POULTRY PRODUCTION

NTQF Level - II

Learning Guide -26

Unit of Competence: - Use Farm Tools and Equipment

Module Title: - Using Farm Tools and Equipment

LG Code: AGR PLP2 M08 LO1-LG-26

TTLM Code: AGR PLP2 TTLM 1219v1

LO1: Select and use farm tools

Instruction Sheet	Learning Guide #26

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

- identifying appropriate farm tools
- checking and reporting farm tools for faults and defects
- using appropriate tools and equipment's

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, **you will be able to: –**

- identify appropriate farm tools
- check and report farm tools for faults and defects
- use appropriate tools and equipment's

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described in number 3 to 7.
3. Read the information written in the "Information Sheets 1, 2 and 3 in page 3, 9 and 12 respectively". Try to understand what are being discussed. Ask you teacher for assistance if you have hard time understanding them.
4. Accomplish the "Self-check 1,2 and 3 " in page 8, 11 and 14 respectively
5. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answers only after you finished answering all Self-checks).
6. If you earned a satisfactory evaluation proceed to "next Information Sheets". However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Activity #26.
7. Submit your accomplished Self-check. This will form part of your training portfolio.

Information Sheet-1	Identifying appropriate farm tools

1.1. Overview of farm tools and equipment

Poultry farming is a very lucrative aspect of agriculture under livestock farming. To achieve maximum result in poultry farming business, there are certain equipment's that are necessary. Tools and equipment are two words that are synonyms, primarily due to the similarity of their meaning. Due to this factor, they can be used in many cases with each other. A tool can be anything that is used to achieve a target. A tool can be non-mechanical as well; however, it has a special mechanical aspect that cannot be ignored. Tools are often seen by animals for use. Equipment's are used by humans only. Tools are usually multi-purpose. Tools shall be used only for the purpose for which they were designed. Tools are a piece of equipment that you use with your hands to make or repair something. Tools are a piece of equipment that you use to help you do a job, especial something that you use with your hands to make or repair something. The equipment is designed for a specific purpose. Equipment is usually the address that is used to achieve a specific purpose.

1.2. Identifying farm tools

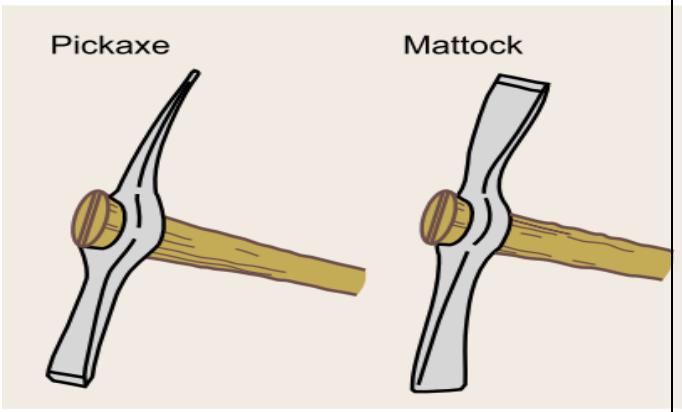
Hand tools are usually light and are used without the help of animals or machines. They are being used in performing farm activities which involve small areas like school garden and home garden. A **tool** is an object used to extend the ability of an individual to modify features of the surrounding environment. Although many animals use simple tools, only human beings, whose use of stone tools dates back hundreds of millennia, use tools to make other tools. The set of tools required to perform different tasks that are part of the same activity is called gear or equipment.

While one may apply the term tool loosely to many things that are means to an end (e.g., a fork), strictly speaking an object is a tool only if, besides being constructed to be held, it is also made of a material that allows its user to apply to it various degrees of force. If repeated use wears part of the tool down (like a knife blade), it may be possible to restore it; if it wears the tool out or breaks it, the tool must be replaced.

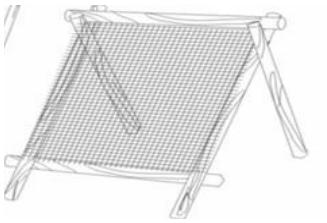
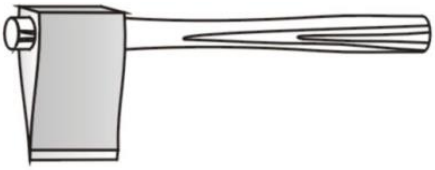
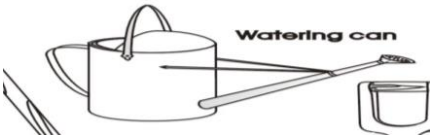
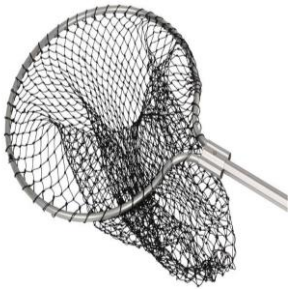
Thus tool falls under the taxonomic category implement, and is on the same taxonomic rank as instrument, utensil, device, or ware. Farm tools include sickle, cutters, weighing scale, measuring tools, garden tools.

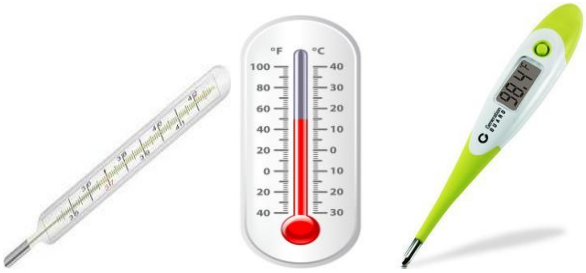
Farm tools		
Items	Description	In picture
Shovel and Rake	Shovel used in agricultural operations is used in poultry farms for removal of manure. Shovel is used in removing trash, digging loose soil, moving soil from one place to another and for mixing soil media. Raking tool helps in mixing the litter so that cake formation of the litter is prevented. If raking is not done regularly, droppings from the bird will mix with the litter material resulting in cake formation.	  
Sprayers	Sprayers are used for disinfection of building, birds, men, material and surrounding areas, as and when required. Several types of sprayers are available in the market. But, a sprayer which is hand-operated and can be carried on the back while in use is most ideal for a poultry farm. The desired disinfectant or sanitizer can be mixed and loaded on to the tank and sprayed as required.	 

	A sprayer is a hand-held agricultural tool with a variously curved blade typically used for cutting weeds.	
Treatment and Vaccine syringe	Unlike broilers, laying-type birds have to be given several vaccinations and some of them by injections. Therefore, automatic vaccinating equipment which loads a set volume of vaccine into the syringe is required to carry-out vaccination within a reasonable time.	  
Wheel barrow	A wheelbarrow is a small hand-propelled vehicle, usually with just one wheel, designed to distribute the weight of its load between the wheel and the operator, so enabling the convenient carriage of heavier and bulkier loads than would be possible were the weight carried entirely by the operator.	
Fork	It used to collect waste	

Spade	It is used to collect animal droppings and manure. S**pade** is used for removing trash or soil, digging canals or ditches, and mixing soil media	
Hoes	It can be used for excavating soft soils and is often used in combination with stretchers or head baskets. Hoes are also effective when excavating drains, cutting back slopes and removing topsoil. The most efficient way of using the hoe is when the workers can stand slightly below the level being excavated.	 
Pickaxes and Mattocks	Pickaxes and mattocks are tools used for excavating hard or stony soils, difficult to penetrate with hoes. Pickaxes are effective when breaking hard or stony ground. When excavating side drains in hard soils, the pickaxe is particularly effective. Mattocks are useful for shaping slopes in hard soils, and also to cut roots	

Bolo	It is used for cutting tall grasses and weeds and chopping branches of tree	
Sprinklers	It is used for watering seedlings and young plants	
Sickle	It is a hand-held agricultural tool with a variously curved blade typically	
Tool Boxes	Tool boxes are used for storing tools. They are usually made of steel but sometimes of wood or plastic. Portable tool boxes are used for carrying and storing a variety of hand tools. Chest-type tool boxes generally contain larger tools, such as specialized automotive tools or machinist's tools, requiring a more permanent location. Some larger tool boxes are mounted on wheels so they can move easily from place to place. Like the boxes, they are available in a variety of sizes and serve similar functions.	  Fig. portable tool box Fig. cantilevered tray tool box   Fig. Removable tray tool box Fig. mechanics tool box   Fig. canvas tool box Fig. Five drawer portable tool

Sieve	Used to identify particle sizes either sandy soil or grain crop for applying to poultry according to their egg	
Axe	To cut unnecessary overgrowth of any wood/ plant around poultry house to protect predators.	
Watering can	Used to take and fetch/supply water to poultry as well cleaning purpose	
poultry catcher leg hook	For catching poultry	 
Poultry catching net	For catching poultry	 
Poultry nail trim	To cut/trim nail of poultry	 

Cutters	Used to cut different tools and materials	
Measuring tools	To measure different length, time and distance	
Thermometer	Used to measure body temperature	
Stethoscope	Used to measure heart rate	

Self-Check -1	Written Test

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

1. What do you do before using materials, tools and equipment? (2pts)

2. List tools that used in poultry farm (5pts)

Note: **Satisfactory rating - 7 points** **Unsatisfactory - below 7 points**
You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____
Rating: _____

Name: _____ Date: _____

Short Answer Questions

1._____

_____

2._____

_____

Information Sheet-2	Checking and reporting farm tools for faults and defects

Finding the right tools among different items is the most critical aspect in poultry raising activity. All the items should be checked before utilization for their

- safety; right material,
- no damage and
- Appropriate amount for a specific activity

Damaged, broken, and material which are not fit for poultry raising should be identified and reported to the responsible person in time.

2.1. Never Use Damaged Tools

Notify your supervisor of broken or damaged tools. Remember, a worker's efficiency is often a direct result of the condition of the tools being used. Workers are often judged by the manner in which they handle and care for their tools. You should care for hand tools the same way you care for personal property. Always keep hand tools clean and free from dirt, grease, and foreign matter. After use, return tools promptly to their proper places in the tool box. Improve your own efficiency by organizing your tools so that those used most frequently can be reached easily without sorting through the entire contents of the box. Avoid accumulating unnecessary items.

Tools and equipment shall be kept in proper operating condition and used only for the purpose for which they were designed. If proper and safe tools are unavailable, this should be reported to the supervisor. All tools should be inspected at regular intervals, and any tool that develops defects while in use shall be taken from service, tagged and not used again until restored to proper working condition. Hammers and similar tools shall be kept in good condition and shall not be used if the handles are loose, cracked, or splintered. Wrenches must be kept in good condition. Defective wrenches such as open-end, box end, socket, and adjustable wrenches with spread jaws, or pipe wrenches with dull teeth, might slip.

Self-Check -2	Written Test

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

1. What type of tools should be reported to the responsible body? (5pts)
2. From what condition always hand tools should be kept? (4pts)

Note: **Satisfactory rating – 9 points** **Unsatisfactory - below 9 points**

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

Answer Sheet

Score = _____
Rating: _____

Name: _____ Date: _____

1._____
_____
_____

2._____
_____
_____
_____

Information Sheet-3	Use appropriate tools and equipment

3.1. Proper Use of Tools and Other Common Equipment

Improperly using tools can cause more problems than it solves. Proper tools and equipment are essential for the effective operation of any civil works site. Equipping the work site with the correct tools and equipment plays an essential role in achieving timely and good quality results. For every construction activity there is an optimal combination of tools, equipment and labour. Depending on the nature and content of the works, the technical staff needs to know which tools to use and how to effectively combine them with manual labour.

Hand tools should be of good quality and designed so that they are efficient in use. The tools should be strong enough to withstand intensive use at the work site, and resistant to wear so that they have a long working life. For most tools this means that the metal head should be made from carbon steel, heat-treated to give the correct strength and wear characteristics.

Efficient tool heads should:

- have the correct shape in order to work efficiently
- be of suitable weight for the strength of the workers
- be properly sharpened along the working edges

3.2. Improper Use of tools

When human judgment (or error) forces a machine beyond its designed capability limits, a machine operator is in a hazardous position, because the machine does not function efficiently.

3.3. Lack or Misuse of Safety tools

If fire extinguishers, guards, shields, or other safety devices are removed and not replaced, or if a machine is operated carelessly, the operator has set the stage for an accident.

Self-Check -3	Written Test

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

1. Why tools required being strong and longing life? (5pts)
2. What are the fulfillments of efficient tool head? (4pts)

Note: **Satisfactory rating - 9 points** **Unsatisfactory - below 9 points**
You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____
Rating: _____

Name: _____ Date: _____

Short Answer Questions

1._____

_____

2._____

_____

_____

References

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

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Learning Guide -27

Unit of Competence: - Use Farm Tools and Equipment

Module Title: Using Farm Tools and Equipment

LG Code: AGR PLP2 M08 LO2-LG-27

TTLM Code: AGR PLP2 TTLM 1219v1

LO2: Select and operate farm equipment

Instruction Sheet	Learning Guide #27

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

- identifying appropriate farm equipment
- reading instructional manual of the farm tools and equipment's prior to operation
- conducting pre-operation check-up
- identifying and reporting faults in farm equipment's
- using farm equipment according to its function
- following safety procedures concerning both females &males requirements

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 –**

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- follow safety procedures concerning both females &males requirements

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3. Read the information written in the "Information Sheets 1,2,3,4, 5 and 6 in page 3, 24, 27, 30, 32 and 35 respectively". Try to understand what are being discussed. Ask you teacher for assistance if you have hard time understanding them.
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Information Sheet-1	Identifying appropriate farm equipment

There are many types of poultry equipment available which are necessary for successful poultry farming. People of different countries are getting inspired in poultry farming day by day as it is a great way of earnings. The demand of animal protein is increasing due to high population growth and poultry farming is a great solution of it. So the demand of poultry products is increasing. Proper management, care and sufficient equipment are must for successful production of poultry.

Farm equipment may include watering equipment, Feeding equipment, Engine, Pumps, Generators, and sprayers. In all poultry housing for laying hens, drinkers, feeders, perches, and laying nests need to be installed. You can also add lighting and a system to collect manure. For successfulness of chicken production based on the production type and standard, it is advisable to use suitable and selected production equipment's. The different equipment used in the chicken house differs according to the chicken age, breed and productivity status.

Housing

Poultry housing is not exactly any equipment but it is a must for poultry production. There are many ways of making chicken cage. It may be a concrete house or a simple house. Concrete or simple whatever the house is, it must have to have the necessary benefits for the poultry birds. The poultry cage must have to the facilities of well ventilation and well day light management. 10-15 feet distance from one house to another house is better.

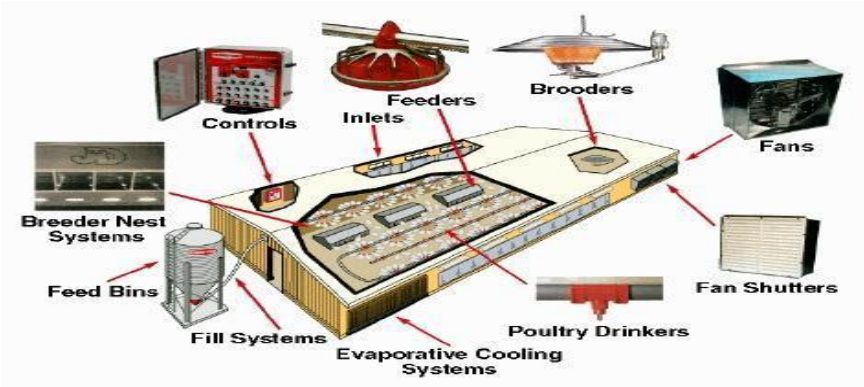

Fig 1. Housing design

Some basic information should maintain before making poultry house or chicken cage.

- The house must have to keep dry and clean always.
- Build the house in open air place
- Liter of the house should be at least 3 inch depth.
- Wood powder, sand or tush can be used as liter.
- Mix half kg of lime powder with the liter.
- Change the litter of the house after every one week.
- Never let the poultry house wet.

The major production equipment used in chicken house is the following;

1.1. Feeders

Feeders are the same, whether being used in free-range, semi intensive systems or intensive systems. They should always be kept clean to prevent spread of diseases and big enough for all chickens of the same age to feed at the same time. One meter trough or a 35 cm (diameter) tube feeder is big enough for 20 adult chickens to eat. It is important that the feeders are constructed in such a way that feed waste is avoided. Also feed waste can be decreased if feeders are not filled to the top. It is better to fill feeders just half full and then check them regularly for refills. Commercial feeders may also be bought at the market, either in metal or plastic. They are often expensive and normally not any better than locally produced feeders. The feeders can be made from locally available materials in different shapes like long, round feeders and can be made up of wooden, tin can, metal, plastic, etc.

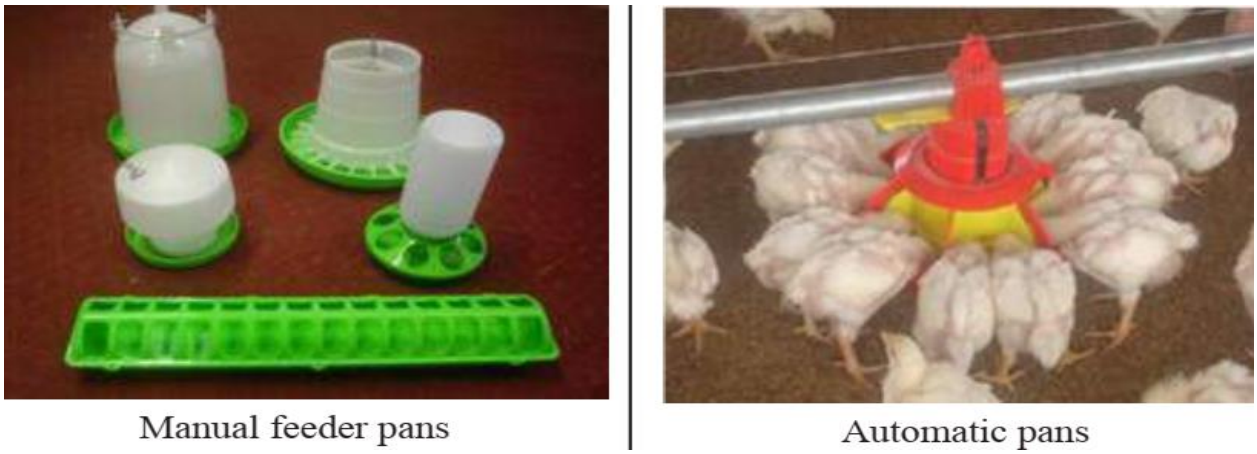

Fig 2. Manual and automatic feeder

The type and number of feeders to be prepared should consider the age and productivity of the chicken Characteristics of good feeders:

- Avoid wastage of feed, prevent contamination of feed
- Easy to clean, durable &strong and easy to fill and cheap

Fig 3. Linear feeder

Fig 4. Circular (hanging) feeder

Fig 5. Feeders made from locally available material

(A) Floor feeding;

(B) Locally constructed feeder.

Fig 6. Floor and locally constructed feeder

1.2. Drinker

In tropical areas it is **very** important to supply enough and above all cool, clean and fresh water to chickens. Drinkers are the same, whether being used in free-range, semi intensive systems or intensive systems. They should always be kept clean to prevent spread of diseases, big enough for all birds of the same age to drink at the same time and easily be produced out of local materials. One meter trough or a 35 cm (diameter) tube drinker is big enough for 40 chickens to drink. An empty tin can placed upside down on a plate forms an excellent drinker. Commercial drinkers may also be bought at the market, either in metal or plastic. The type and number of drinkers to be prepared should consider the age (chick, grower and layer) and productivity of the chicken. The drinker should be always cleaned, dried at least twice a day & sprayed with disinfectant chemicals once a week after properly cleaned.

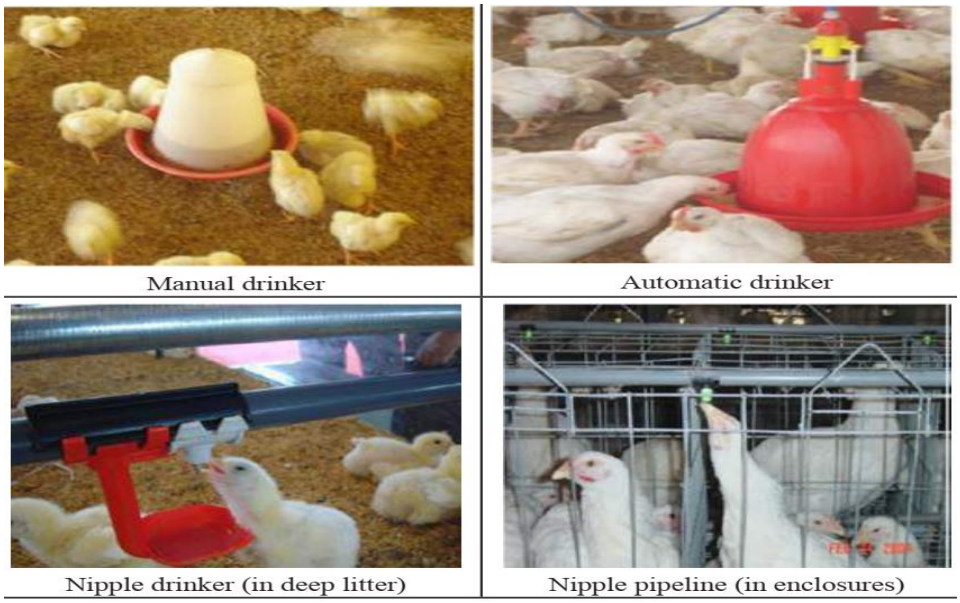

Fig 7. Manual, automatic and nipple drinker

Characteristics of good quality drinkers:

- can give enough, clean and fresh water
- strong, durable and stable
- easy to clean and fill
- no splashes of water and cheap

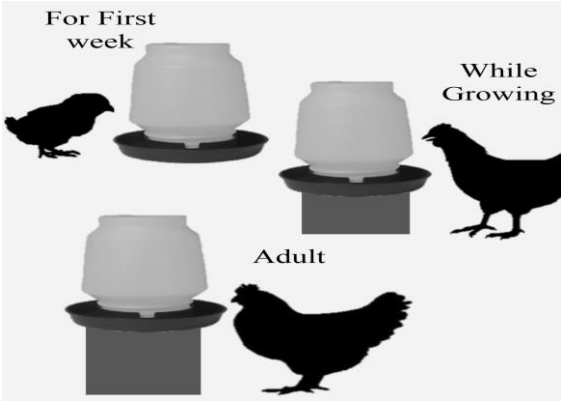

Fig 8. Made from locally available material

There are 2 types of drinker

- ✓ Bell drinker
- ✓ Nipple drinker

Bell-drinker is most commonly used for watering layer. In case of chicks of (chicks during first week of brooding) manual drinker are properly used. Manual drinker is called "fountain drinker."

Nipple drinker: - drinker look like nipple

-water come out when they are pressed

-can be used for all types and classes of birds.

Fig 9. Chick drinker

Fig 10. nipple drinker

Fig 11. Locally constructed drinker

1.3. Laying nests

Provide nests in the hen house for laying makes it easier to collect eggs and they can be kept clean. There should be adaptation period of the hen for the laying nest before start of laying eggs which is important to prevent the hen not to lay their eggs outside the laying nest.

If you mark the eggs properly, you will know which eggs are new and should be collected. You may avoid dirty and cracked eggs, if the eggs are collected twice a day. Collect eggs at the same time every day in the morning and the evening. Removing eggs continuously is important if you want to avoid that the hens become broody. In many villages, nests are not provided for the hens and eventually the hens will lay their eggs on the ground, in high grass or in natural shelters, where it may be difficult to find. Some chicken farmers build nests on the ground outside the chicken houses.

Nests should be placed inside the chicken house and preferably above the ground. For laying you may have a battery of nests where more hens can lay at a time. Nests should be of the right size for the hen to feel comfortable. The size and length as well as the number of compartments of the laying nest to be prepared should consider the number of hens. A nest box will typically measure 30 x 30 x 30 cm. The laying nest prepared by this size is enough for 5 layers. It is advisable to place the laying nests in the dark part of the house to prevent exposure to the sun. Don't make them too big, as the hen will not feel comfortable. A calabash or nest basket may measure 40 x 20 x 25 cm (upper diameter x height x lower diameter). A clay pot is made more or less the same as calabash.

In all poultry houses except battery cages, eggs are collected by hand from nests on which one hen sits. These individual nests need to be about 30 cm wide, 35 cm long and 40 cm high. They can be made of wood or of other locally available materials, such as bamboo or hard types of grass. They need to be filled with a thick layer of litter to prevent eggs breaking. To keep the litter in the nest, make a little partition about 10 to 15 cm high at the front of the nest. Hens usually prefer to lay eggs in a protected nest like this than simply on the floor of the house.

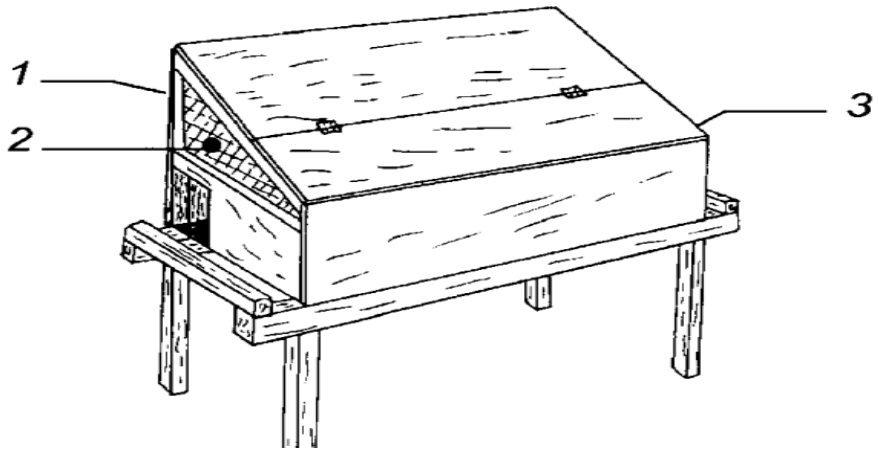

Fig 12: Laying nest. 1. Wire netting back to nest box, 2. Wire netting also provides ventilation at the side, 3. Entrance hole also at this end

To avoid the number of eggs laid by hens on the ground and loss of product, we have to consider the following points:

- ✓ Place enough nest and introduce nests one week before onset of lay
- ✓ Collect ground eggs many times a day and use a comfortable nest
- ✓ Don't feed when the hens are on the nest
- ✓ Avoid dark corners in the house and do not collect the first eggs
- ✓ Divide the nests uniformly over the house and place nests on a wind free place

Fig 13. Laying nests made from locally available material

1.3.1. Recommended standards of equipment & density (feeders, drinkers and nests)

Table 1. Space requirement for chickens at different ages

Feeding and watering space requirement in cm/bird					
Feeder/ Drinker type	Chicks 0-8 weeks	Layer growers 8-18 weeks	Broilers	Layers	Breeders
Long feeder	7	9	5	12	18
Round feeder	3	4	2	5	7
Long drinker	1.5	2	1	2.5	3.5
Round drinker	1.5	2	1	2.5	3.5
Housing space requirement (number of birds in $1m^2$)					
Housing type					
Full slats	15	7	-		
2/3 slats, 1/3 litter	-	6	4		
1/2 slats, ½ litter	-	5	-		
Full litter	10	4	3		
Laying nests requirement					
Types of nests					
Individual nest (hens/nest)	7	5			
Communal nests (hens/m2)	50-75	30-50			

1.4. Perches

Chickens like to spend the night on perches in high places. During the day the more nervous birds can also quickly find shelter there. You will need to have a space under the perches which catches the bird droppings. The litter will get less moist and it is also easier to collect the manure.

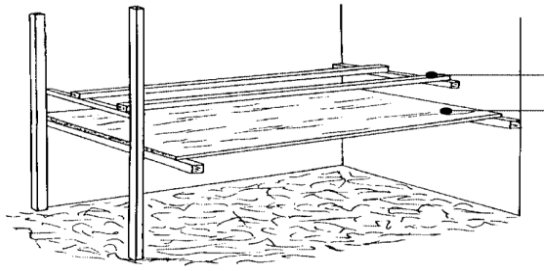

Fig 14: Perch with dropping board. 1. Perch, 2. Droppings board is cleaned daily

Perches are usually made of wood and are small slats 5 cm wide and 5-7 cm long. It is best to place them about 35 cm apart. Each chicken needs approximately 15 cm (or more) of sitting space, depending on the size of the birds. Although perches are indispensable in all kinds of chicken houses, the kind of perch and its location differ per house. In housing with litter it is a good idea to place a wooden floor under the perch to catch most of the droppings.

The manure can then be removed regularly, preferably once a week. Usually this wooden floor is installed about 75 to 80 cm above the ground, so that the perches are placed 1 m above the ground. To prevent the chickens from coming into contact with their droppings, close the front opening between floor and perch.

Fig 15. Perches

Perches help to;

- keep birds from sitting on feeders and waterer
- keep poop out of the feed and water
- improve bone strength

1.5. Transportation crates

To prevent chickens from dying during transportation, spacious and airy crates must be used. These crates can be made of wood or other locally available materials.

Fig 16. Crates

1.6. Beak trimmer /De-beaker

Most commonly used equipment is the electrical beak trimmer. The equipment will be mounted on to a stand of convenient height (0.6 to 0. 75m) with peddle connected to the top of the unit a chain (strong threat) so that up on pressing the peddle with the foot of the operator, the hot blade sides down cutting the beak placed over a small plat form in the equipment .the equipment also provided with a thermostat to regulate temperature.

- Debeaking (beak trimming) is the cutting of the points of the beaks. It needs precision and must be done very carefully. When there is bleeding wound must be cauterized.
- Debeaking causes enormous stress to the birds and for this reason everything must be done to reduce stress before, during and after debeaking.
- There are two debeaking methods 'hot and cold' with the 'hot' methods cutting and cauterizing are done at the same time. With the 'cold' method the beaks often regrow.

Age at debeaking

Opinions differ as to the best time for debeaking. In general the younger the bird the less stress the debeaking causes.

Debeaking is a precision operation and requires skill and experience, careless work results in losses the flock will not reach a proper body weight, feed consumption will be too high and the flocks' top production will be missed.

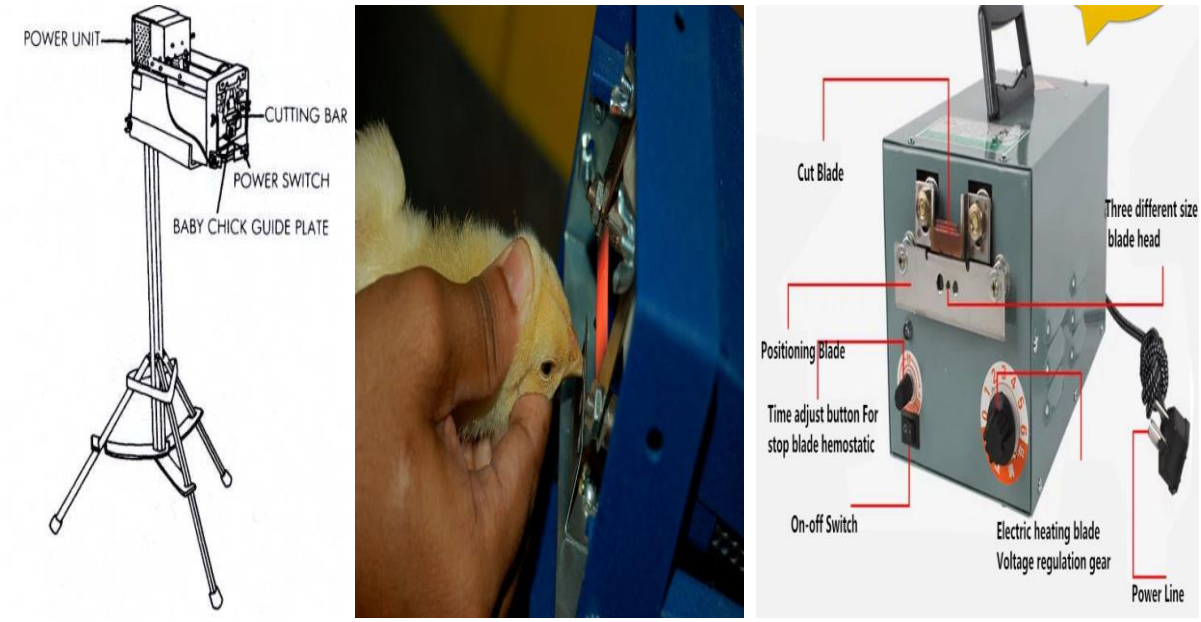

Fig 17. De-beaker

1.7. Weighing balance

Weighing balance is the mandatory requirement for weighing feed, birds at market .now a days, balance with digital display to the nearest available at reasonable rate.



Criteria to Measure

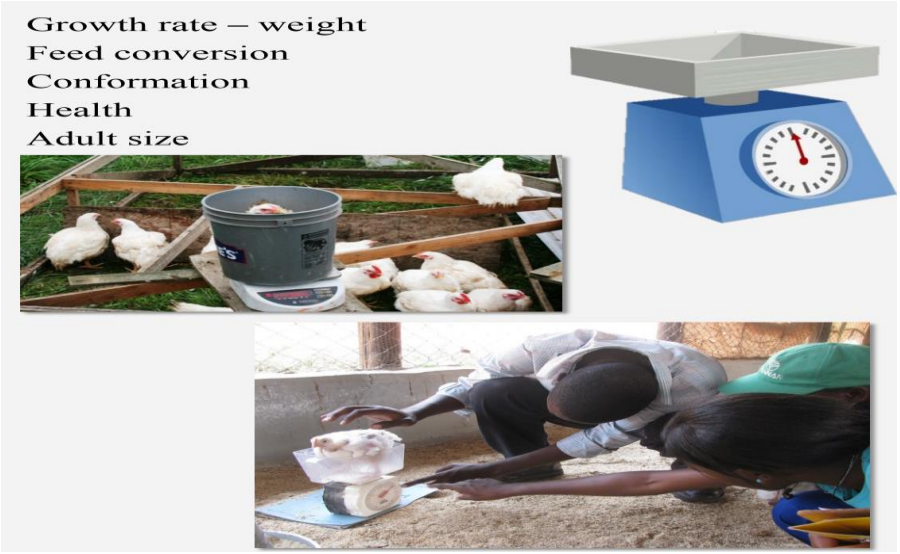

Fig 18. Different types of weighing balance

1.8. Candling Eggs /Candler

You can get a good view of an egg's interior by using an egg Candler. A Candler encloses a light source in a case or box with light shining through a hole 3 centimeters (1 1/8 inches) in diameter. Usually the light source is a 25- to 60-watt light bulb, but you can use a slide projector, a powerful flashlight (electric torch), or even an actual candle.

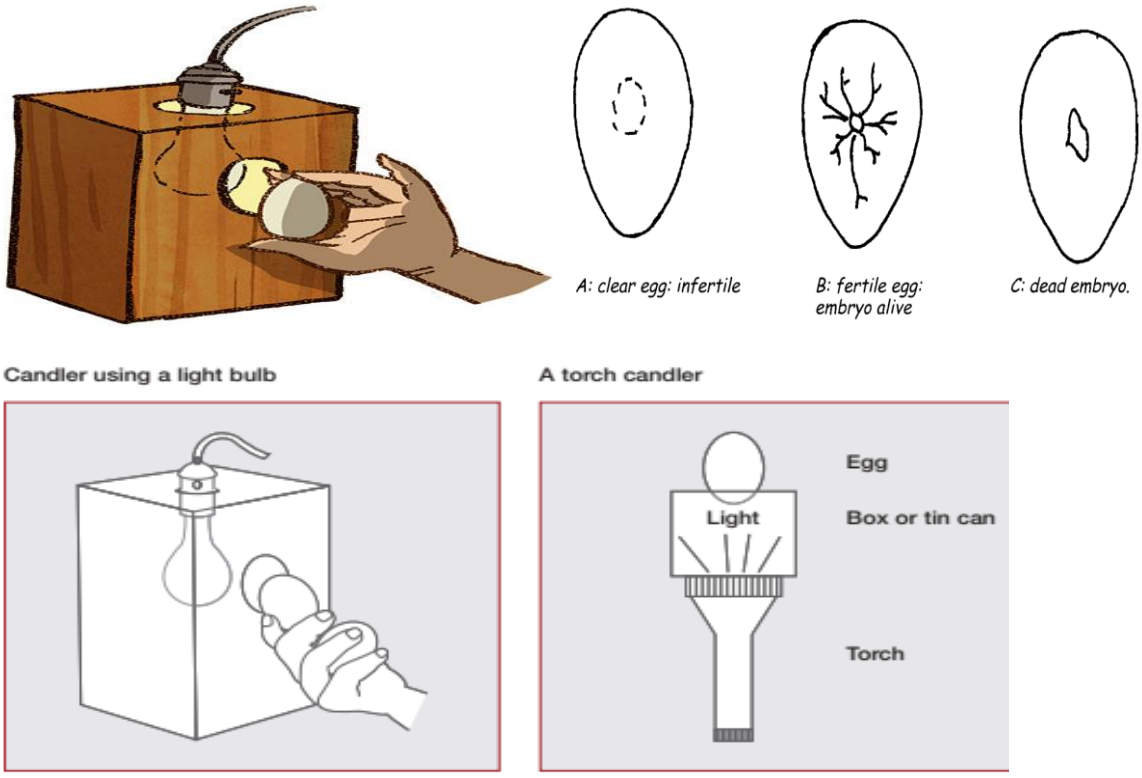

Fig 19. Different forms of Candler

During incubation one should always check which eggs are fertile and which are not fertile. Fertile eggs very quickly develop blood vessels, which may be seen against a sharp light from a torch.

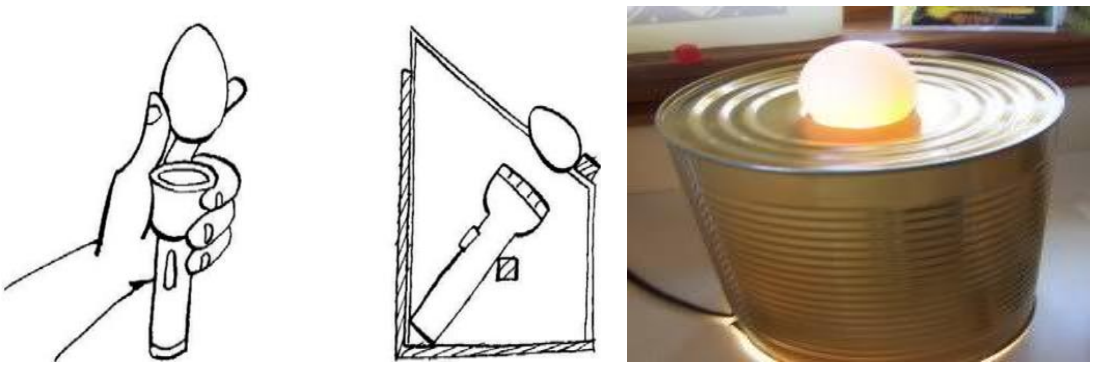

Fig 20. Home-made egg candlers using either your hand or a wooden box and a torch

1.9. Disinfectant Dip

A disinfectant dip has several advantages. First, it helps reduce the introduction of disease-carrying dirt. Second, and just as important, it is a daily reminder to the farmer of the importance of sanitation. It is especially important where barefoot farmers, or those who do not have spare pairs of shoes for each chicken house, visit more than one such

house each day. The dip can be formed with mud or clay and lined with concrete or a sheet metal tray. In some cases, it may be better to construct a shallow, basin-like dip instead. The basin should be no more than 1.27 centimeters (1/2 inch) deep with a large center area. This has advantages over a deeper dip because the disinfectant solution and accumulated dirt can be swept out. People also are more likely to walk through a shallow dip than a deep one.

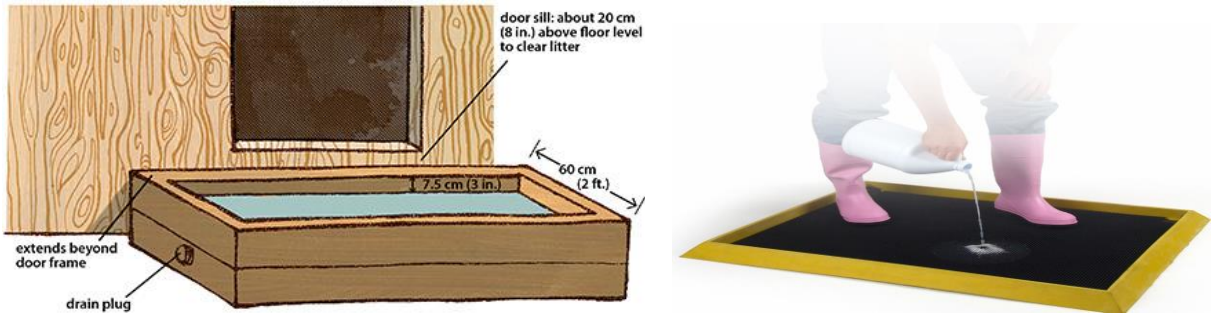

Fig 21. Disinfectant dip

1.10. Incubator

Incubation is the art of bring eggs from laying to successful hatching. It is the process of placing eggs under optimum environmental condition for hatching. Incubation can be achieved either by natural means using broody hen or by artificial means through incubator. Incubation period is a time period or interval between incubation and successful hatching. It is 21 days for chicken egg

Incubator is such poultry equipment which is used for hatching the bird's egg in unnatural ways. Generally, in natural condition the poultry birds hatch the egg, but they can maintain and hatch a limited number of eggs. So, when it is necessary to hatch a huge number of eggs then the producer must have to use an incubator. There are many types of egg incubators. Diesel and electric incubator is the most popular and widely used.

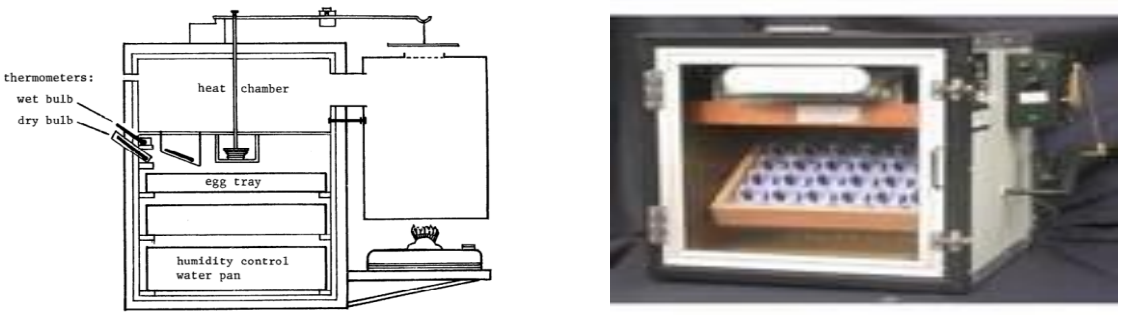

Fig 22. Incubator

1.11. Brooders /heater

A brooder, in simple words, is an artificial hen (mother) which provides warmth and light for the chicks to eat and drink during the first 3 to 4 weeks of age. Brooders provide heat for young birds for the first few weeks of life during which they are unable to regulate their own body temperature.

- Brooder guards restrict the young birds to within the vicinity of heat and feed supply.
- Brooder guards can be made from flexible materials such as ceiling boards cardboard or wire netting.
- Brooder types include charcoal or woodstoves, kerosene lamp or stoves, electricity heaters or bulbs

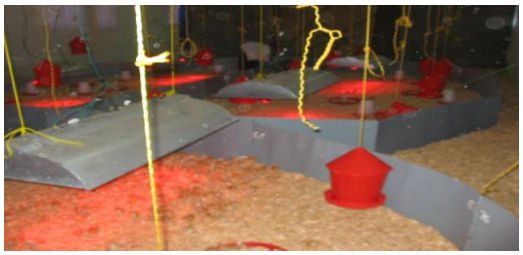

Fig 23. Infra-red brooder

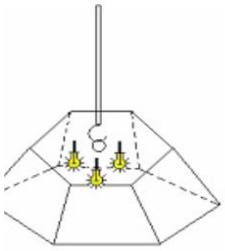

Fig 24. canopy (floor) brooder

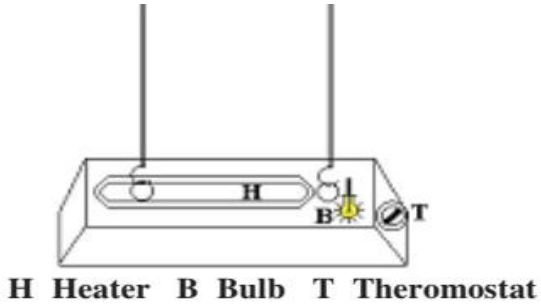

Fig 25. Sketch of reflector brooder

Fig 26. Reflector brooder

Fig 27. Battery brooder

1.12. Brooder Guard

Brooder guard, as the name suggests, guards the chicks from straying too far away from the heat source. Brooder guard is necessary because day-old chicks are not aware of feed, water etc. especially during the beginning because, in nature, hen takes care of their needs. Therefore, they have a tendency to look for corners, which will be usually dark and huddle. This leads to starvation, thirst and finally death. There are no hard and fast specifications for a brooder guard. Generally, brooder guard is made of many rectangular portions (usually 10 to 12), each measuring about 60 cm × 30 cm (2 ft × 1 ft) chain-linked lengthwise by means of hooks to facilitate their placement. It can be made of Galvanized Iron sheets, cardboard, thick carton (cardboard) material or any other material which can stand erect on its length. Hence, brooder guard is like a circular wall of 30 cm height with a brooder at its center.

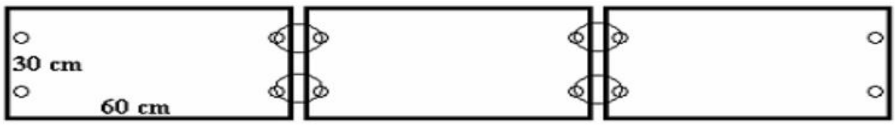

Fig 28. Brooder guard

1.13. Egg filler flats

By now, you are familiar with rectangular trays with depressions to suit eggs in the market place where you buy eggs. They are called “Egg filler flats”. Each of them can hold 30 eggs. It can be made of plastic or paper pulp. Plastic ones are common because they are durable and easy to clean and disinfect. However, pulp trays reduce breakage of eggs during transportation and are environment-friendly. Eggs are directly collected in such filler flats.

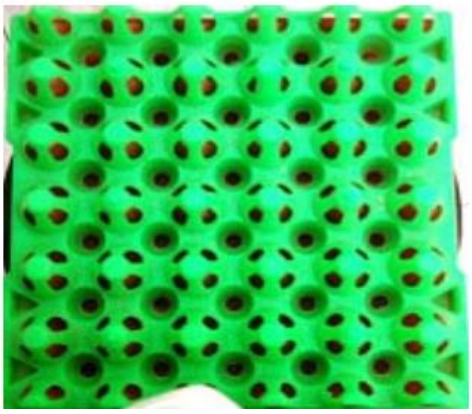

Fig 29. Plastic egg filler flats

Fig 30. Paper pulp egg filler flats

1.14. Shell grit box

It is used to provide shell grit to the layer birds as a supplemental source of calcium

Fig 31. Shell grit box

1.15. Hay box

Unlike most small animals, baby chicks are unable to live for any length of time without an additional source of heat other than their own bodies. Chick brooding refers to the early periods of growth (0-8 weeks), when young chicks are unable to maintain their normal body temperature without the aid of supplementary heat. It is by natural brooding that baby chicks are raised all over rural Ethiopia. The broody hen rearing and protecting few chicks ceases laying during the entire incubation and brooding periods of up to 81 days.

Table 2. The dimensions and specifications of the hay-boxes and runs used in the current on station and on-farm trials		
No of chicks	**Hay-box dimension, cm**	**Run dimension, cm**
10	30 x 26 x 26	30 x 56 x 56
20	30 x 37 x 37	30 x 80 x 80
30	30 x 45 x 45	30 x 98 x 98
40	30 x 52 x 52	30 x 113 x 113
50	30 x 57 x 57	30 x 127 x 127
60	30 x 63 x 63	30 x 139 x 139
70	30 x 68 x 68	30 x 150 x 150

Fig 32. Hay box

1.16. Egg grading/sorting machine

Fig 33. Egg grading

1.17. Engine

An engine or motor is a machine designed to convert one form of energy into mechanical energy. Heat engines, like the internal combustion engine, burn a fuel to create heat which is then used to do work

An engine or motor is a machine designed to convert one form of energy into mechanical energy. Heat engines, like the internal combustion engine, burn a fuel to create heat which is then used to do work. Electric motors convert electrical energy into mechanical motion, pneumatic motors use compressed air, and clockwork motors in wind-up toys use elastic energy. In biological systems, molecular motors, like myosins in muscles, use chemical energy to create forces and ultimately motion.

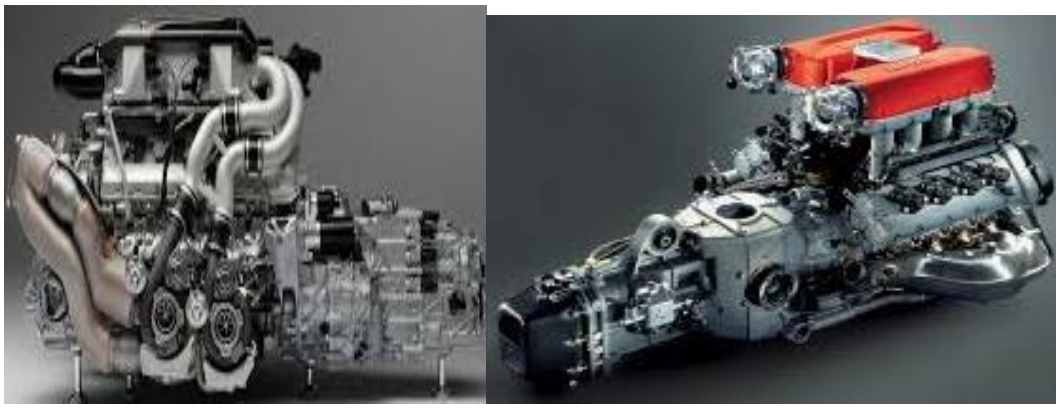

Fig 34. Engine

1.18. Pumps

A **pump** is a device that moves fluids (liquids or gases), or sometimes slurries, by mechanical action. **Pumps** can be classified into three major groups according to the method they use to move the fluid: direct lift, displacement, and gravity **pumps.** Pumps operate by some mechanism (typically reciprocating or rotary), and consume energy to perform mechanical work moving the fluid. Pumps operate via many energy sources, including manual operation, electricity, engines, or wind power, come in many sizes, from microscopic for use in medical applications to large industrial pumps. Mechanical pumps serve in a wide range of applications such as pumping water from wells, aquarium filtering, pond filtering and aeration, in the car industry for water-cooling and fuel injection, in the energy industry for pumping oil and natural gas or for operating cooling towers and other components of heating, ventilation and air conditioning systems.

Fig 34. Pumps

1.19. Generators

Generator may refer to:

- Signal generator: electronic devices that generate repeating or non-repeating electronic signals
- Electric generator: a device that converts mechanical energy to electrical energy
- Generator (circuit theory): an element in an abstract circuit providing a source of electricity
- Engine-generator: an electric generator with its own engine
- Wearable generator: a hypothetical generator that can be worn on the human body
- Gas generator a device: often similar to a solid rocket or a liquid rocket that burns to produce large volumes of relatively cool gas.

- Motor–generator: a device for converting electrical power to another form

Fig 35. Generator

Self-Check -1	Written Test

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

1. Is the demand of poultry product increasing or decreasing? Why? (5pts)
2. List major poultry production equipment that used in our country (4pts)
3. Name two types of poultry drinker (2pts)

Note: **Satisfactory rating - 11 points** **Unsatisfactory - below 11 points**
You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____
Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____
   _____
   _____
   _____
2. _____
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   _____
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3. _____
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Information Sheet-2	**Reading Instructional manual of the farm tools and equipment's prior to operation**

Following Instructions and directions provided by supervisor

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

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

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

The MSDS is a detailed informational document prepared by the manufacturer or importer of a hazardous chemical. It describes the physical and chemical properties of the product. MSDS's contain useful information such as:

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

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

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

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

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

Self-Check -2	Written Test

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

1. List down instructions and directions provided by supervisor to be followed by an expert in poultry raising (5pts)
2. Write the useful information contained in material safety data sheet. (5pts)

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

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

Answer Sheet

Score = _____
Rating: _____

Name: _____ Date _____

1.

- _____
- _____
- _____
- _____

2.

- _____
- _____
- _____

Information Sheet-3	Conducting Pre-operation check-up

This may include pre-start and safety checks, service and maintenance procedures including checks of all materials, tools & equipment's using for different purposes in raising poultry. For example, during loading & unloading poultry fuel and lubricant levels, and an assessment of tyres, wheels, controls and cables, warning lights and electrical systems, braking and hydraulic systems should be conducted. Calculations may include the height, weight, width, and safety of the load.

Poultry machinery and equipment is tangible personal property that is used directly in collecting or processing of a poultry product on the farm area. What may be involved in routine pre-operational checks or monitoring operation of tools or equipment's? This may include routine safety and pre-start checks and preparatory procedures including cleaning, lubricating, and hand sharpening, priming pumps, clearing filters, tightening, basic repairs and adjustments.

Reason for completing pre-operational and regular checks

The reason for conducting pre-operational and regular checks is to reduce the potential for time out of the paddock due to maintenance issues, and to ensure the equipment system is working correctly and efficiently. Good maintenance and regular checks can help to resolve minor problems before they lead to the need for major repairs. Unexpected downtime at critical periods in the season can be especially frustrating when conditions are good for equipment. There are many things the operator should check on a regular basis. Some of these will be quick checks while using, others may be at the end of the tank or the end of a day's using. The most important of all checks the operator can do is when the equipment is first delivered. Never assume that new equipment is ready to use when it arrives on-farm.

Checks to do when the equipment is first delivered

If the equipment is not new, always clean the equipment externally with appropriate decontamination agents before doing any checks, measurements or adjustments.

- Read the equipment operation, maintenance and rate-controller manuals before operating the equipment.

- Check the manufacturer's maintenance requirements and replacement schedules for items such as filters. Note these in a prominent place or in a maintenance register.

- Check and record the current rate controller settings before doing anything else. Ideally these would be recorded in the rate-controller manual or/and electronically along with the date they were checked, before operating the sprayer.

Safety guards*:* check the safety guards are located in the appropriate position.

Checks are conducted on all equipment with insufficient or faulty items reported to the supervisor. As the business grows and you get more clients and more assignment, you can get more tools and equipment and offer more services. Employers are also required to ensure that those using equipment have sufficient knowledge and training to use it safely.

Self-Check -3	Written Test

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

1. What may be involved in routine pre-operational checking operation of tools or equipment's? (5pts)
2. Reason out why conducting pre-operational and regular checks of equipment? (5pts)

Note: **Satisfactory rating - 10 points** **Unsatisfactory - below 10 points**
You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____
Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____
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2. _____
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Information Sheet-4	Identifying and reporting faults in farm equipment's

Equipment procedures and maintenance guidelines should be kept in a central location for quick reference when needed. If missing, request complimentary copies from manufacturer or maintenance contractor. Malfunctions, faults, wear or damage to equipment are identified and reported in line with enterprise requirements. Since factors vary among installation sites, equipment users must work closely with each of their suppliers to ensure that proper data is being collected, that the data is being provided to the correct supplier, and that the resulting solutions are feasible.

All events (failures) that occur during inspections and tests should be reported through an established procedure that includes collecting and recording corrective maintenance information. The data included in these reports should be verified and then the data should be submitted on simple, easy-to-use forms that failures are tailored to the respective equipment or software.

Then check and report to your supervisor how much of the materials he/she provided in the list are functional and how much of them are faulty. Then are the functional tools and equipment's sufficient enough to the poultry raising activity with the available labour power. Then after reporting the faulty and functional materials your supervisor will guide you what to do if there is insufficiency of material for that particular poultry production activity.

Why Reporting?

- Accountability
- Program monitoring
- Program evaluation
- Program improvement
- Sharing the lessons learned with other

Self-Check -4	Written Test

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

1. Why reporting of fault equipment required to supervisor? (2pts)
2. What will be done after reporting to supervisor? (3pts)

Note: **Satisfactory rating - 5 points** **Unsatisfactory - below 5 points**
You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____
Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____
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2. _____
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Information Sheet-5	Using farm equipment according to its function

Farm equipment is any kind of machinery used on a farm to help with farming. Poultry houses should be equipped with different equipment that is necessary for satisfactory production.

The following major equipment is required during the brooding period:

Brooder: These are the units that furnish the heat needed to keep the chick's worm.

Brooder guard: These are guard that keeps the chicks around the heat source

Drinkers: At the beginning of the brooding period shallow drinkers are used. As the chicks grow up these drinkers should be replaced by deep drinkers.

Feeders: For the first few days of brooding, the chicks may be fed on flat or shallow feeders like pans or egg trays. When they are about one-week-old large feeder made of metal or wood are usually used.

Fig 36. Poultry in cage system

Table 3. Space requirements during the brooding period (Indicative only)

Floor space (deep litter)	8/m2
Long feeder	7cm/ Bird
Round feeder	3 cm/ Bird
Drinking space (round drinkers)	1.5 cm/ Bird

Laying hens keeping is one of the leading areas of the poultry. To maximize the productivity comfortable living conditions shall be ensured to the poultry. Such conditions include not only high-quality food, and an optimum microclimate, but also hi-tech cage equipment.

Selection of equipment depends on the following:

- required poultry population
- technologies of housing systems
- climate conditions
- of selected breeding cross

Fig 37. Cage system

Self-Check -5	Written Test

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

1. Define farm equipment. (4pts)
2. List major equipment required during brooding period. (2pts)

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: _____

Name: _____ Date: _____

Short Answer Questions

1. _____
_____
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2. _____
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Information Sheet-6	Following Safety procedures

The importance of regular and through cleaning of workplaces has already been emphasized by most of the safety measures. Which cleaning intervals need to be maintained depends on the operational circumstances. It is recommended to exactly prescribe the frequency based on experiences and measurements at individual workplaces. The cleaning of workplaces is not only a technical and supervisory problem. Priority should be given to developing awareness of the problem among the workers through training and provision of information.

Every tools, equipment's and materials should be handled with a maximum care, and safety, otherwise it may contributes its share of hazard risks maximization.

Tools, equipment's and materials must be clean, maintain & store properly before and after completion of the work. Machinery and equipment breakdowns, faults or malfunctions will need to be reported to supervisor for repair or replacement to achieve work plan requirements. Before going to determining Procedures for the safe operation of equipment we will discuss Occupational health and safety.

Occupational health and safety is a discipline with a broad scope involving many specialized fields. In its broadest sense, it should aim at:

- The promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations;
- The prevention among workers of adverse effects on health caused by their working conditions;
- The protection of workers in their employment from risks resulting from factors adverse to health;
- The placing and maintenance of workers in an occupational environment adapted to physical and mental needs
- The adaptation of work to humans

- **Safe systems and procedures are for:**
  - Maintenance and operation of vehicles and equipment
  - Handling livestock
  - Manual handling, including lifting and carrying
  - Protection from mechanical hazards including hydraulics, Hazardous noise and organic and other dusts
  - Health and safety of personnel and bystander
  - Outdoor work including protection from solar radiation
  - Appropriate use of personal protective equipment
- **Maintaining a clean & safe work site practice**

The following rules concerning hygiene in the workplace should be observed and enforced in all commercial and administrative (public and private) workplaces:-

- Workplaces and their equipment should be properly maintained and kept clean.
- The lighting should preferably be natural, and artificial light should be appropriately distributed.
- The temperature should be maintained at appropriate levels, and natural or artificial ventilation should be available at all workplaces.
- Sanitary conveniences should be sufficient, suitable and properly maintained. Washing facilities should be provided for workers' use. Separate conveniences and facilities should be provided for men and women except in establishments with no more than five persons or when only the employer's family is employed.
- Rooms should be provided where alternative facilities are not available for temporary rest during working hours, in particular to meet the needs of women workers.
- Workers should be protected by appropriate measures against substances, processes and techniques which are unhealthy, toxic or harmful.

Self-Check -6	Written Test

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

1. For what purpose safe systems and procedures are used? (5pts)

Note: **Satisfactory rating - 5 points** **Unsatisfactory - below 5 points**
You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____
Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____
_____
_____
_____
_____
_____

Operation Sheet-1	Techniques of Procedures in using equipment

Step 1- Never use any equipment you have not been trained to use.

Step 2- Check all switches to see that they are off before plugging into the outlet.

Step 3- Do not touch the edge of the blade

Step 4- Clean any equipment blade from the center out.

Step 5- Use a wooden or plastic plunger rather than your hands or spoons to push meat down into a meat grinder.

Step 6- Keep your hands to the front of the revolving bowl when operating the food cutter. This is one of the most dangerous pieces of equipment in the commercial kitchen.

Step 7- Never starts a machine until you are sure all parts are in their proper places. If it is a machine that operates with gears, check the gear position.

Step 8- When using electrical power equipment; always follow the manufacturer's instructions and recommendations. Do not wear rings, a wristwatch, or a tie when operating electrical power equipment.

Operation Sheet-2	Workplace Safety Procedures

Techniques for safety precautions in any work area;

Step 1- Don't fool around. "Horseplay" is one of the biggest causes of injuries on the job and it may be grounds for dismissal.

Step 2- Never work while under the influence of drugs or alcohol, as you are a hazard to yourself and your co-workers.

Step 3- Pay particular attention to moving objects, such as equipment, dollies, mixers, and slicers.

Step 4- Walk; do not run, in the work areas.

Step 5- Stay completely alert on the job.

Step 6- Avoid back strain by lifting properly.

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 1 hour.

Task 1. Monitor procedures in using equipment

Task 2. Follow workplace safety procedures

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POULTRY PRODUCTION

NTQF Level - II

Learning Guide -28

Unit of Competence: - Use Farm Tools and Equipment

Module Title: - Using Farm Tools and Equipment

LG Code: AGR PLP2 M08 LO3-LG-28

TTLM Code: AGR PLP2 TTLM 1219v1

LO3: Perform preventive maintenance

Instruction Sheet	Learning Guide #28

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

- cleaning tools and equipment immediately after use
- performing routine check-up and maintenance
- storing tools and equipment in designated areas

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 tools and equipment immediately after use
- perform routine check-up and maintenance
- store tools and equipment in designated areas

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described in number 3 to 7.
3. Read the information written in the “Information Sheets 1, 2 and 3 in page 3, 9 and 12 respectively”. Try to understand what are being discussed. Ask you teacher for assistance if you have hard time understanding them.
4. Accomplish the “Self-check 1, 2 and 3 ” in page 8, 11 and 14 respectively
5. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answers only after you finished answering all Self-checks).
6. If you earned a satisfactory evaluation proceed to “next Information Sheets”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Activity #28.
7. Submit your accomplished Self-check. This will form part of your training portfolio.

Information Sheet-1	Cleaning tools and equipment immediately after use

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

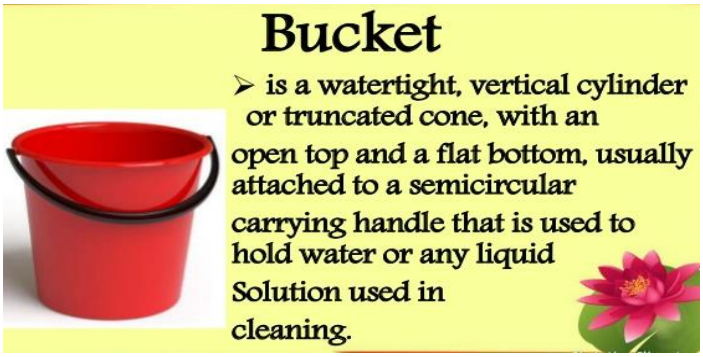
- Tools and equipment are cleaned, maintained and stored according to manufacturer specifications and supervisor instructions.
- Whenever we are going to our work area we have to take our equipment materials and tools safely.
- After completing our task, we have to replace them to their place (store)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

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

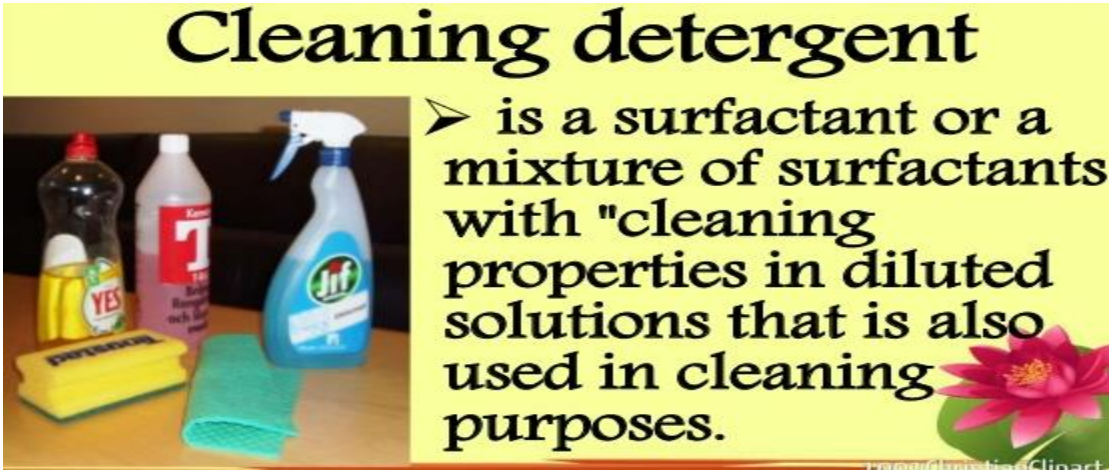
Regular cleaning and disinfection is substantially important "to keep pathogens away" from your chicken and for maintenance of good health. Special attention should be given to avoiding incursion of infectious agents from outside the farm. Similarly, adequate bio-containment plan is needed to control the spread of pathogens within the same premise. It also enforces the use of adequate method; disinfectant (chemical) or physical measures (burning/burying) to reduce the risk of contamination. The type of disinfectant, mode of application, type of material and dimension determines the outcome of disinfection. The following procedures illustrate specific matters of good farm hygiene. Clean regularly poultry premises, feeding and watering equipment and farm compound.

Use a clean water source to water chickens. Regularly test the portability of drinking water by Public health laboratory through conducting bacteriological and chemical tests with satisfactory results. Make sure your feed resource is safe from possible contamination.

Keep feed stuff dry to avoid growth of fungus and bacteria. Make sure that feed containers (sacks) are safe (new items are preferable). Avoid movement of feed containers between farms. Disinfection kills almost all bacteria, fungi, viruses, and protozoa. It reduces the number of microorganisms to make equipment and surfaces safer for use.



Cleaning is the removal of dirt and organic substances from surfaces of tools and equipment. 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.



Cleaning is the removal of foreign material (e.g., soil, and organic material) from objects and is normally accomplished using water with detergents or enzymatic products. Thorough cleaning is required before high-level disinfection and sterilization because inorganic and organic materials that remain on the surfaces of instruments interfere with the effectiveness of these processes. Cleaning is done manually in use areas without mechanical units (e.g., ultrasonic cleaners or washer-disinfectors) or for fragile or difficult-to-clean instruments.

With manual cleaning, the two essential components are friction and fluidics. Friction (e.g., rubbing/scrubbing the soiled area with a brush) is an old and dependable method. Fluidics (i.e., fluids under pressure) is used to remove soil and debris from internal channels after brushing and when the design does not allow passage of a brush through a channel. When a washer-disinfector is used, care should be taken in loading instruments: hinged instruments should be opened fully to allow adequate contact with the detergent solution; stacking of instruments in washers should be avoided; and instruments should be disassembled as much as possible.

Disinfectants are chemical substances, which kill microorganisms but should not affect human health 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

Fig 1. Cleaning and disinfecting poultry house

Advantage cleaning tools and equipment

- To prevent from rust
- To be durable and long life span to use
- To prevent our health and the environmental pollution etc.

Disinfection is the elimination of pathogens, except spores, from inanimate objects

- Disinfectants are chemical solutions used to clean inanimate objects

  (physical processes, e.g., UV radiation, may also be employed to effect disinfection)
- Germicides are chemicals that can be applied to both animate (living) and inanimate objects for the purpose of eliminating pathogens
- Antiseptics are formulated for application to living tissue

IDEAL CHEMICAL DISNIFECTANT

- **An ideal chemical antiseptic or disinfectant should have the following properties:**
- Wide spectrum of activity
- Active in the presence of organic matter
- Effective in acid as well as alkaline media
- Speedy action
- High penetrating power
- Stable
- Compatible with other antiseptics and disinfectants
- Not corrode metals
- Not cause local irritation or sensitization
- Not interfere with healing
- Not be toxic if absorbed into circulation
- Cheap and easily available
- Safe and easy to use

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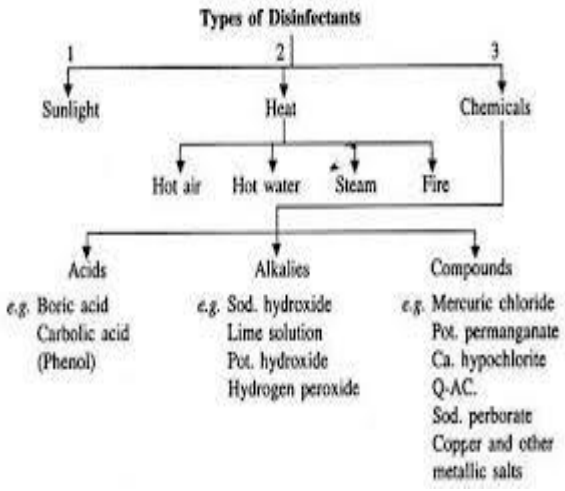
Various Agents In Sterilization

PHYSICAL AGENTS	CHEMICAL AGENTS
Sunlight	Alcohols: Ethanol, isopropyl
Drying	Aldehydes: Formaldehyde, Glutaraldehyde
Dry heat : Hot air oven, Incineration, Flaming	Dyes
Moist heat: Boiling, Pasteurization, tyndallisation, Auto claving	Halogens
Filtration	Phenolic compounds
Radiation Ionizing, Non Ionizing	Gases Ethylene oxide, Formaldehyde, beta propiolactone(BPL).
Ultrasonic vibration	Metallic salts and surface active agents

Fig 2. Cleaning hatchery house

Types of Cleaning, Disinfection and Sterilization Processes

Cleaning	Disinfection	Sterilization
Manual Cleaning with or without use of brushes, specialized tools **Automated Cleaning** Ultrasonic Medical Washers	**Low Level** Kills most vegetative bacteria, some viruses and some fungi. **Intermediate Level** Kills vegetative bacteria, viruses, fungi and mycobacterium. **High Level** Kills all microbial organisms – potential to render device sterile. **Thermal** Disinfection via thermal applications under 100°C.	**High Temperature** Moist heat/steam Dry heat **Low Temperature** Ozone **Chemical** Liquid - Steris Hydrogen peroxide **Gas** Ethylene Oxide Hydrogen peroxide (gas plasma) - Sterrad **Radiation**-Gamma, E-beam



Self-Check -1	Written Test

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

1. Define the term “Cleaning”. (4pts)
2. By what way outcome of disinfection determined? (5pts)
3. What is the first step in cleaning steps? (3pts)

Note: **Satisfactory rating - 12 points** **Unsatisfactory - below 12 points**
You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____
Rating: _____

Name: _____ Date: _____

Short Answer Questions

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

Information Sheet-2	Performing routine check-up and maintenance

Maintenance is the preservation or safeguarding of machinery, property & equipment's according to the manufacture's manual so that the service life of machineries & equipment's is prolonged and operate in environment friendly condition. Most of the implements required to carry out maintenance and repair of tools are inexpensive and simple to use. Depending on the number and types of tools on site, a set of tools for repair work should be made available on site.

Keeping and maintaining tools and other items of equipment are not only good for locating them for projects, but also helps to enhance the total image of the shop and enables the project to finish faster. Clean and repair all tools with problems tools that are beyond repair should be removed from service and replaced with new ones so appropriately clean and store equipment's. Whenever every tools 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'
- 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. First read and follow all manufacturers' guide-lines and instructions for periodic service, maintenance and inspection of equipment and systems.

A maintenance schedule should be in place to ensure that your equipment is maintained at least at intervals indicated in the manufacturer's operating instructions or more frequently if indicated by the risk assessment. Any daily checks should be undertaken as recommended by the manufacturer. This will help prevent problems such as blockages, leaks or breakdowns, which can increase risks. A maintenance schedule should be in place before going to the work to ensure that your equipment is maintained at least at intervals indicated in the manufacturer's operating instructions or more frequently if indicated by the risk assessment.

Any daily checks should be undertaken as recommended by the manufacturer. This will help prevent problems such as blockages, leaks or breakdowns, which can increase risks. The need of pre operational check is: it minimizes the occurrence of hazards on the machine or on the operator.

The importance of maintenance:

- Maintenance is important to make sure the constant production of high quality of milk.
- You can take the regular maintenance services from your service supplier.
- A regular maintenance service will reduce production losses and increase constant production.

Maintenance Procedure:

In order to maintain any given equipment's one has to know the procedures to be performed during maintenance. The maintenance process involves:-

- Identifying the main parts of machines & equipment's
- Identifying machines & equipment's which need maintenance
- Prepare tools & equipment's needed for maintenance
- Identify OHS , hazards &risks involved during maintenance
- Prepare PPE to avoid or minimize those risks

In order to carry maintenance activities accurate, timely and relevant information about the equipment's & machineries are necessary. Hence, maintenance activities are only possible if regard is given to manufacturer's manual.

Self-Check -2	Written Test

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

1. Define the term “maintenance”(3pts)
2. List importance of maintenance of tools and equipment.(4pts)
3. Write procedures in maintenance of tools and equipment. (5pts)

Note: **Satisfactory rating - 12 points** **Unsatisfactory - below 12 points**
You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____
Rating: _____

Name: _____ Date: _____

Short Answer Questions

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

Information Sheet-3	Storing tools and equipment in designated areas

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

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

Fig 3. Identifying ang storing equipment accordingly

Any storage system is compromise between the use of space and the use of time.

There are three ways of storing

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

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

Self-Check -3	Written Test

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

1. Where or in what condition/ place tools and equipment to be stored? (4pts)
2. Discuss and list three ways of storing tools and equipment. (5pts)

Note: **Satisfactory rating - 9 points** **Unsatisfactory - below 9 points**
You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____
Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____
   _____
   _____
   _____

2. _____
   _____
   _____
   _____
   _____

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