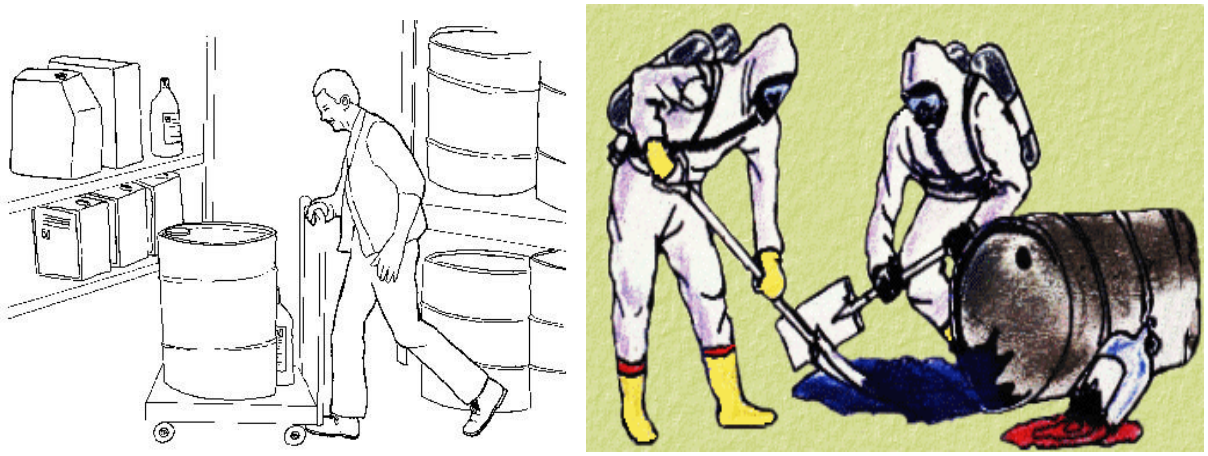


Figure-8, wet cleaning

Requirements of poultry farm hygiene

A. Disinfection and disinfectant

1. They should kill all pathogens.
2. Should not be poisonous to birds and person operating.
3. With minimum of corrosive action on poultry equipment.
4. Should be long lasting.
5. Easy to use and must be cheap.
6. No irritating or objectionable small or bleaching effect.

B. Factors affecting the action of disinfectants

1. Concentration: follow manufacturer's directions.
2. Time action depends on time of application.
3. Temperature: important in the tropics since disinfectants work best with warmth

Figure-9, using a low pressure washing system to clean a hatcher.

Self-Check -1	Written Test

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

List out the Requirements of poultry farm hygiene? (5 point)

Note: **Satisfactory rating - 10 points** **Unsatisfactor**

Score = _____

Rating: _____

Answer sheet

Name: _____ Date: _____

Short Answer Questions

1. -

_____

_____

_____

_____

_____

_____

Information Sheet-2	Cleaning and storing attachments and other ancillary/additional equipment

2.1 Cleaning, Maintaining, Storing tools and equipment

Before and after applying litter materials washing the floor with enough water and detergents it is necessary to avoid dirt and pathogen (disease causing microorganisms). Similarly, after effective cleaning the floor surface and equipment should be sprayed or dusted using disinfectants or insecticides. The equipment and tools also should be washed properly and drying the materials to prevent rusting. Finally, put these materials and equipment in appropriate place. Finally, if there is a broken tool or equipment maintain it immediately.

2.2 Hatchery Ancillary equipment

In addition to the setters and hatchers it is also important to maintain and check the other equipment in the hatchery properly. Manufacturer's recommended maintenance programs should be adhered to. The following are common problem areas in hatcheries.

• **Air handling systems: -** Filters need be cleaned or replaced regularly as blocked filters will reduce the oxygen supply to the eggs Air handling system filters that are not regularly cleaned or replaced become blocked and will prevent oxygen entering the hatchery.

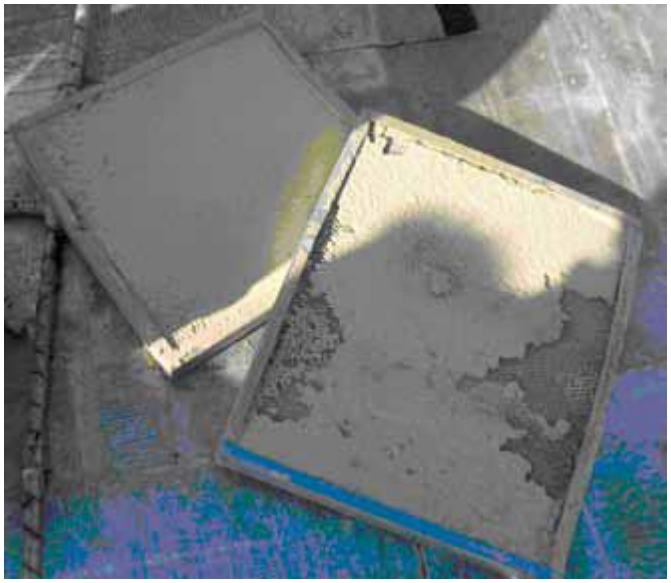


Figure -10, Ancillary equipment

2.3 cleaning equipment & work site

Cleaning refers to removal of matter from a surface on which it is not acceptable. Soil surface should be contact with a cleaning agent for adequate time and sufficient pressure should be applied, if required, to remove the soil. Cleaning involves two steps: wash step and rinse step. Equipment should be carefully selected and, washed, and maintained before they can be sanitized.

Sanitizing is the processes of destruction of micro-organisms on surface after washing and rinsing. The purpose of sanitizing is to reduce the microbial count to a safe level. It is achieved through heat and application of chemical compounds.

Both cleaning and sanitizing from the basis of poultry health treatment program sanitation and their purposes are:

1). Reduce health hazards by avoiding contamination
2). Prevent the spread of diseases, and food & water contamination,
3). Control abnormal odors, and
4). Create conducive environmental conditions.

Disposing wastes materials

To dispose waste material following waste disposal instruction is the first thing it include

- Enter information as waste is added to container
- Keep waste containers closed
- Keep soil waste separate from liquid waste
- Do not place incompatible wastes in same container
    - Place leaking containers in secondary container and call the ORCBS as soon as possible for disposal Following requirements for pre and post- operating checks on equipment

2.4 Maintenance of personal protective equipment

- All PPE should be cleaned as soon as possible after use.
- Soaking overalls in a slightly solution (e.g. 30 ml household bleach in 4L water will prevent residues becoming ‘fixed’ in the fabric. Soaking will also break down any organophosphate or carbamate residues that may be present
- A similar solution may be used to wipe over other items of PPE before storage.
- Routinely check all items after use for wear and tear so that replacements can be obtained before the equipment is next required.
- A respiratory cartridge should always be stored in a clean airtight container to prevent the activated carbon filter losing useful life by exposure to dust and other contaminants in the atmosphere.
- The usage time of respirators should be recorded and they should be tested regularly for efficiency. This can be done by placing a dab of acetone or perfume on the outer

side of the cartridge, donning the respirator and observing whether any odour can be detected.

Self-Check -2	Written Test

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

1. Write Maintenance of personal protective equipment? (5 points)
2. Write the advantages Disposing wastes materials? (5 points)

Note: **Satisfactory rating - 10 points** **Unsatisfactory - below 10 points**

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

Answer sheet

Name: _____ Date: _____

Short Answer Questions

1._____

_____

_____

_____

_____

_____

2.

_____

_____

_____

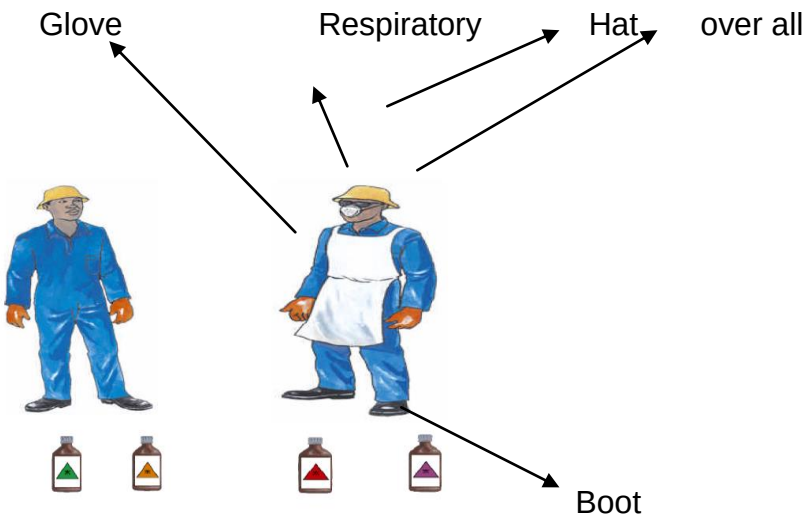
_____

_____-

Information Sheet-3	Appling insecticides as required by the organisation and the harvest strategy

3.1 Personal protective equipment's

Personal equipment may include boots, overalls, chemical resistant gloves, face shields, respirators or hats



3.2 Sprayer maintenance

1. Cleaning the sprayer after use

Wash the sprayer out after each use several times with clean water. This avoids corrosion as well as contamination of the next crop to be sprayed.

- If the sprayer is to be stored, wash with detergent and rinse several times to remove the detergent.
- Make sure the knapsack sprayer is in good condition and does not leak.
- Check nozzles and sprayers are in working order and there are no leaks.
- Ensure the knapsack; filters, lance and nozzle are clean.

2. Check equipment regularly

- ✓ Check the application equipments for leaking hoses and gaskets especially where the parts are joined together.
- ✓ Check nozzles for wear and to make sure they are not plugged. If they are blocked, do not clean them using a hard object. This could damage the orifice.

3.3 Preparing and adjusting application and P.P.E

When you want to spray chemicals first of all you have to know for what purpose you want to spray chemicals after identifying, then you have to choose the appropriate spraying equipment, chemical, such as if you want to use herbicide in small area you have to choose knapsack sprayer and deflector nozzle, for spraying insecticide for small area use knapsack sprayer and use cone nozzle.

1. Pre-Start Checks

- ➢ It is very important to check whether the sprayer is in good working condition before use.
- ➢ If the sprayer is leaking, liquid can easily contaminate the operator and pose most of chemicals.

Moreover, it may damage the crop and causes undesirable side effect on the plant and surrounding environment.

Therefore, a pre-start check is very essential to minimize the hazards and inaccuracy.

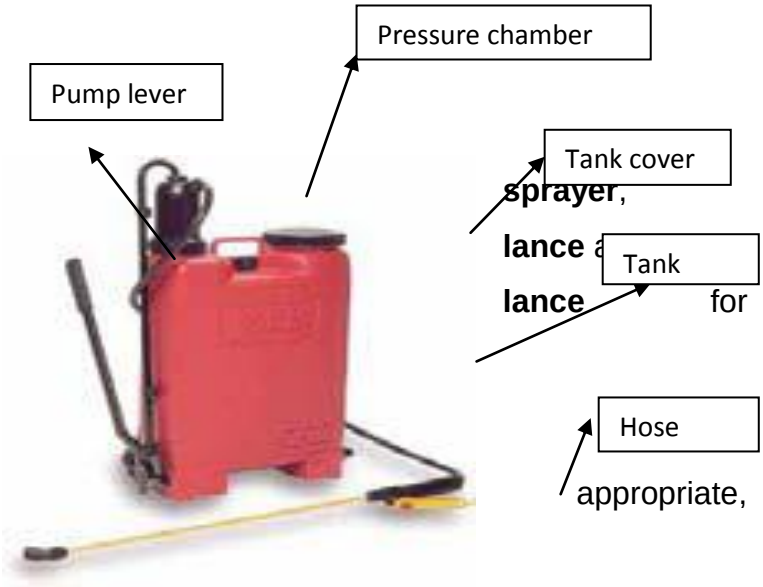
Checking Sprayer Prior to Use –

a. Check connection between:-

- ✓ **hose** to **the sprayer**,
- ✓ **Trigger** to **lance** a
- ✓ **Nozzle** to **lance** for tightness.

b. Half fill sprayer with water.

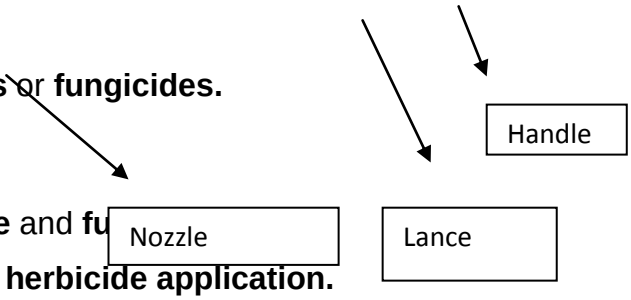
c. Adjust pressure release valve to appropriate,



press:-

- **High for insecticides** or **fungicides.**

d. Choose the appropriate nozzle:-



- ✓ **Cone for insecticide** and **fu**
- ✓ **Deflector nozzle** for **herbicide application.**

e. Pump up sprayer to check operation of **pump** and **trigger valve**.

f. Spray on to dry concentrate or earth to check evenness of the spray pattern.

3.4 Identifying and reporting or repairing damage, non-functions or worn equipment

Before going to spray check the spraying equipment if there is any damage parts. You have to report the damage part and repair it before applying the chemicals

-
- Store animals carcasses in an appropriate freezer walk in cooler/or refrigerator
- Autoclave and /or incinerate infectious wastes

Place autoclaved biohazard waste bags in an opaque bag prior to disposal

3.5 Safe Working practice

The prime rule is to read and comply with the product label. Following these rules will help to avoid contamination of yourself, your own property and also your neighbors' property.

3.6 When you are mixing chemicals

- Wear protective clothing and equipment.
- Use a mixing site outdoors that can be easily cleaned.
- Avoid spill.
- Decant liquid concentrates carefully; cut paper containers cleanly. Have a water supply handy.
- Clean spills promptly or rapidly and correctly.
- Promptly reseal and place containers back in the store.

3.7 When you are spraying chemicals:

- Follow the label instructions.
- Wear protective clothing and equipment.
- Avoid spraying on windy days.
- Repair leaky or damaged hoses and valves.
- Clean yourself and your equipment after spraying

Self-Check -3	Written Test

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

1. Write at list five cleaning the sprayer after use? (5 points)

2. When you are mixing chemicals? (5 points)

Note: **Satisfactory rating – 10 points** **Unsatisfactory - below 10 points**

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

Answer sheet

Name: _____ Date: _____

Short Answer Questions

1._____

_____

_____

_____

2.

_____

_____

_____

Information Sheet-4	Completing all require records and documentation

4.1 Record keeping

Record keeping it is essential that you keep good records of feed used, dead birds, weight of birds.

These records will then be used to determine if you made a profit or a loss.

4.2 Assessing and recording Poultry condition

A sample record sheet is given so that you can know accurately how your flock is performing.

Broiler record sheet

Batch No.: Shed No.: Breed:

Hatch date: Starting No.:

Feed given (bags)									
Day	1	2	3	4	5	6	7	8	Total
Week1									
Week2									
Week3									
Week4									
Week5									
Week6									
Week7									
Week8									
Total									

Live body weight at 42 days		FCR:	
No. of birds weighed:		Mortality:	%
Total weight of birds:	Kg	Total feed intake:	kg/bird
Average weight of one bird:	Kg		

Remarks: **Layer record sheet**

Batch:		No:	
Hatch:		Date:	
No. at begging of period:		Age at beginning of period:	

Feed given (bags)									
Day	1	2	3	4	5	6	7	8	Total
Week1									
Week2									

Week3									
Week4									
Week5									
Week6									
Week7									
Week8									
Total									

Death and cull

Day	1	2	3	4	5	6	7	8	Total
Week1									
Week2									
Week3									
Week4									
Week5									
Week6									
Week7									
Week8									
Total									

Eggs laid (saleable = G and non-saleable = B)																		
Day	1		2		3		4		5		6		7		8		Total	
	G	B	G	B	G	B	G	B	G	B	G	B	G	B	G	B	G	B
Week1																		
Week2																		
Week3																		
Week4																		
Week5																		
Week6																		
Week7																		
Week8																		
Tota																		

Mortality %_____ Feed intake_____ g/hen/day Rate of lay_____%

Remarks_____

Figure-11, for record keeping

The following data should be recorded

- Breed
- Number of eggs set
- Number of quality chicks hatched
- Number of “grade outs”
- % age of total hatchability
- % age of “grade outs”
- % age of extra chicks given to customer

.4 Documenting relevant information

Document: Data collected and recorded for the purpose of keeping by using either paper-based or digital, and information will be recorded into log books or other records.

The information includes bout

• Application procedures and effects of veterinary chemicals

•Types of health preparation treatments

• Enterprise vaccination program and procedures

• Identification of and prescribed treatments for infections and infestations

• Animals health and nutritional requirements

•Types of parasite infestation and their symptoms

• Relevant codes of practice with regard to the safe use and handling of hazardous substances

• With holding periods for treated animals

• Animals handling and restraint techniques

• OHS legislative requirements

• Select and prepare animals for culling

• Arrange and co-ordinate equipment and resources

• Weigh and drench animals

• Assemble, check and calibrate drenching equipment

• demonstrate safe and environmentally responsible workplace practices
• provide due care and humanely handle animals

Proper recording and documenting after the activates is very important for the following reasons

- To find out faulty items
- To clarify problems
- To control any activates

4.4.1 Evaluating farm cleaning, disinfection efficacy

- The efficacy of clean and disinfection should be monitored regularly.
- Bacterial and salmonella counts should be completed at least once per flock.
- Monitoring trends in Salmonella counts will permit continuous improvements in farm hygiene to be made.
- It should be remembered that if cleaning and disinfection have been effective, no Salmonella species should be isolated during sampling.

Table Records sanitized equipment sheet on

Equipment	Caustic concentration	Sanitizes concentration	Inspection
Tanker			
Crates			
Trays			

Supervisor Review: _____

The entire farm with clear demarcation of clean and dirty areas with unidirectional approach (one-way route) roads/ access points/ clean-dirty water demarcation etc. - all color coded should be displayed in office with Critical Control Points clearly marked

- Personnel roster- shed-wise/ entry/exit time; duty /job chart-cleaning of shed, feeding pans/ watering channels, cage cleaning, litter turning etc.
- Visitor's entry log
- Vehicle entry log
- Disinfectant spray schedule for houses; wheel/ foot-dip change roster
- Trace-in and Trace-out for both consignments (chicks/ Hatching Eggs etc.)arrivals and transfers respectively
- Log for feed / equipment arrival and allocation shed-wise, in hatchery/ disinfection of equipment
- Health check-up and cleanliness check-up schedules for personnel
- Schedule for vector/ rodent control program & monitoring
- Record of dead bird, hatchery waste disposal/ manure disposal
- Water

Self-Check -4	Written Test

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

1. Write at list five Documenting relevant information? (5 points)

2. Write at list five Evaluating farm cleaning, disinfection efficacy? (5 points)

Note: **Satisfactory rating – 10 points** **Unsatisfactory - below 10 points**

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

Answer sheet

Name: _____ Date: _____

Short Answer Questions

1._____

_____

_____

_____

2.

_____

_____

_____

_____

_____

Operation Sheet-1	mixing chemicals

Procedure/steps

- Wear protective clothing and equipment.
- Use a mixing site outdoors that can be easily cleaned.
- Avoid spill.
- Decant liquid concentrates carefully; cut paper containers cleanly. Have a water supply handy.
- Clean spills promptly or rapidly and correctly.
- Promptly reseal and place containers back in the store.

Operation Sheet-2	spraying chemicals

Procedure/steps

- Wear protective clothing and equipment
- Follow the label instructions.
- Wear protective clothing and equipment.
- Avoid spraying on windy days.
- Repair leaky or damaged hoses and valves.
- Clean yourself and your equipment after spraying

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- mixing chemicals?

Task 1- spraying chemicals?

List of Reference Materials

1. MAGWOOD S.E & MARR H. 1964. The effect of airborne bacterial populations on contamination of eggs and embryo surfaces. Poult. Sci., 43,1567-1572. 16. - Studies in hatchery sanitation.

A simplified method for assessing bacterial populations on surfaces within hatcheries. Poult. Sci., 43,1558-1566.

CAB International, 1987. Manual on poultry production in the tropics Wallingford, Oxon, United Kingdom

French, K.M. 1984, Practical Poultry Raising Peace Corps, Trans- Century Corporation, Washington D.C.

G.C Banerjee , 2000. A text book of Animal Husbandry. 8th ed Oxford & IBH publishing CO. Pvt.ltd, New Delhi / Calcutta, India

Lists of Instructors who developed the Learning Guide

No	Name of Instructors	Their Institutions	Mobile Number	e-mail address
1.	**Abadi Brhanu**	Maichew ATVET College	0920870056	adonayabadi@gmail.com
2.	**Alemayehu Tolera**	Bako ATVET College	0994132626	toleraalex@gmail.com
3.	**Alemu Abate**	Burie Ploy-technic TVET College	0912355539	adoni4@gmail.com
4.	**Alula Tesfaye**	Assosa ATVET College	0912004697	alula188@gmail.com
5.	**Bekele Abdissa**	Agarfa ATVET College	0920839098	bakeabdi@gmail.com
6.	**Dereje Kebede**	Nedjo ATVET College	0911530210	derejekebede2012@gmail.com
7.	**Ewunetu Bekele**	Bako ATVET College	0920096917	esewunetu@gmail.com
8.	**Mesfin Getachew**	Walaita Soddo ATVET College	0916475289	dukekeshamo@gmail.com
9.	**Terefe Tolcha**	Alage ATVET College	0911067132	terefetc@gmail.com