POULTRY PRODUCTION

Level -II

Learning Guide -15

Unit of Competence: Identify Poultry Production systems and activities

Module Title: Identifying Poultry Production systems and activities

LG Code: AGR PLP2 -LO1-LG-15

TTLM Code: AGR PLP2 TTLM 1219v1

LO-01: Identify poultry production systems and their requirement

Instruction Sheet	Learning Guide #15

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

- Identifying poultry production systems and requirements
- Characterizing Poultry production systems
- Identifying required materials, tools and equipment's in each production Systems
- Recommending Suitable and feasible production system
- Identifying Information regarding the availability of demanded breeds and flock size
- Co-ordinating and Monitoring poultry production systems

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 poultry production systems
- Character Poultry production systems
- Identify required materials, tools and equipment's in each production Systems
- Recommend Suitable and feasible production system
- Identify Information regarding the availability of demanded breeds and flock size
- Co-ordinate and Monitoring poultry production systems

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described in number 1 **to 7.**
3. Read the information written in the "Information Sheets 1". Try to understand what are being discussed. Ask you teacher for assistance if you have hard time understanding them.
4. Accomplish the "Self-check 1-6 **in page -4, 8,13,15,18 and 23**
5. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-check 1).
6. If you earned a satisfactory evaluation proceed to "Information Sheet 2". However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Activity #1.
7. Submit your accomplished Self-check. This will form part of your training portfolio

Information Sheet-1	Identifying poultry production systems and requirement

1.1. Poultry production systems

Definition of terms

Poultry: refers to all birds kept for the production of eggs and meat for human consumption.

Layers: chickens rose to be egg-layers

Broilers: chickens kept for meat production

Chicks: young chicken between 0-8 weeks

Hens: female chickens in their second year of lay, or after their first molt

Feedstuff: is synonymous with feed, food or fodder although it is broader, covering all materials included in the diet because of their nutritional properties. It includes natural feeds of animal origin, synthetic and other pure nutrients which are added in the natural feeds.

Feed: is a mixture of feedstuff blended/processed in a form which is acceptable to animals.

1.2. Poultry production systems

Production system is the way in which animals are kept and managed for specific purpose. In poultry production, it is broadly categorized as:

1. The extensive system
2. The semi-intensive system and
3. The intensive system

1.3. Basic requirements for poultry production

Feed

Nutrients, the chemical substances found in feed material are needed by birds in definite amount, with the quantities varying according to the kind of birds and the purpose for which

it is being fed. A deficiency in a nutrient can be a limiting factor in egg production or growth. The feed, which the chicken consumes, is composed of the following different nutrients: water, carbohydrate, fats, proteins, minerals, and vitamins. Each of the nutrients in feeds serves a particular purpose. A brief discussion of the different nutrients follows

1. Carbohydrates

Carbohydrates provide the major energy required by all animals including poultry.

- Maize
- Millet
- Sorghum
- Rice
- Root crops and starchy f
- Seeds

Fig 1. Source of carbohydrate

2. Fats

Fats are another energy sources and are highly concentrated in energy. An insufficient supply of both carbohydrates and fats results in reduced growth rate or egg production in poultry.

3. Protein

Grain and mill feeds supply approximately one half of the protein needs for most poultry rations. Additional protein is supplied from high protein concentrates.

Form the standpoint of poultry nutrition; the amino acids that make up proteins are really the essential nutrients, rather than the protein molecules itself.

In poultry nutrition, special attention needs to be given to supplying the amino acids lysine, methionine, cysteine and tryptophan. These are sometimes referred to as the critical amino acids in poultry nutrition. An amino acid deficiency always results in show growth or poor egg production.

4. Minerals

The minerals, which have been shown to be essential for chickens, are sodium, chlorine, potassium, calcium phosphorus etc.

5. Water

Poultry should have free access to clean, fresh water at all times.

6. Vitamins

In addition to the nutrients mentioned above numerous vitamins are required in relatively small amount

Poultry health management

The best fed and housed stock with the best genetic potential will not grow and produce efficiently if they become diseased or infested with parasites. Therefore good poultry health management is an important component of poultry production. Infectious disease causing agents will spread through a flock very quickly because of the high stocking densities of commercially housed poultry. For poultry health management to be effective a primary aim must be to prevent the onset of disease or parasites, to recognize at an early stage the presence of disease or parasites, and to treat all flocks that are diseased or infested with parasites as soon as possible and before they develop into a serious condition or spread to other flocks. To be able to do this it is necessary to know how to recognize that the birds are diseased, the action required for preventing or minimizing disease and how to monitor for signs that the prevention program is working.

Principles of health management

The key principles of poultry health management are:

1. Prevention of disease
2. Early recognition of disease
3. Early treatment of disease

Poultry housing system

The importance of the type of poultry housing system employed for chicken production cannot be over emphasized. It protects the birds from the harsh environmental climatic conditions, which may have adverse effect on the chickens' performance and productivity. In a poultry house, the overall heat generated is the sum of heat generated by the birds, the surrounding environment and biodegradation of fecal material. Thus, the type of housing system to be used is a major determinant factor in the type of management to be adopted in the poultry farm. The poultry house should be constructed based on the climatic condition of the area.

In poultry house construction, one should have to consider:

- Building orientation
- House width, length and height
- Cooling system
- Air exchange
- Space

Self-Check -1	Written Test

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

1. List out the three categories of chicken production systems (6pts)
2. What are the basic requirements for chicken production systems?(4pts)

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. -

   _____

   _____

2. _____

   _____

   _____

Information Sheet-2	Characterizing chicken production systems

2.1. Concepts of characterizing chicken production systems

Chicken characterization is the method of distinguishing each production systems based on chicken holding scale, management systems and inputs. In addition each production system has their own characteristics which differentiate them from each other. Accordingly, the three poultry production systems are discussed as listed below.

The extensive system

The extensive system of poultry production (commonly known as “free-range”) is based on the practice of allowing the chicken’s access to foraging areas outside the poultry house. It contains small flock size **(less than 100 chickens).**

This system is characterized by a low input (scavenging is almost the only source of diet), low input of veterinary services, minimal level of bio-security, high off-take rates and high levels of mortality. Here, there are little or no inputs for housing, feeding or health care. The advantage of this system is that little labor is needed and that waste food can be used efficiently. Very low costs can offset low production levels so that keeping chickens around the house can be profitable if certain improvements are made.

Figure 2. Extensive chicken production system

The semi-intensive system

Under a semi-intensive system, the birds do not have access to the outdoors as they would in a free-range system. They are however, free to move around the chicken house, and are not confined to cages. The floor of the shed is covered with absorbent material (wood

shavings, rice hulls, straw) to absorb the moisture from faeces and provide an appropriate environment for the birds. The numbers of flocks involved are relatively high which ranges between 100-1000 chicken. The chicken breed used in this system includes both local and improved breeds.

This production system is characterized by medium level of feed, water and veterinary service inputs and minimal to low bio-security. There is some control over housing, feed and health care services to the chicken. In this production systems Local, modern breeds or a mixture of the two work best.

Figure 3. Semi-intensive chicken production

The intensive system

Under the intensive system, chickens are fully confined either in houses or in cages throughout their lives. The number of chickens involved are relatively high (**more than 1000 chicken).** The chicken breed used is specialized improved breeds (layer or broiler). They should provide the expected product within that time. The chickens are totally dependent on their owners for all their requirements. Feed is controlled or given to each chicken based on their age. Modern or improved breeds work best in this production system. In general there is better management system (feeding, housing system and health care services) over the two production systems (extensive and semi-intensive).

Types of intensive systems

Intensively, chickens can be raised into three types. These are:

- Deep litter system
- Slatted floor system
- Battery cage system

Deep litter system

- Birds are fully confined (with floor space allowance of 3-4 birds/m^2 within a house, but can move around freely).
- The floor is covered with deep litter (5-10 cm deep layer)
- The fully enclosed system protects the birds from thieves and predators, and is suitable for specially selected commercial breeds of eggs or meat producing poultry (layers, breeder flocks and broilers.)

Figure 4. Chicken production using deep litter system

Slatted floor system

- Wire or wooden slatted floors are used instead of deep litter, which allow stocking rates to be increased to five birds/m^2 of floor space.
- Birds have reduced contact with feaces and are allowed some freedom of movement.

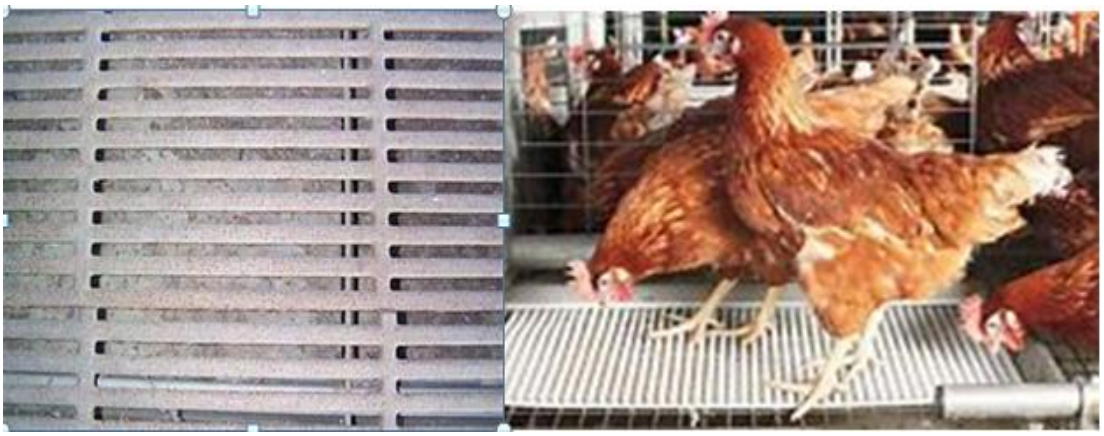

Figure 5. Chicken production using slatted floor system

Battery cage system

- This is usually used for laying birds, which are kept throughout their productive life in cages.
- There is initial high capital investment and the system is mostly confined to large scale commercial egg layer operations.
- Intensive system of rearing indigenous chickens commercially is uncommon.

Figure 6. Chicken production using battery cage system

Self-Check -2	Written Test

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

1) ---------- is the small scale chicken production system
   a) Extensive b) semi-intensive c) intensive
2) ---------- is a production systems that requires high capital investment
   a) Extensive b) semi-intensive c) intensive

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____
2. _____

Information Sheet-3	Identifying required materials, tools and equipment's in each production Systems.

3.1. Materials, tools and Equipment's and their uses for intensive chicken production system

Water equipment's

- **Pan and jar type:** This type of waterer is circular in nature, having two compartments i.e. jar for filling water and pan for delivering water.

Figure 7. Pan and jar type waterer

- **Bell type automatic waterer**: These are made of high-impact plastic in a bell shape usually suspended from separate pipeline for the purpose

Figure 8. Bell type automatic waterer

- **Manual drinker**: In case of chicks during first week of brooding, manual drinkers are popularly used

Figure 9. Manual drinker

Feeding equipment's

Feeders are equipment's used in feeding poultry birds. The food is deposited in the feeder and the birds feed from it. The amount of feeders provided for a poultry farm should be according to amount of birds available. It is important that you always keep the feeders clean to ensure the health safety of the birds.

- **Linear feeder:** is a chicken feeding equipment having a rectangular shape which usually made of Galvanized Iron

Figure 10. Linear feeder

- **Circular feeder**: These are semi-automatic feeders and can hold 5 to 7 kg feed in its cone at a time

Figure 11. Chicken circular federer

- **Automatic feeder:** These are operated with electricity and the height of the feeder can be adjusted depending upon the age of the birds.

Figure 12. Automatic chicken feeder

- **Heaters or Brooders:** The heater or brooder is equipment used in regulating and increasing the temperature of the poultry farm. These helps to keep the birds warm when the weather is cold

Figure 13. Day old chicken heater

Materials and tools

Some of poultry farm tools

- Tape measure: used for measuring
- Hammer**:**
- Spade: used to collect animal droppings and manure
- shovel: used in digging, moving soil, other granular materials, cleaning ditches, leveling base for sill rocks and steps

Some of farm materials may include:

- Overall:
- Rubber boots
- Foot bath
- Respiratory mask
- Wood shivering/grass/ teff straw
- **Dis-infectants**
  - ✓ (Alcohol)
  - ✓ Chlorine and Chlorine Compounds.
  - ✓ Formaldehyde.
  - ✓ Glutaraldehyde.
  - ✓ Hydrogen Peroxide.
  - ✓ Iodophors.
  - ✓ Ortho-phthalaldehyde (OPA).
- Different broad spectrum drugs (eg. Vita chicks, Oxy-tetracycline,etc)

Other Poultry Farming Equipment's and their Uses

- **Incubator:** This is an instrument used in hatching eggs. Egg hatchery with an incubator can be described as a means of hatching of eggs in an unnatural way. These means can be employed when there are many eggs to be hatched.
- **Chick box:** The chick box is equipment where the poultry birds are kept for egg laying. It has a roll away egg tray attached to it so that when eggs are layed, they roll away and the birds will not trample on the eggs. This particular equipment help in preventing egg damage

- **Fly Tray:** Fly trap is an equipment's used in controlling the number of flies around a poultry farm. It helps to poultry farmer reduce the number of flies in the poultry
- **Egg Tray:** This is equipment's used in setting the eggs. Just like the name, it is tray-like equipment where the eggs are place for sampling.
- **Poultry Incubator Controller:** Poultry incubator controller is equipment used for controlling the incubator and timer counter. It displays the temperature and humidity condition of the incubator
- **Ventilation Fan:** The ventilation fan is equipment used for ensuring maximum ventilation in the poultry farm. It is also equipment used in reducing the temperature of the poultry farm during a hot weather.
- **Laying Nest:** Laying nest is equipment that helps the birds for laying of eggs. One of the advantages of this equipment is that it increases the egg productivity of the poultry birds
- **Egg Scale:** This is equipment used in weighing the weight of the eggs. It helps the poultry farmer know the eggs that are fertile enough for hatchery because it is assumed that an underweight egg does not have what it take to form a chick.
- **Egg Washer:** Egg washer is equipment that makes use of a powder called the egg washing powder. Water is added into the egg washer and then the egg washing powder is added also. It is used for washing the eggs before delivery.

3.2. Materials, tools and Equipment's and their uses for semi-intensive chicken production system

Under this production system, the most important materials, tools and equipment may include:

- **Federer** it may include both rectangular and rounded federer

Figure 14. Chicken federer

- **Waterer:** it may include both automatic and manual waterer

Figure 15. Chicken waterer

- **Laying nest**

Figure 16. Laying nest

3.3. Materials, tools and Equipment's and their uses for extensive chicken production system

Under this production, the chickens are kept free-range for part or all of their **production** cycle. Thus, there are no materials, tools and equipment's used under this production systems. The chickens search for feeds, water and shelter by themselves.

Self-Check -3	Written Test

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

1. List out the materials, tools and equipments required for the three categories of chicken production systems separately with their function (10pts).

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____

_____

_____

Information Sheet-4	Recommending suitable and feasible production system

4.1. Feasibility and suitability production system

Suitable and feasible production system that is helpful to achieve pre-determined farm objective and in line with environmental legislations is recommended. Which management system is more appropriate to local and improved or both breed as to run the production successfully and make it profitable? Based on this question you should plan the most applicable production system during running the operations. The suitability and feasibility of the three production systems are discussed below.

4.1.1. Extensive chicken production system

This system is most suitable if you have a lot of space, preferably covered with grass. At night, the chickens can be kept in any kind of shelter which should be as roomy, airy and clean as possible. Disease concerns increase when birds have access to the outdoors and interact with wild birds. The poultry can encounter more predators (including theft by neighbors). In this system local breed works best.

4.1.2. Semi- intensive chicken production system

This type of chicken production system is better is partially supplemented with inputs like supplemental feed, vaccine, etc. In this production systems Local, modern breeds or a mixture of the two work best. The house must be accommodating laying nest and feeders which serves as chicken house for night time. The house should have one or two side open door for easy movement of the chicken to the fenced area during the day time. The fence can be made from mesh wire or other materials and will not allow the chicken to escape above on it. The fenced area should be always clean and dry. The feed the chickens obtain from the scavenging is very low, they should be supplemented with energy and protein feeds.

4.1.3. Intensive chicken production system

This system requires high management systems (feeding, housing and health care services) with more inputs (feeds and feeding, breed, health, housing and other inputs) than the above two chicken production systems. It is market oriented and should provide

the expected product within that time. In this production systems improved breeds (layer or broiler) works best. They should provide the expected product within that time.

Self-Check -4	Written Test

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

1. Describe the breeds that works best in the three production systems separately (10pts)

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____
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Information Sheet-5	Identifying demanding chicken breeds

5.1. Concepts on chicken breeds

There are numerous chicken breeds available around the world with a wide variety of color, size, feathers, comb and body shape. So, it's very important to learn about how to identify chickens from those different breeds. All chicken breeds have some special characteristics and nature which can help you identifying them. But for positive identification you will need some knowledge about chicken breeds, images, charts or other ways of distinguishing them from various breeds of similar colors, size and types. Gender, color, raising purpose and some other characteristics can also be helpful for identifying specific breed from a wide variety of available breeds.

Purpose of keeping poultry:

- ✓ Meat type
- ✓ Egg type and
- ✓ Dual purpose
- ✓ Exhibition type

How to Identify Chickens?

There are parameters to identify and select the demanding chicken breeds for the required purpose (for meat, egg, dual purpose and exhibition type). The common ways of identifying chicken breeds are listed as below.

1. **Body Shape**

Generally meat producing breeds (broilers) have heavy bodies and large bones so that it can support their weight. On the other hand egg producing breeds (layer) have typically smaller bodies. Small sized body helps them to put all of their resources into egg production. General or dual purpose chicken breeds are lighter than meat producing breeds and slightly larger than layer breeds. So, you can identify chickens by their body shape.

2. **Comb & Wattles**

Different chicken breeds have different combs and wattles. Combs and wattles have a great importance for identifying chickens breed. With some breeds of chicken combs and wattles are almost entirely associated.

3. **Size**

Different sized chicken breeds can be seen around the globe. They can be both large sized and small size. Bovine chickens are large chicken breed and local breeds are small sized chicken breed.

4. **Feathers**

Every chicken breed has special types of feathers. Feathers of chickens provide a lot of information about their breed and origin. Chickens can have both loose-fitting and close-lying feathers. But it depends on their purpose and the environment form where their ancestors came from.

5. **Shanks**

We can get valuable information about a chicken breed by their leg shanks color. Most of the chicken breeds have yellow shanks.. Some chicken breed also have hair on their shanks that provide a clue for identifying them. Cochin is such a chicken breed which has feathers on their legs but some are not.

Self-Check -5	Written Test

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

1. What are the common ways of identifying chicken breeds (10pts)

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____
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   _____
   _____
   _____
   _____
   _____

Information Sheet-6	Coordinating and Monitoring poultry production systems

6.1. Coordinating and Monitoring

Achieving good chicken, barn and health are attained through coordinating and monitoring of daily operational excellence and attention to detail. A combination of quality nutrition, veterinary guidance, and increased consideration of barn and chicken management will help to ensure chickens have the best possible chance to perform at their maximum potential.

Some critical focus areas needs to be coordinated and monitored in poultry production systems are as follows:

1. **Biosecurity:**

- Well-defined biosecurity practices throughout broiler production (pre-, during and post placement) are crucial to successful poultry production.
- Effective biosecurity can aid hygiene, vermin and insect control on-farm and help to limit disease transmission within and between barns.

2. **Pre-placement preparation**

- Pre-placement preparation is needed before the new flock arrives to help prevent losses during brooding and the rest of grow out.
- Checkpoints to keep in mind: heaters, floor temperature, temperature and relative humidity probes, ventilation, drinkers, feeders, etc.

3. **Brooding management**

- With today's improved genetic capabilities and the fast growth of birds, more time is being spent during the critical brooding phase. As a result, ensuring a good start in poultry production can have a significant impact on the future health and performance of the birds.

4. **Litter management**

- The litter in a poultry house acts as bedding for the birds. In addition to standing and resting on the bedding, birds will naturally peck at the litter. Litter condition and quality have an impact on broiler intestinal health and profitability, starting from when the chicks are placed all the way through production.

5. **Water management**

- Drinking water accounts for 70–80 percent of the bird's daily drinking needs. Poultry will generally consume more water than feed. As a result, water is the most critical nutrient for poultry. An abundance of clean water will reduce challenges and maximize performance.

6. **Feed management**

- Birds must have easy access to feed. Proper feeder line height corresponding to the height of the birds helps to reduce feed wastage and mixing feed with litter, and it ensures that all birds have access to feed. Adequate feed access is also achieved by following the feed line manufacturer's recommendations for the number of birds per feed pan or line of trough feeder.
- Birds will naturally peck at litter but avoiding "out-of-feed" events helps to reduce the potential for birds to peck excessively at the litter. Simple measures like activating trigger feed pans and monitoring feed bin levels during barn checks can help to prevent such events.
- Good feed quality that avoids contaminants like mycotoxins is important to ensure performance.

7. **Stocking density**

- A higher stocking density of poultry in addition to crowded housing conditions has been shown to have a negative impact on performance, causing stress to the birds
- Lowering stocking density throughout the overall production of the birds may help to reduce challenges.

8. **Environmental management**

- General environmental management of the barn includes many components, such as temperature, relative humidity, ventilation and lighting.

9. **Keeping an eye on equipment**

- Walking the barns routinely will also help to ensure equipment remains in working order

10. **Mortality checks**: Cull diseased birds as early as possible.

6.2. Monitoring during times of transition

- Increasing the frequency at which barns are walked and examining the activity of the flock can help with early disease detection.

- Daily monitoring of temperature, humidity and ventilation inside the barn as well as outside temperature is recommended.
- Monitoring transition times can help with understanding what is happening in the barn (e.g., from day to night, when birds are placed, during half-house brooding, feed changes, etc.).
- Monitoring feed and water consumption helps to monitor the flocks' progress

6.3. Communication and provide feedback to staff and management

Based on the monitoring results, the workers should have to communicate and discuss as to:

- Ensuring strong communication and coordination between all those involved in helping your farm run smoothly will ensure a stronger and more successful gut health management program for your birds.
- Feedback is provided to staff and management on request, or as necessary in accordance with established industry standards.

Feedback is given to each worker either orally or in written form.

Feedback includes:

- Regular staff discussion in groups,
- Reviews of performance with each staff member,
- Management encouraging comment on their own performance,
- Clearly defining responsibilities for each position,
- notices,
- Providing information on unit performance - good and bad.

6.4. Allocate work optimises resources

While doing any work related with intensive poultry production system we have to allocate the necessary resources which are proper and suitable to undertake the general work activities. It is usually done within routines, methods and procedures where some discretion and judgment is required in the selection of equipment and materials, organization of work, services, and actions to achieve outcomes within time and budgetary constraints should be properly allocated. The resource which has to be allocated is used to achieve the work. Some of the resources are, materials, tools and equipments, financials, labors, machinery, personal protective equipments, etc, have to be allocated so as to run the work properly

Self-Check -6	Written Test

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

1. What are the activities should be coordinated and monitored in chicken production systems (10pts)

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____

_____

_____

_____

_____

Operation Sheet 1	Preparing for Bird Arrival or Pre-placement preparation

Preparing for chicken arrival or pre-placement preparation

Step 1- Remove all old litter.

Step 2- Clean the house

Step 3- Disinfect house and equipment using an approved disinfectant.

Step 3- Fumigate if possible

Step 4- Let house lie empty and air out for two weeks

Step 5- Place about four inches of clean, dry litter such as pine shavings or sawdust

Step 6- Use chick guards to keep birds close to heat, feed and water.

Step 7- Bring house up to brooding temperature one day before delivery.

Step 8- Fill waterer 4 hours before arrival.

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. Remove old litter from poultry house and preparing for chicken arrival

List of Reference Materials

FAO, (2015). Advanced livestock and poultry production
http://www.fao.org/docrep/008/y5169e/y5169e00.htm

Hy-line international welfare goals and principles guide line 2018
www.Hyline.com

Agromisa (2003). Chicken farming in the tropics 2: lecture notes. (ed. E.H. Ketelaars) Educational material no. 33. ISBN 90-5285-060-7.

POULTRY PRODUCTION

Level -II

Learning Guide -16

Unit of Competence: Identify Poultry Production systems and activities

Module Title: Identifying Poultry Production systems and activities

LG Code: AGR PLP2 M05-LO2-LG-16

TTLM Code: AGR PLP2 TTLM 1219v1

LO-02: Identify and select poultry breed

Instruction Sheet	Learning Guide #16

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

- Identifying and characterizing common poultry breeds
- Identifying and deciding criteria for selection
- Identifying egg laying hens
- Classifying fertile and non-fertile eggs
- Identifying production purpose
- Selecting appropriate breeds based on the criteria

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 and characterize common poultry breeds
- Identify and decide criteria for selection
- Identify egg laying hens
- Classify fertile and non-fertile eggs
- Identify production purpose
- Select appropriate breeds based on the criteria

Learning Instructions:

Read the specific objectives of this Learning Guide.

1. Follow the instructions described in number 1-6.
2. Read the information written in the “Information Sheets 1”. Try to understand what are being discussed. Ask you teacher for assistance if you have hard time understanding them.
3. Accomplish the “Self-check 1 and 2” **in page -29 & 33**
4. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-check 1).
5. If you earned a satisfactory evaluation proceed to “Information Sheet 2”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Activity #1.
6. Submit your accomplished Self-check. This will form part of your training portfolio.

Information Sheet-1	Identifying and characterizing common poultry breeds

1.1. Concepts of characterizing common poultry breeds

There are hundreds of highly productive poultry breeds available around the world in general and Ethiopia in particular. Some of them are very famous for egg production, some are popular for meat production and some breeds are famous and popular for both meat and egg production. However, majority or all of the household farmers found in the country are not well informed the productive chicken breed specifically for egg, meat, dual purpose chicken breed and for game and ornamental purpose. These chicken breed may be indigenous breed or improved breed. Therefore, to be successful and profitable, identifying and selecting the productive breed for required purpose is the key. Accordingly, the common productive poultry breed are described the name and characteristics of some productive poultry breeds below.

Improved poultry breeds

1. **Rod Island Red**

- These chooks normally have hard rust colored feathers, but may be darker or almost black.
- The Rhode Island Red is an American breed of domestic chicken
- Rhode Island Reds are large: roosters weigh in at around 8.5 lb (3.8 kg), the hens 6.5 lb. (3 kg)
- They are generally good pets to keep. However sometimes hens, can be quite aggressive.
- They are a tough utility bird, **raised for meat and eggs**. Indeed they are among the best laying types of chickens with good feeding their egg production is excellent, being from **250 to 300 large**, light brown eggs a year. They are moderately early maturing. Rhode Island Reds are also used for creating many modern hybrid types of chickens. However, their large comb makes them susceptible to frost bite. They remain productive with good management.

Figure 1. RIR chicken

2. **White leghorn**

- Most Leghorn chickens have single combs but there are several color varieties that have rose combs.
- Recognized colors are white, red, black tailed red, light brown, dark brown, black, blue, buff, Columbian, buff Columbian, barred, exchequer and silver.
- The Leghorn breed was developed in Livorno, Italy
- Leghorns mature into smallish chooks, weighing from 3 lbs (1.4kg) to 4 lbs (1.8kg)
- Leghorns are nervous types of chickens around humans and can fly, making them less popular as a homestead breed.

- Uses of the Leghorn Chickens
- Leghorns are **fantastic egg producers**, laying around 280 white eggs a year. They are the world's top breed behind commercial egg producing lines. The leghorn breeds are most selective breed in poultry industry and they are white in colour

Figure 2. Leghorn chicken

3. **Cocckhok**
   - This chicken breed honestly doesn't have amazing annual production
   - Average egg production of this chicken ranges between 160-180 eggs per year.
   - They are large breed; they can make decent birds for meat
   - They have a mixture of black and red or white and black color
   - They consume more feed and Slow growth rate
   - They are not good egg layer
4. **Bovine chickens**

   They are a superior chicken breed. The Bovines Brown and white are a highly versatile and tough bird. Combined traits include high peak production, great laying persistency, and a flat egg weight curve, resulting in top quality dark brown (bovine brown) and white eggs(bovine white) . The Bovines Brown and white have excellent feed intake capacity and robustness so that it fully expresses genetic potential in multi-age and free range environments. This is an attractive looking bird that maintains great feather cover. The Bovines Brown and white are an ideal bird for the commercial egg producer looking for overall solid performance. The can laid 300-330 eggs per year per hen.

5. **ISA brown**
   - Is Improve breed
   - Isa brown is prolific egg layers. Mostly used in commercial layer farming purpose to produce large size brown color eggs.
   - They lay more than 300 eggs in a year by a single hen. The weight of the single egg is 60 g.
   - Meat production: It is light in weight the meat production is quite less
6. **Sussex Chickens**

   - The most famous Sussex chooks are the Light Sussex. These are very distinctive types of chickens having a white body with a black tail and black wing tips, neck being white striped over with black. Other colors include Brown, Buff, Light, Red, Speckled, Silver, White and Coronation.
   - The Sussex chicken was created over a century ago in the county of Sussex, England.

- Cocks should weigh approximately 9lbs (4.0 kg), and the hens (females) 7lbs (3.2 kg)
- The Sussex chicken is an alert, docile breed that can adapt to any surrounding, comfortable in both free range and confined spaces

- Sussex is dual purpose
- Types of chickens that are good foragers, and understandably

Local breeds:

The general characteristics of the indigenous chicken breeds of Ethiopia are summarized as follows:

- Non-descriptive breeds closely related to the Jungle fowl.
- They vary in color, comb type, body conformation
- Vary in weight and may or may not possess shank feathers.
- Broodiness (maternal instinct) is pronounced.
- Slow growth
- Late maturity
- Relatively resistant to disease than exotic breeds
- Low egg production,
- Small sized eggs
- Low survivability of chicks
- Low feed utilization efficiency

Some of the Ethiopian indigenous chicken ecotypes

1. **Farta indigenous chicken breed**
   - Found in the Amhara regional state in northern Ethiopia.
   - They are maintained under scavenging regimens with occasional supplementation and sheltered in the family house.
   - The chickens have predominantly white body plumage that occurs at similar frequency in both sexes.

Fig. 3. Leghorn chicken

- Wheaten strips on a black background are the typical plumage colors in males but are not observed in females. The other peculiar feature in males is a black breast which is almost absent in females

2. Horo indigenous chicken breed

- Found in Horo Guduru Wollega Zone,
- Improved local chicken breed
- Horo is good for meat and eggs
- capable of hatching 180 eggs per year
- High-production under low-input systems
- Medium sized chicken

Figure 3: Horo local chicken

3. Sheka indigenous chicken breed

- Egg production potential of local chicken is 30 to 60 eggs/year/hen
- They are not good layer, but good for meat production
- They are medium sized chicken
- The chickens are disease resistant and
- productive under low-input systems

Figure 5: sheka local chicken

4. **Mandura indigenous chicken breed** :

- Found in the Benshangul Gumuz regional state in northwest Ethiopia
- They are reared by mixed communities of Amhara, Gumuz and Agaw
- Brown is the most predominant plumage in the population followed by red, white and white or grayish strips on brown or reddish background

Fig. 6: sheka chicken

- Complete red is typical of males' plumage but absent in females.

5. Konso indigenous chicken breed

Found in the Southern Nations, Nationalities and Peoples Regional State in south Ethiopia. Most of the cocks have different color: red body plumage, brown, zigrima and black are the prominent plumage colors in hens. Few hens have naked necks.

Figure 7: sheka local chicken

Self-Check -1	Written Test

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

1. _____ is the indigenous chicken breed of Ethiopia

   a) Horo b) Bovine brown c) RIR d) all

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____

Information Sheet-2	Identifying and deciding criteria for selection

2.1. Identify egg laying hens

There are some common criteria that are used to identify and select good layer or hens. These are:

1. **Looking wattle**

Figure 8. Layer identification by their wattle

2. **Vent shape**

Figure 9. Layer identification by their vent

3. Shank color

Figure 10. Layer identification by their shank color

4. **Toes color**

Figure 11. Layer identification by their toes color

5. **Measure how many fingers fit between the pubic bones**

If you can't fit 3 fingers or more then she is not good laying

Good layer

Poor layer

Figure 12. Identification layer by measuring pubic bones

2.2. Classifying fertile and non-fertile eggs

Candling: refers to the passing of light through the egg in a dark room so that the interior can be seen to detect infertility and dead embryos. When eggs are tested through candling three groups of eggs can be identified as:

- Infertile egg or clears: These eggs appear completely clear
- Dead embryos: If the embryo is dead the blood settles away from the embryo towards the edge of the yolk forming in some cases an irregular circle of blood known as blood ring. The air cell in eggs with a dead embryo will be ill defined (not clear). Such eggs should be disposed off
- Live embryo: A live embryo at this stage will fill most of the egg, apart from the air cell, which is large and clear. Such eggs are transferred to the hatching compartment

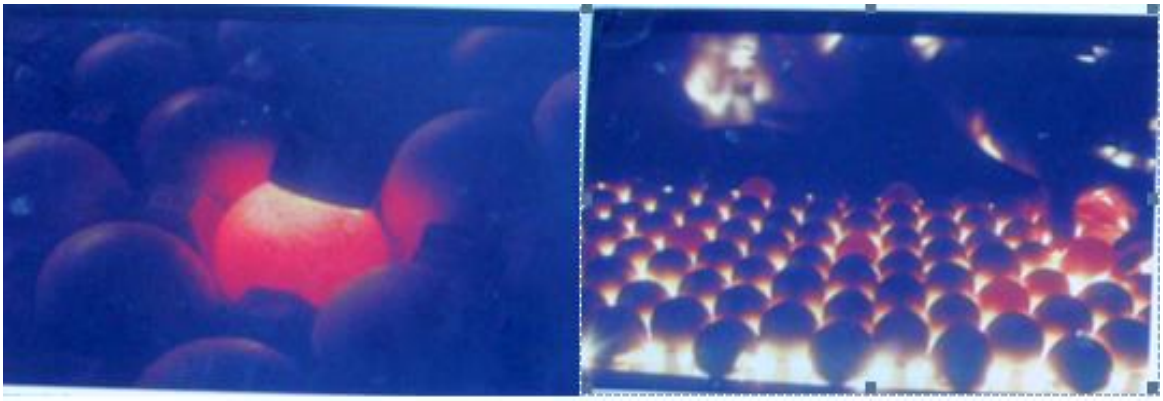

Figure 13. Egg candling

Self-Check -2	Written Test

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

1) What are the criteria used for identifying good layer hen? (15pts)

Note: **Satisfactory rating - 11 points** **Unsatisfactory - below 11 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____
   _____
   _____
   _____
   _____
   _____

Operation Sheet 2	Identify laying hens

Identify laying hens

Step 1- Wear appropriate workplace PPE

Step 2- Use footbath

Step 3- Enter the chicken house

Step 4- Catch the hen

Step 5- check the wattle, vent shape, shank color, under foot color and measure pubic bones by your finger

Step 6- judge and identify whether the hen is good or bad layer

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. Identify the poor and good layer following its procedures

List of Reference Materials

FAO, (2015). Advanced livestock and poultry production

Dawit Alemu, Tamirat Degefe and Setotaw Tefera (2010). Overview and background paper on Ethiopia's poultry sector: Relevance for HPAI research in Ethiopia. Ethiopian Institute of Agricultural Research. Devesh Roy International Food Policy Research Institute.

POULTRY PRODUCTION

Level -II

Learning Guide -17

Unit of Competence: Identify Poultry Production systems and activities

Module Title: Identifying Poultry Production systems and activities

LG Code: AGR PLP2 M05-LO3-LG-17

TTLM Code: AGR PLP2 TTLM 1219v1

LO-03: Identify poultry house and facility requirements

Instruction Sheet	Learning Guide #17

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

- Identifying required poultry house construction
- Selecting appropriate site for poultry house establishment
- Determining space required for different poultry class
- Planning farm layout and chicken houses
- Identifying and obtaining internal environment 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 –**

- Identify required poultry house construction
- Select appropriate site for poultry house establishment
- Determine space required for different poultry class
- Plan farm layout and chicken houses
- Identify and obtain internal environment requirements

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described in number 1-6.
3. Read the information written in the “Information Sheets 1”. Try to understand what are being discussed. Ask you teacher for assistance if you have hard time understanding them.
4. Accomplish the “Self-check1-5 ” **in page -40,42, 44, 47 and 50**
5. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-check 1).
6. If you earned a satisfactory evaluation proceed to “Information Sheet 2”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Activity #1.
7. Submit your accomplished Self-check. This will form part of your training portfolio.

Information Sheet-1	Identifying required poultry house construction

1.1. Idandifying requirements for poultry house construction

Poultry house is the structure/building that protects birds from external harsh environments and provides them with suitable situation for their health and productivity

Poultry production systems should provide fresh air, clean feed and water, protection against predators, shelter from cold, rain, wind, sun and excessive heat; as well as a source of heat when birds are young. Basically, the birds need a good house to be able to grow, sleep, and lay eggs in comfort, free from stress and disease.

A properly constructed poultry house, regardless of its size and the materials used, has certain essential features. The basic requirements for poultry housing are:

- ✓ A watertight roof
- ✓ Proper ventilation
- ✓ Inner surfaces which are easy to clean
- ✓ Protect rat and wild bird
- ✓ A clean environment
- ✓ proof floor, walls and roof
- ✓ Correct location

The following point should be considered during poultry house construction.

Location against wind direction: The house should be placed at the back faces the direction from which wind and storms usually come, and so that it receives as much sunshine as possible.

Orientation of poultry house: The poultry house should face south or east in most localities. A southern exposure permits more sunlight in the house than any of the other possible exposures. An eastern exposure is almost as good as a southern one; birds prefer morning sunlight to that of the afternoon. The birds are more active in the morning and will spent more time in the sunlight.

Adequate space according to the number of poultry: The size of poultry house depends on the number of fowls, and on whether they are to remain indoors all day, or are allowed to roam about and are shut up at night only. The measurement varies according to the

production purpose, growth stage of the poultry. The main aim should be to provide a type of house that has plenty of space.

Need for specifying foundation, well- drained area and good drainage system: The ground should be dry, well drained (i.e. provide with ditches or pipes for carrying way a rain water) and fairly level if possible the poultry house should be placed on a sloping hillside rather than a hill top or in the bottom of valley. A slopping hillside provides good drainage

Adequate aeration: Ventilation in the poultry house is necessary to provide the birds with fresh air and to carry off moisture. Since the fowl is a small animal with a rapid metabolism, its air requirements per unit of body are light in comparison with other animals. So the presence of fresh air around the site should be preferred.

Adequate light: Day light in the house is desirable for the comfort of birds. Sunlight in the house is desirable not only because of the destruction of disease and for supplying vitamin-D but also makes poultry happy.

Self-Check -1	Written Test

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

1. What are the basic requirements for poultry housing?

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1.

_____

_____

_____

Information sheet 2	Selecting appropriate site for poultry house establishment

2.1. Site selection

If one is seriously considering the establishment of a special poultry business, it will be well for him to study the various sections of the different site in order to determine just which offers best opportunities for poultry rising. Sometimes there is no choice, but if there is a choice features for a good location are:

- ✓ Well drained land, this is especially important where litter systems are used.
- ✓ Within sight of owner / supervising personnel.
- ✓ Away from other chicken houses to reduce the spread of diseases, generally the more the distance the better.
- ✓ Noisy areas should be avoided.
- ✓ Especially in hot climates, having tall trees which cast shade on the roof is an advantage however; the natural air flow (wind) should not be hindered.
- ✓ No direct sunshine entering the house, placing the house in an east-west direction is best.
- ✓ Residential areas should be considered.
- ✓ The most desirable temperature for a poultry house is 11 to 26 ^{o}C in tropics. The use of insulation with straw pack or other materials can keep house warmer during cold time & cooler during the hot time.
- ✓ The house site should be near to feed sources especially green feeds. Farm site with enough space for green feed establishment is preferable.
- ✓ The house should be near for veterinary service.
- ✓ The site must have adequate and clean water supply to satisfy the needs of entire flock or should be near a water source & the water have no disease causing germ, bacteria & poison.
- ✓ Identifying the presence or the absence of predators around the area is essential to protect the bird from risk.
- ✓ The site should be closer to the market and there must high market accessibility.
- ✓ Year round road access is necessary to transport the inputs and the outputs easily

Self-Check -2	Written Test

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

1. What are the important parameters used for site selection for establishing chichen house?

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Question

1. _____
   _____
   _____
   _____
   _

Information sheet 3	Determining space required for different poultry class

3.1. Space requirement

Floor space requirements for free-run, indoor systems vary considerably depending on breed, ambient temperature and whether any or the entire floor consists of wire or wooden slats. In general, the most space is required in systems with 100% litter floors, and the least where the floor is entirely wire or slats. Producers should interpolate between the extremes in the following table based on individual circumstances.

This is the most important basic principle in housing, as the space available determines the number and type of poultry that can be kept. Linear space or length of perch per bird is measured in centimetre. The recommended floor and perching space for the three main types of chicken is shown in below

Chicken type	Floor space (birds/m^2)	Perch Space (per bird)
Layer	3	25cm
Dual purpose	4	20cm
Meat	4-5	15-20cm

Hen groups are comfortable at a stock density of three to four birds per square meter. If more space is allowed, a greater variety of behavior can be expressed. Less space creates stressed social behavior, allowing disease vulnerability and cannibalism and leaving weaker birds deprived of feed or perch space. Individual birds need more room for normal behavior and adequate exercise than the 22 birds/m2 density currently used in commercial laying cages.

Feed and feeder space requirements for chickens

Age (weeks)	Feeder space (m)
1-4	2.5
4-6	3.8
6-9	6.1
10-14	9.6
15 and above	12.7

Minimum water and watering space requirements for in hot dry conditions

Age (weeks)	Water space (m)
0-1	0.7
2-4	1
4-9	1.5
9 or more	2.0
Layer	2.5

Nests

To avoid excessive competition and minimize eggs laid on the floor, one nest should be provided for every five hens. If larger communal nests are used, at least one square meter per 50 birds should be allowed. Nest boxes for individual hens should measure approximately 30 cm on all sides, with a nest floor area of about 0.1 $m^{2.}$

Self-Check -3	Written Test

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

1. Write the floor space requirement of layer, meat and dual purpose chickens?

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____
   _____
   _____
   _____
   _____

Information sheet 4	Planning farm layout and chicken houses

4.1. Design farm lay out and chickens' houses

Farm lay out and chickens' houses are designed according to farm objectives and standards

Design of poultry housing must consider production and environmental aspects such as wind, heat and cold, predator risk and also their impact on production.

The construction materials that are used should be:

- Durable (long lasting)
- Easy to handle and easy to repair if damaged
- Readily available and as cheap as possible.

The width of the house if only natural ventilation is used should not generally exceed 9m. The length depends on the number of chickens that are going to be kept and availability of building space.

The height should not be less than 2 m anywhere in order to make the house easily accessible everywhere. Moreover, it provides more volume to the house resulting in a better air quality.

The floor should be made of concrete for easy cleaning or be filled with 50cm sand. Wire netting should be placed under and around a floor made of sand in order to keep rats and other predators out.

In hot climates at least 3 sides should be open (wire netting) in order to have enough fresh air (ventilation). By means of boards or mats the sides may be temporarily and partially closed when there are young chickens in side.

The roof should protect the birds against direct sun light and rain for that reason it should extend the walls for about 50cm beyond the wall. Poultry house should have elevated ceiling to keep heat away from birds. The roof may be ridged or slope to one side. If the roof is ridged this ridge should be open to permit heat to escape.

- **Technical specifications to be considered during construction of broilers house**
  - ✓ Maximum width = 8-9m
  - ✓ Maximum length = up to 30m (it depends on the number of flock)

- ✓ Centre height = 2.5-3m at *eaves* and 4-5m at *ridge* roof is preferable in tropics.
- ✓ Over hang = 2.5-3 feet
- ✓ Width sides built /solid walls
- ✓ Length sides built wall up to 0.5m from floor and remaining covered with ¾-1inch wire nets
- ✓ Raised platform of 2.5-3feet from surrounding lands

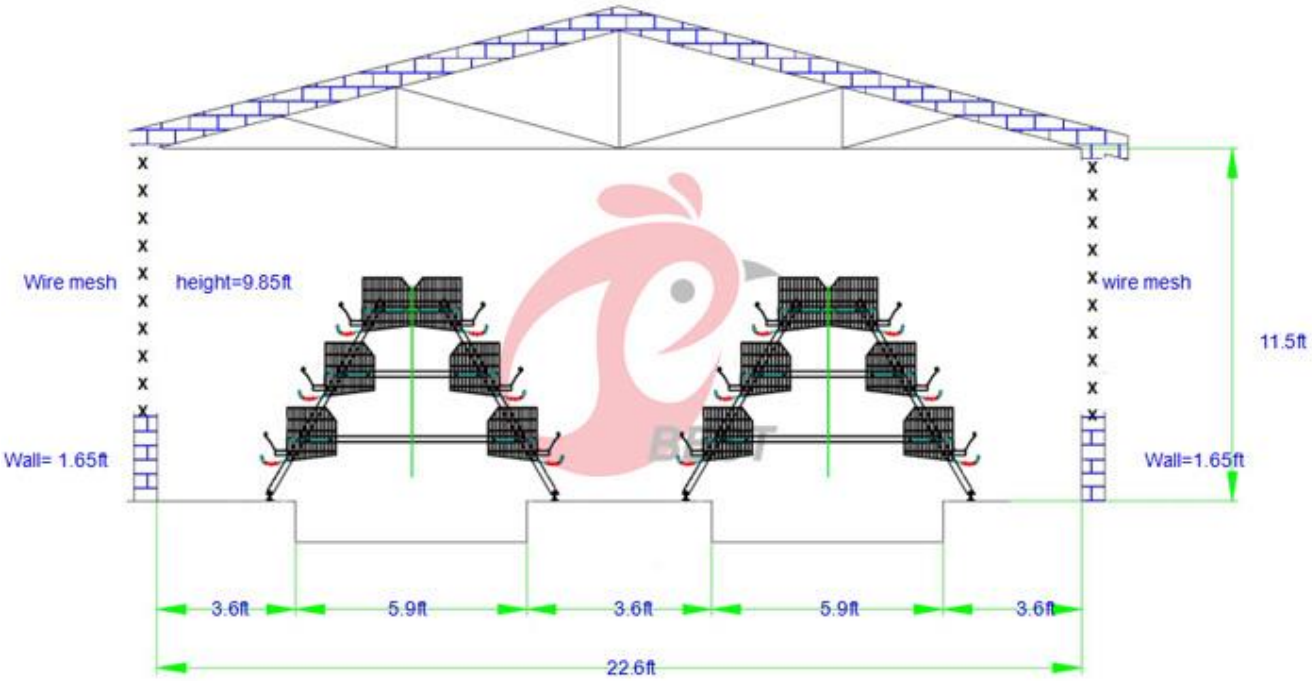

Figure: Poultry house design

Self-Check -4	Written Test

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

1. What to be the materials used for construction of poultry house?

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

1. _____

_____

_____

Information Sheet 4	Identifying and obtaining internal environment requirements

4.1. Concepts of internal factors in chicken houses

The climate in poultry houses influences the wellbeing and health of humans as well as the birds. Respiratory, digestive and behavioral disorders are more likely to occur in houses in which the climatic conditions are not up to standard. The efficiency with which feed is utilized is related to the health status of the flock. Animals that are not healthy cannot be expected to perform optimally. The younger the animals are or the higher their production level, the more sensitive they become to the climatic conditions in the house. Climate can be defined as the sum of environmental factors which influence the functioning of man and animal.

4.2. Climatic factors

The following factors must be measured at animal level.

- Temperature
- Relative humidity
- Air composition
- Air speed and air movement
- Light

4.2.1. Temperature

Layers are warm blooded (homoeothermic) i.e. within a certain range, their body temperature is quite constant. On average, the body temperature of birds is between 41°C and 42.2°C. Body temperature is kept quite constant and is regulated by part of the chicken brain (the hypophyse). This part of the brain is comparable to a thermostat. Contraction and widening of blood vessels and the speed of respiration influence heat emission and retention which consequently influence the body temperature. It takes some time before heat regulating mechanisms start functioning in newborn animals and therefore they need a higher ambient temperature than adult animals do. Furthermore, the ratio between the surface area and weight of young animals is unfavourable and they do not have any fat reserves.

Recommended temperatures for chickens

First day	32-34°C
1st week decrease	30°C
2nd week decrease	26°C
3rd week decrease	22°C
4th week decrease	20°C

4.2.2. Relative humidity

Relative humidity in poultry houses is measured to determine whether respiratory disorders are due to too high or too low relative humidity. If the relative humidity is too high, condensation can accumulate in the house. This has a direct effect on the growth of micro-organisms

4.2.3. Air movement and airspeed

Whether or not birds are comfortable is very much influenced by air velocity and air temperature. Young animals are more sensitive to these factors than older, heavier animals. Taking into consideration the recommended temperatures, the air velocity at animal level is allowed to vary between 0.1 and 0.2 m/second. If house temperatures are low, the animals experience higher air velocities as a (severe) draft which can lead to disease. A simple way of determining the (negative) effect of drafts is the ‘draft value.

Self-Check -4	Written Test

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

2. What are the internal factors in poultry housing?

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

List of Reference Materials

FAO, (2015). Advanced livestock and poultry production

Effective heating systems for poultry houses – World Poultry, Vol.22, No.2, 2005

Agromisa (2003). **Chicken farming in the tropics 1: basics**. Educational material no. 32. ISBN 90-5285-006-2.

Agromisa (2003). **Chicken farming in the tropics 2: lecture notes**. (ed. E.H. Ketelaars) Educational material no. 33. ISBN 90-5285-060-7.

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