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**ASCI**  
Agriculture Skill Council of India

# Facilitator Guide



Sector  
**ARGICULTURE AND ALLIED**

Sub-Sector  
**Poultry**

Occupation  
**Poultry Farming**

Reference ID: **AGR/Q4306,Version 1.0**  
**NSQF Level: 3**

## Small Poultry Farmer





**Shri Narendra Modi**  
Prime Minister of India

“ Skilling is building a better India.  
If we have to move India towards  
development then Skill Development  
should be our mission. ”

## About this Guide

Dear Trainer,

This Trainers Manual is intended to empower preparing for the Small Poultry Farmer Qualification Pack (QP). Every National Occupational (NOS) is spread over Unit/s. Key Learning Objectives for the NOS check the start of the Unit/s for that NOS. The images utilized as a part of this book are portrayed beneath. Small Poultry Farmer is in charge of Installation, Testing, Commissioning of Small Poultry Farmer at agriculturist's field for better water administration and increment in yield of product. The National Occupational Standards indicate the measures of execution an individual must accomplish when doing a capacity in the work environment, together with the information and comprehension they have to meet that standard reliably. These word related guidelines are appropriate both in the Indian and worldwide settings. According to these measures the Small Poultry Farmer ought not work freely, ought to be relentless and must be able to settle on operational choices relating to his range of work. The student ought to pick up clarity of work and ought to be result situated; The Trainee ought to likewise have the capacity to exhibit abilities to utilize different devices in the Small Poultry Farmer. The mentor should guide and prepare the students' in the accompanying abilities:

- **Knowledge and Understanding:** Satisfactory operational learning and comprehension to play out the required chore
- **Performance Criteria:** Pick up the required aptitudes through hands on preparing and play out the required operations inside the predetermined measures
- **Professional Skills:** Capacity to settle on operational choices relating to the zone of work

The course incorporates Trainer Guide including student handbook for the learners and coach's aide; appraisal guide; session arrangement; and syllabus for you. The course material likewise incorporates a couple of blurbs as showing helps in the classroom. The appraisal guide subtle elements the assessment system. As a mentor you will assess the learners' execution and grade them in light of the assessment parameters given in the aide. The system additionally incorporates field visit for the students where they will watch the method/operations and administrations of the Small Poultry Farmer. Chapter sare prepared to build up the expert abilities like – choices making, systematic and basic considering. We hope you will be able to impart your knowledge with our help to make this program a success and up-skill the workers to the recommended standards.

We trust you will have the capacity to confer your insight with our help to make this program a win and up-skill the workers to the suggested norms.

All the best!

## Acknowledgements

We are thankful to all organizations and individuals who have helped us in preparation of this Participant manual. We also wish to extend our gratitude to all those who reviewed the content and provided valuable inputs for improving quality, coherence and content presentation of chapters. This handbook will lead to successful roll out the skill development initiatives, helping greatly our stakeholders particularly trainees, trainers and assessors etc. We are thankful to our Subject Matter Expert **Dr. Ravi Kumar** who has given the content and helped us in preparation of Participant Handbook.

It is expected that this publication would meet the complete requirements of QP/NOS based training delivery, we welcome the suggestions from users, Industry experts and other stakeholders for any improvement in future.

## Role of the Trainer

**As a trainer, keep in mind the following guidelines:**

### **Know your job thoroughly**

The Trainer ought to first know his/her learners (the students) keeping in mind the end goal to guarantee their productive contribution in the learning procedure. Fundamentally the majority of these contemplations are guided by the reasoning of participatory preparing, which advocates that preparation, not at all like instructing, is more worried with the general improvement of the human identity.

- As a Trainer, remember the accompanying rules:
- Training is not learning
- The trainer needs to learn for himself/herself, through his/her own particular activity and movement
- The trainer can just guide the understudy movement in a way that prompts a decent learning background
- The trainer can create reasonable situations fancied to deliver a powerful learning (curricular, co-curricular and additional curricular) experience
- Trainees' response with the earth is relied upon to achieve an adjustment in conduct
- The trainer is the key component, as on him/her depends the arranging of the learning circumstance for accomplishing the sought result

### **Practice these common courtesies**

- Greet the students
- Be warm and neighborly
- Introduce yourself
- Ask their names
- Explain the reason and objectives of preparing project
- Ask their desires
- Always make inquiries
- Listen to then quietly and answer their inquiries
- In case you can't react to an inquiry say that you will hit them up
- Respect the students
- Do not hang over them, their work, or get in their work-space
- Do not take their work or move it without requesting their consent
- Be a decent onlooker
- Offer rededication for weaker students Correct the flawed practices of learners at work before they transform into propensities
- Do not condemn
- Show gratefulness where it is expected
- Always say 'please', 'thank you', and "too bad"
- Be a tutor

### Responsibilities

- The trainer has a unique position and assumes a few parts. He/she is a go between the student and administration.
- The trainer has moral and lawful duties and guarantees the expert advancement as well as the prosperity of the young. You need to counteract:
  - Discrimination as a result of sexual orientation, race or nationality or some other kind
  - Bullying and/or lewd behavior
  - Abuse of liquor, prescription or whatever other substance
  - Physical threats through mischance, air contamination, commotion or risky chemicals
  - Overstepping the student's physical limit
- You likewise need to secure that time directions or other lawful controls are not infringing– neither by you nor by the disciple.

### Symbols Used



Steps



Time



Tips



Notes



Objectives



Do



Ask



Explain



Elaborate



Field Visit



Practical



Lab



Demonstrate



Exercise



Team Activity



Facilitation Notes



Learning Outcomes



Say



Resources



Activity



Summary



Role Play



Example

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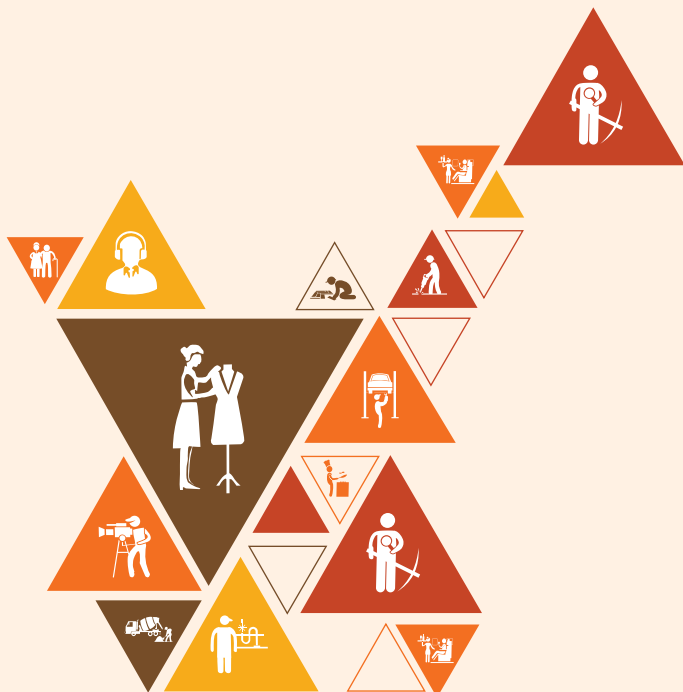
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# 1. Introduction

Unit 1.1 – Brief Outline About Small Poultry Farmer



## Key Learning Outcomes

**At the end of the session the participants will be able to:**

- Know scientific operation and usefulness in utilizing different varieties and strains for small-scale poultry production
- This chapter says technical information for the farming system, different breeds, varieties and strains suitable for small-scale poultry holders

## UNIT 1.1: Brief Outline About Small Poultry Farmer

### Unit Objectives

**After completing this session the trainees will be able to**

- Know scientific operation and usefulness in utilizing different varieties and strains for small-scale poultry production
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### Say

#### • Introduction about small poultry holders

- These groups of farmers practice extensive, semi-intensive, and intensive rearing which help them to address the issues of food security and also enable demand based production for marketing
- Size of flocks may vary from a few hundreds to few thousands in clusters
- This farming system requires some minimal infrastructure like poultry sheds and equipment, intensive training of farmers in chick rearing, health care, inputs like balanced feed and good quality stocks of both improved Desi and commercial variety along with micro-credit for produce collection & marketing
- Self Help Groups/ Cooperative set up for facilitating inputs acquisition and marketing helps this sub sector to become economically viable.
- Trained Poultry skilled Workers are required in this section to disseminate services like basic health coverage and skills

#### Size of the flock

1. Small-scale poultry holders (300 - 3000 birds)
2. Medium-scale poultry holders (10000 – 50000 birds)
3. Large-scale poultry holders (50000 – 400000 birds)

### Outline Breeds suitable for small scale poultry holders

1. **Indigenous birds** - Aseel, Ankaleshwar, Buser, Brown desi, Chatting (Malay), Daothigir, Denki, Frizzle, Phages, Haringhata, Kalasthi, Faverolla, Punjab Brown, Tellicherry, Titni, Teni, Nicobari
2. **Improved Desi birds** – Vanaraja, Giriraja, Nandanam chicken varieties, Gramapriya
3. **Commercial strains** - Cobb, Ross, Lohmann, etc.

### Indigenous birds for small-scale poultry holders

#### Aseel

- The Aseel has broad, prominent shoulders, wide hips; narrow stern, but "thick and strong in hand at root of tail," this latter being a great indication of strength; full, broad, heavily fleshed breast; thick and muscular thighs.
- **Standard Weights:** Cock – 4 to 5 kg; Hen – 3 to 4 k; cockerels 3.5 to 4.5 kg; pullets – 2.5 to .5 kg
- Annual egg production - 90

#### Kadaknath

- Better adaptability and good-tasting black meat
- Protein content in kadaknath is higher than 25% in an ordinary bird it varies between 18-20%.
- Research has shown that this species has lower cholesterol (0.73-1.05%) than white chicken (13-25%)
- Medium layer; 80 eggs per year

#### Tellicherry

- The weights of males and females of Tellichery chicken – 1.7 and 1.4 kg
- Eggs are tinted
- Annual egg production: 60-80
- Average egg weight: 40 gms
- Native of kerala

**Punjab brown**

- Body weight of cock - 2 kg and hen - 1.5 kg
- Annual egg production – 60 to 80
- Dual purpose breed
- Punjab brown rearing is familiar in Punjab region

**Nicobari**

- Suitable for egg production
- Annual egg production - 150 to 160
- Comparatively a smaller sized, short legged birds

**Ankaleshwar**

- Origin – Gujarat
- Annual egg production - 80
- Average flock size 5-10 birds

**Miri**

- Native of Assam
- Body weight at 5 months - 0.7 to 0.8 kg
- Body weight at 10 months - 1 to 1.3 kg
- Annual egg production - 60 to 70

**Kashmir faverolla**

- Origin – Kashmir
- Medium sized breed
- Suitable for ornamental purpose

**Bursa**

- Small to medium sized birds
- Standard weight – cock - 0.85 to 1.25 kg; hen – 0.8 to 1.2 kg
- Poor egg layer; 40 to 55 eggs per annum

**Improved desi birds for small-scale poultry holders**

- The annual egg production capacity of Gramapriya and Vanaraja birds are 200 to 220 and 200 to 230 egg/ bird/ year, respectively.
- First egg lays at 200 to 230 days depending on plane of nutrition and other managerial parameters. Egg weight varies from 55 to 60 gram. Mature body weight 2.5 to 3.5 kg.

**Improved chicken that can be introduced in small scale poultry farming in free range should have following characters-**

- Adaptability in village condition
- Self propagation
- Good brooding capacity
- Mothering ability
- Well body conformation
- Hardy in nature
- Good scavengers
- Attractive and coloured plumage
- Escaping capacity from predators
- Disease resistance

**Commercial strains**

- Rearing commercial strains are highly profitable
- Scientific management is necessary for commercial strain rearing
- Commercial broiler strain yield 2.5 to 3 kg at marketing age
- Commercial layer strain produce approximately 310 eggs per annum

## Explain



### Explain Feed requirement:

- Minimal requirement of feed as the birds thrive on by scavenging but some supplementary feeding with home grown grain/by products is needed
- Non-conventional and locally available feed resources – utilized by small holders
- Nutritive value of these ingredients – known by small holders
- The low cost feed formulations using locally available raw material shall be standardized
- Knowledge on feed availability, especially ingredients like corn and soya are the primary concern of the commercial sector
- Contract farming by poultry integrators for maize production will be needed
- Use of alternate cereals as feed substitute and pelletized feed may be encouraged in order to avoid depletion
- Instead of antibiotic growth promoters, use of enzymes, probiotics will be optimistic

### Discuss Health coverage

- Health coverage is as crucial to the commercial sector as to the rural/small scale sector
- Small holders required basic health care (biosecurity measures and haphazard use of vaccines)
- Doorstep delivery of health services to the rural poultry farmers
- Cold chain and thermo-stable vaccines are other requirement, which shall be considered along with continuous supply of biological drugs
- Ethno-veterinary medicines shall be encouraged

### Enlight Training, extension and Information system

- A source of rural poultry programs lies in the training of farmers in basic rearing and of poultry skilled workers for disseminating health services and imparting skills to the farmers
- Farmers' skill training shall be undertaken at large scale to give technical information about farming
- Provision for poultry training is also be made for advanced and latest technologies to the personnel in the commercial sector
- Basic training in hygiene and sanitation shall be urged to be imparted to personnel handling meat/egg products in slaughter houses and processing centers, mostly by commercial sector

**Brifely tell Marketing**

- Marketing is one of the weakest link in the rural poultry development program. Presently market for poultry products is concentrated in peri-urban and urban areas
- The overall impression of the market is that of not well organized and there is exploitation by middle men, reducing the margin of profit for farmers who are under threat by vagaries of weather, price fluctuations and productivity
- Agencies like National Egg Coordination Committee and Bromark are declaring prices for eggs and poultry/broiler based on market dynamics and has participation of farmers, which helps tackle the problem of middlemen to some extent

**Do** 

- Provide trip for trainees to see the few small-scale poultry houses at field level
- Give exercise on identification of various breeds, varieties and strains of the birds

**Notes for Facilitation** 

- Discuss farm capacity in small poultry farmer system
- Explain the importance of birds selection for small-scale level
- Field demonstration is necessary
- Provide in house explanation on various breeds suitable for small-scale

[illegible]





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## Unit 2.4 – Environmental factors of housing



## Key Learning Outcomes

**At the end of the session the participants will be able to:**

- Understand and study the Scopes and Opportunities in the Poultry Industry
- Understand the Role of a Small Poultry Farmer

## UNIT 2.1: Principles of Land Selection

### Unit Objectives

**After completing this session the trainees will be able to**

- Understand scientific rationale for selection of site and basic issues related with site selection

### Say

- This chapter says land requirements, infra structural facilities, environmental factors and Managerial issues regarding site selection for poultry house construction

### Explain

**Explain Criteria for selection of poultry house sites**

#### **I. Land requirements**

1. Should select elevated land for construction of poultry sheds and also hard rock land is more suitable.
2. Avoid locating poultry farm in a swampy area or bottom of the valley
3. Construct sheds in such a way that the long axis end walls face East-West direction and the side walls face North-South direction
4. Prevailing wind direction must be considered when wind currents to avoid flow from the chicken house toward any residence.
5. Ensure sufficient land available on the farm to properly utilize the litter as fertilizer
6. Wind shed is a term which describes wind flow pattern on the downside of an existing building.

## II. Facilities

1. Ensure adequate facility for water, electricity, telephone, approach road, supply of chicks, feed, veterinary aid and nearness to market for sale of cull birds and eggs.
2. Proper roads must be adequate
3. Provide adequate floor space per bird.
4. BIS specifications for construction of poultry sheds are available.

## III. Environmental issues

1. Construct sheds in such a way that predators (cats/dogs/snakes) will not enter the shed. Avoid entry of rats by constructing rat proof civil structures.
2. Keep the shed clean and free from flies/mosquitoes etc.
3. Provide adequate light and ventilation and comfortable housing conditions during all seasons (cool in summer and warm in winter).

## IV. Managemental issues

1. After every batch of growers/culled birds is disposed off, the dirty litter material and manure should be removed, walls and floors should be cleaned, white washed with lime and disinfected with 0.5% malathion or DDT insecticide spray or formaldehyde solution.
2. If deep litter system is followed, always use dry and clean litter material (sawdust, paddy husk, etc.). Spread 2 to 4" layer of litter on the floor, keep clean/disinfect brooding, feeding and watering equipment and then introduce chicks in the house.
3. If cage system is followed, ensure that droppings are spread with lime powder or 10% malathion spray twice a month to prevent menace of flies. The droppings under the cage can be removed after 6 months.
4. Provide strong roof and hard flooring. Raise plinth of the shed at least one feet above the outside ground level.
5. Ensure the constant and steady demand for eggs is available and the market is nearer to the farm.



- Provide trip for trainees to assess given site or land at field level for poultry house site selection process
- Give exercise on specific site for various facilities



- ## Notes for Facilitation
- Discuss poultry site selection and criteria involved
  - Explain the importance of site selection for poultry farm operation and marketing
  - Field skill demonstration is necessary
  - Provide in house explanation on various factors in scientifically planned house



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## UNIT 2.2: Scientific Planning of Poultry Housing

### Unit Objectives

**After completing this session the trainees will be able to**

- Important principles for design and construction of house

### Say

- This session deals with house design, principles of housing and specification of poultry house

#### Discuss Principles of housing

- Housing should provide comfort and protection to birds
- Scientific management in a controlled manner
- Easy, convenient and economic operations
- Reduces the total cost of production
- Maximizes flock performance
- Ensuring better health and welfare
- Proper micro-climatic conditions
- Increased stocking density
- Optimum and uniform growth rate

#### I. Orientation

- Long axis should be East-west and width extending North-South in tropical countries

#### II. Foundation

- Solid concrete blocks and bricks with 1 to 1.5 feet below the surface and 1 to 1.5 feet above the ground level

#### III. Floor

- A cement concrete floor will eliminate disease problem and help in easy cleaning and disinfection and reduce problems due to insects, rodents, worms and seepage

#### IV. Length

- Can be of any extend

#### V. Width

- Not more than 30 feet
- If the width of the shed is more than 30 feet, ridge ventilation at the middle line of the roof top with proper overhang is must
- Can be of any width in EC houses up to 40 feet

#### VI. Height

- From foundation to the roof line should be 8-10 feet (eaves height) and at the centre 10-12 feet
- In case of cage houses, the height is decided by the type of cage arrangements (3 or 4 tier)

#### VII. Side wall

- Usually half of two-thirds area will be kept open and fitted with wire mesh in floor houses.
- In cage houses, avoid side wall. In EC houses should have solid side walls.

#### VIII. Doors

- Either single or double should swing both ways

#### IX. Overhang

- The roof at the eaves should atleast extend 3 to 4 feet (1 to 1.25 meters) and this may depends on height of the house.
- The normal thumb rule is that the length of the overhang will be half the window height

### Describe ideal operation of Poultry house

#### A good poultry house must provide:

- Locational, structural and operational bio security
- Tap the maximum genetic potential of the bird
- Have operational efficiency
- Comfortable to the birds and workers
- Economical and durable
- Suitable for local agro-climatic conditions

### Do

- Give exercise to measure or evaluate the house units and get feedback or comment of each poultry house

### Notes for Facilitation

- Discuss importance of poultry house layout planning
- Explain scientific principles of housing and specification
- Field demonstration and hands on training is necessary

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## UNIT 2.3: Building Materials for Poultry House

### Unit Objectives

**After completing this session the trainees will be able to**

- Importance of building materials for constructing the poultry house

### Say

- This session deals with various building and roofing materials for poultry house construction and explain advantage of different floor

#### Define Roof

- Roof of the poultry house may be thatched, tiled, asbestos, or concrete depending upon the cost involvement
- Different types of roofs are shed, gable, half-monitor, full-monitor, flat concrete, gambrel, gothic, etc.
- Gable type is most preferred in tropical countries like India

#### Outline Roofing materials

- The roofing materials used may vary based on the needs, requirements and budget of the farmer. The various roofing materials are straw, coconut leaf, palmyrah leaf, light roof (Asphalt coated), tiles (Country and Mangalore), plastic, asbestos, aluminium, fibre glass, etc.

#### Floor

- It must be flat with no protruding rocks or other objects
- It should be covered with suitable litter (saw dust, wood shavings, dried leaves, chopped straw, rice hulls, etc.)
- For a small holder with only a few birds, a raised split bamboo floor eliminates the need for litter
- The housing must allow the fresh excreta to be removed from underneath
- Spaces between the bamboo strips need to be such that the excreta falls through but the bird doesn't catch its foot between the strips (about 2 to 2.5 cm wide for an adult bird)

### Discuss Floor material

- There are several types of floor materials available such as katcha floor, concrete floor, plastic slatted floor and wire mesh floor. Among these concrete floor is best for poultry house

### Concrete floor

- Concrete with rat proof device and free from dampness
- Extended 1.5 feet outside the wall on all sides to prevent rat and snake problems
- Consist of well-drained soil or gravel or concrete which is more desirable, it is easy to clean, durable and more rat proof
- A concrete floor should be 80–100 mm thick and be made of a stiff 1:2:4 or 1:3:5 mix, laid on a firm base at least 150 mm above ground level, and given a smooth finish with a steel trowel
- Floor should have a slope for easy cleaning and flow of water
- Should be impermeable to parasites and easy to clean

### Other materials

- The door must be open outside mostly in deep-litter poultry houses
- The size of door is preferably 6 x 2.5 feet
- At the entry, a foot bath should be constructed to fill with a disinfectant

### Do

- Provide field demonstration of different floor system poultry house at field level
- Give exercise to identify different roof material, floor material and other materials used in poultry house

### Notes for Facilitation

- Discuss importance of building materials in relation to microenvironment
- Explain various type of floor system
- Field demonstration is necessary

[illegible]

## UNIT 2.4: Environmental factors of housing

### Unit Objectives

**After completing this session the trainees will be able to**

- The factors involving to maintain ideal micro environmental condition for the birds

### Say

- This session deals with micro environmental factors influencing the production efficiently, and explain importance of temperature, relative humidity and ventilation (removal of unsound gases) in poultry houses

**Discuss Birds' comfortable environment in poultry house**  
**Poultry house environment**

- It influences the well-being 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.

**List out Two types of environment**  
**Macro environment**

- Denotes outside of the house environment
- Not able to manipulate

**Micro environment**

- Denotes the environment around the animal
- Temperature, relative humidity and air quality
- It can be influenced by insulation of roof, walls and floor, ventilation, heating, cooling and lighting

**Outline factors to be measured at birds' level:**

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

**Explain****Explain role of Temperature**

- On average, the body temperature of birds is between 41°C and 42.2°C.
- The comfort zone is defined as the temperature zone in which the birds are able to keep their body temperature constant with minimum effort. This temperature zone also depends on the feeding level and housing conditions

**Measuring and assessing temperature**

- The best instrument for measuring temperature is the bird itself. Assessing the temperature by observing the birds themselves should only be done when the animals are at rest, not when they are active or eating.

**Obvious indicators of unsatisfactory house environment are:**

1. Behaviour of the animals
2. Abnormal body position
3. External abnormalities
4. Abnormal plumage may point to mistakes in house climate
5. Coughing/sneezing frequencies
6. Activeness

- Measuring the temperature is the most common way of assessing the climate in a house. Such a measurement can give a lot of useful information and is not expensive or hard to do.

### Ways of measuring the temperature

1. Minimum/maximum thermometer (in every house or section of a house)
2. Temperature sensor (computerized climate control)
3. Thermometers (alcohol, electronic)
4. Infrared thermometers – electronic thermometers

### Location of the thermometer

- The temperature in a house is not uniform and therefore, there are several places where the sensor should not be placed (i.e. it should not be hung close to the wall or behind something which hinders the air flow) and should not be hung too high in the house.
- Furthermore, the location of the air inlet and heating equipment is important in determining the best position for the temperature sensor.
- It is best to place it as close to the birds as possible and in such a way that the fresh air passes the sensor before it reaches the birds.

### Recommended temperatures for layers

- The critical temperature for layers is 20°C. For every 1°C lower than 20°C, the birds require an extra 1.5 g of feed per day.
- The most efficient temperatures for layers are between 20 – 24°C. When temperatures rise above 24°C, shell quality and egg weight will reduce.

### Recommended temperatures for broilers

- The critical temperature for broilers and rearing birds is highly dependent on age.

Note: These temperatures are recommended temperatures and should be adapted to local situations as necessary.

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

### Describe importance of Relative Humidity

- Relationship between the moisture content of the air and the maximum moisture content at the current air temperature expressed in percentages.
- 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.

### Measuring and controlling humidity

- Psychrometer, dry/wet bulb or the mechanical hygrometer.
- Humidity is controlled by the intense heating or cooling of house air in response to the temperature outside the house.
- When outside temperatures are low, relative humidity in the house is low, which often results in dry dust circulating in the air within the house. If the relative humidity is too high, this may result in wet litter. The ideal relative humidity for poultry is 60-80%.

### Discuss Air composition

- The most important components of air are nitrogen ( $N_2$ , approximately 79%) and oxygen ( $O_2$ , 20.3%). In addition to these main components there are several other gasses such as carbon dioxide ( $CO_2$ ), and water ( $H_2O$ ).
- Birds inhale  $O_2$  and exhale  $CO_2$  and  $H_2O$ .

### Harmful gasses in poultry houses are:

- **Carbon dioxide (CO<sub>2</sub>)** – The carbon dioxide in poultry houses largely originates from air exhaled by the birds. The CO<sub>2</sub> content of the air is used to measure the effectiveness of ventilation.
- **Ammonia (NH<sub>3</sub>)** – Ammonia is a product of bacteriological processes in the manure. It is easily bound to water. Ammonia is lighter than air and thus it rises in the air. The ammonia content of the poultry house air depends on ventilation, temperature, relative humidity and stocking density. High ammonia concentrations irritate the mucous membranes.
- **Hydrogen sulphide (H<sub>2</sub>S)** – H<sub>2</sub>S is released when organic matter (protein) in the manure decomposes. It has an offensive smell (rotten eggs) and is a very dangerous gas. When the manure is stirred or removed from the pit, the H<sub>2</sub>S is released into the air. Even low concentrations of hydrogen sulphide in the air can be fatal for humans and animals. This is why it is important to ventilate at maximum capacity while stirring or removing the manure.
- **Carbon monoxide (CO)** – Carbon monoxide is an odourless, very dangerous gas. It is the result of incomplete combustion due to a lack of oxygen (O<sub>2</sub>) in gas heaters (clean filters).
- **Sulphur dioxide (SO<sub>2</sub>)** – Sulphur dioxide develops when oil is used as fuel. The cleaner the oil, the less SO<sub>2</sub> is formed.

### Measuring gas content of air

- A gas detector can be used to measure the gas content of the air. All measurements should be done at birds' level.
- The device consists of a pump and its most important components are the tubes which are necessary to determine the gas content.
- The tubes are filled with a chemical substance that changes colour when air which contains the gas being measured passes through it.
- There are special tubes for determining the CO<sub>2</sub>, NH<sub>3</sub>, H<sub>2</sub>S, SO<sub>2</sub> and CO contents of the air

### Controlling dust particles

- The dust in poultry houses mainly consists of skin particles, feathers, feed particles, litter and dried manure.
- Proper maintenance of poultry houses and regular cleaning creates more comfortable conditions for birds and better working conditions for humans.

### Outline Air movement and airspeed

- Taking into consideration the recommended temperatures, the air velocity at bird level is allowed to vary between 0.1 and 0.2 m/second.
- If house temperatures are low, the birds experience higher air velocities as a (severe) draft which can lead to disease.

### Measuring air velocity

- Air velocity can be measured using an anemometer. The air movement pattern within a house can be made visible by using a smoke generator or smoke powder.

### Importance of air movement or ventilation in poultry house

- Moving fresh air into a house and moving stale air out of the house
- Sending unwanted heat, excess moisture, ammonia out of the house
- Limiting the buildup of harmful gases
- Providing oxygen for respiration

### Natural ventilation

- Natural outside air can easily flow into and out of the house
- Ventilated shelter must be exposed to the wind
- Windbreaks reduce natural air movement, keep them 100 ft away
- Increased air-exchange rates by installing fans
- Proper building design & construction major factors which affect ventilation

### Components of ventilation system

#### Fans and openings:

- Control the amount of air exchange
- Effect air distribution and mixing

#### Heaters:

- Provide supplemental heat during cold weather and brooding

#### Controls:

- To adjust ventilating rates (fan controls), supplemental heating rates, and the air velocity rates (fan controls), supplemental heating rates, and the air velocity through openings as weather, bird age and size change

### Do

- Provide exercise to handle different equipments to measure temperature, humidity and air movement in commercial poultry houses

### Notes for Facilitation

- Discuss importance of poultry house environment
- Explain temperature, humidity and ventilation role in poultry house
- Hands on skill training is necessary

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MINISTRY OF SKILL DEVELOPMENT  
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## 3. Handle Birds In Poultry Sheds

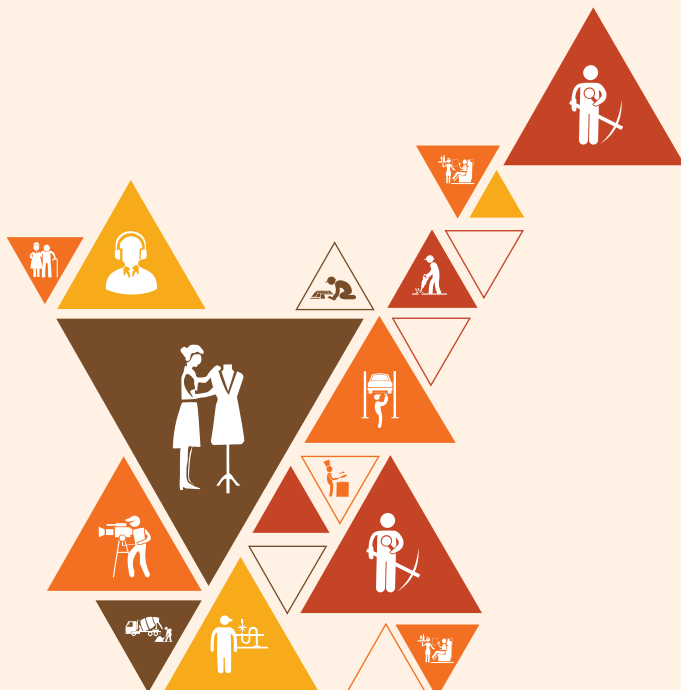
Unit 3.1 – Layout of brooder house

Unit 3.2 – Layout of Grower House

Unit 3.3 – Layout of layer house

Unit 3.4 – Management of Heat Stress

Unit 3.5 – Management of cold stress



AGR/Q4329

## Key Learning Outcomes

**At the end of the session the participants will be able to:**

- Understand the different types of vaccines and
- Understand the diseases and management
- Record the weight of the birds at regular interval
- Monitor the physical condi
- abnormal signs
- Manage waste safely and correctly in accordance with regulatory requirements
- use and store drugs, medica
- Record and maintain the complete medica

## UNIT 3.1: Layout of brooder house

### Unit Objectives

**After completing this session the trainees will be able to**

- Design and specification of brooder house
- This chapter says brooder house layout planning and preparation.

### Say

- **Introduction**
- Special care is required to design and construction of brooder house for chicks in order to have the uniform growth. Proper management have the better livability.

### Explain

#### **Explain Model house for 500 chicks**

- Brooder house have an east-west orientation
- Chicks will be housed during the period between 0 and 8 weeks
- Brooder house is critically important for good livability and higher productivity during the layer period
- Model brooder house side walls should not be more than 18'
- Height of side of the brooder house from eaves to the bottom is 6 feet.
- Height of the building from the center of the to the bottom is 12 feet
- Flooring should be preferably cement flooring
- Side walls – welded mesh – half inch
- Side eaves length should be two and half feet
- Breadth of the house should not be more than 20 feet
- Totally floor area required for 500 chicks – 250 square feet

**Discuss Brooder house preparation**

- Screen the window and door against predators and ventilate freely.
- Shield the chicks from direct sun.
- Before the chicks arrive, prepare a brooding area surrounded by a cardboard fence approximately 16 inches high and 6 feet in diameter.
- Several inches of coarse, dry shavings, sawdust, peat moss or vermiculite makes good litter.
- Several thicknesses of newspaper placed under the waterers and feeders for the first week helps keep the contents clean.

**List out Brooder house accessories:**

- Infrared lamp used as a convenient heat source in a brooder house. One 250 watt infrared lamp is usually sufficient to heat 100 chicks at an average temperature of 95°F.
- Always should use more than one lamp so the chicks will not be without heat if a lamp burns out.
- Heat the chicks only and not the air, so air temperature measurements cannot be used as a guide to chick comfort when using infrared lamps. Most of the larger brooders use gas or oil as fuel to more adequately supply heat.
- Small brooders with an electric heating element can be purchased for brooding small numbers of chicks. Change the bulb size in this unit to adjust the temperature.

**Brooder house space allowance**

- Provide half a square foot of brooder house space per chick from 1 day to 8 weeks of age

**Brooder house feeder and waterer**

- Place feed on chick box lids or trays from cut-down card-board boxes for the first few days. Feed and water should be available to the chicks as soon as they arrive.
- Provide 1 inch of feeding space per chick at the hoppers at first and increase to about 2 inches after chicks in 2 weeks old.
- After 8 weeks, provide 3 to 4 inches of feeding space for growing pullets.
- A hanging tube-type feeder 15 inches in diameter will feed about 30 birds.
- Less feed is wasted by filling hoppers only half full and adjusting feeder height or size to bird size.



- Allow them to do model house for 500 chicks
- Individually arrange brooder house preparation



- ## Notes for Facilitation
- Discuss brooder house layout and specification
  - Explain calculation of model brooder to receive chicks
  - Measurement of feeder and waterers
  - Measurement of external heat in brooder

[illegible]

## UNIT 3.2: Layout of Grower House

### Unit Objectives

After completing this session the trainees will be able to

- Design and construction of grower house

### Say

- This session says scientific planning for grower house construction and essential elements of grower house.

#### Outline Grower house

- It is used to grow egg-type birds from 9 to 20 weeks of age.

#### Grower house criteria

- Proper cleaning and disinfection of grower house is needed before introduction of grower birds
- Provide sufficient floor space, feeding space and water space
- Spread litter material to a height of 4" in case of deep litter system
- Change the feeder and waterer according to the need
- Arrange feeder and waterers in the grower house
- Follow good litter management to avoid diseases like coccidiosis
- Only 12 hour lighting programme is sufficient in case of open-sided houses. No artificial light is needed.

### Explain

#### Explain importance of Uniformity

At a given age, growing pullets should have average body weight very closer to recommendations and at least 70% of the birds' weight within 10% of flock average. Points to be considered for getting uniformity among growing pullets are,

- Receive chicks of uniform weight
- Provide proper feeding, watering and floor space
- Change the feeder and waterer according to the age
- The height of the feeder and waterer should be at the back height of the bird
- Provide proper energy in the diet
- Sample weights of the pullets are taken at regular intervals and change the feed accordingly
- Provide proper feeding space, so as to all birds consume feed simultaneously

#### Grower house specifications

1. Front feeding length : 30 inch
2. Front and back height : 15 inch
3. Depth : 18 inch
4. No. of growers (9 to 18 weeks) accommodated per box : 10
5. Floor space requirement
6. Grower in deep litter system – 1 square feet and in cages – 0.30 square feet

#### Do

- Allow them to plan sketch for model house for 500 number of grower birds

#### Notes for Facilitation

- Demonstrate grower house layout and specification
- Explain calculation of model grower cage house requirement
- Drawing of grower house layout

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## UNIT 3.3: Layout of layer house

### Unit Objectives

After completing this session the trainees will be able to know scientific skills on:

- Design and construction of layer house

### Say

- This chapter says different systems of layer house, specification of layer house models and layer house equipments

#### Layer house

Layer house provide shelter for mature female bird producing eggs. One of the earliest decisions required in the planning process is to select the system of housing.

#### Define different system of housing:

##### I. 1+3 system

- One brooder cum grower house with three layer house
- A new brood of chicks are obtained once in twenty weeks then the growers are shifted from the grower house at 18 to 19 weeks of age.
- The batch interval is 20 weeks

##### II. 1 + 1 + 5 system

- One brooder house, one grower house and five layer house
- In this system a new brood of chicks are purchased every 12 weeks. Here the growers can be shifted to the layer house earlier and the birds in the layer house can be comfortably maintained for a longer period

##### III. 1 + 1 + 6 or 8 system

- Every nine weeks a new batch of chicks will arrive
- The layers can be maintained in the layer house for a longer period of time, particularly if the rate of lay continues to be good and profitable.

### Rearing system

- Usually three kind rearing system of layers are followed such as free range, intensive and semi intensive system. Among these intensive system of rearing is commonly practiced.

### Describe two types of intensive rearing system

1. Floor system of rearing
2. Cage system of rearing

#### I. Floor system of rearing

- Litter material should be 6" height and clean
- Nest should be place in the layer house this allows the birds to get accustomed to them
- Should be use Clean nesting materials
- Space requirements 2 square feet in deep litter house and 1.75 square feet in a slat and litter house
- Either linear or round feeders should be provided, 4" of feeder space in linear feeder and 12-15" diameter circular feeder for 12 to 15 birds
- Waterer space is just half that of the feeder space
- Long basin should be enough to provide for 35-40 birds, water guards should be placed over the waterers to prevent birds from dirtying and spilling water
- The corners of the houses should be cordoned off to prevent birds from sitting on the eggs
- Nest should be placed in the darker part of the house; one nest should be enough for 5-6 birds

### Cage rearing

- Usually two or three tier cages
- Conventional type of cage houses, the lower cage is raised about 2 to 2 1/2 feet from the floor level
- Just below the cages a shallow pit of 6 inches is dug to allow all the faecal material to fall in.
- No side walls are required for cage house with the wire mesh being stretched down to the floor level to facilitate better ventilation and for quick drying of the moisture in the droppings.

### Recommended Floor space in cage rearing

- Chick (0 to 8 weeks) = 0.3 Sq.ft
- Grower (9 to 16 weeks) = 0.5 Sq.ft
- Layer (Above 17 weeks) = 0.6 Sq.ft

### Battery cage method

- Very common methods used in many countries
- Small sized metal cages are used
- Each cages accommodate about 3 to 8 hens
- Walls of the cages are generally made of mesh or solid metal and the floor is made of sloped wire mesh which allow the faeces to drop down
- Eggs are gather in the egg collecting conveyor belt of the cages
- In this system food is provided in front of the hens by a long bisected metal or plastic pipe and water served to them by using overhead nipple systems
- Cages are arranged in long rows in one above another system.

### California Housing (High Rise/ Elevated cage house)

- Provides sufficient ventilation & waste management in tropical countries
- Height of the shed is raised by 7-8 feet from ground level using concrete pillars
- Distance between two pillars is 10 feet
- Two feet wide concrete platforms are made over the pillars
- For 3 'M' type cages are arranged 4 platforms are needed
- The inter-platform distance is 5-8 feet depending upon the type of the cages used
- The total height of the house is 20-25 feet and the width is 30-33 feet

### Reverse cages

- In this the longer side of the cage is in front, running parallel to the length of the house and where the feeders are placed.
- The present trend is to provide a squarer cage so as to increase feeder space.

### Measurement of various cages

- 12" depth X 15" length cage to hold 3 layers
- 12" depth X 18" length cage that holds 4 layers
- Each cage has a constant height of 17" in front and at the back 15"
- Cage rearing facilitates easy management, lesser space requirement, easy collection of eggs, lesser percentage of broken eggs, better egg weight, clean egg production, easy culling, reduced mortality level, etc.



- Classification of different layer systems in the field
- Identification of different types of cages used in layer house



- ## Notes for Facilitation
- Discuss different layer house system and specification
  - Demonstration of different layer house cages models
  - Measurement of different cage systems and equipments

[illegible]

## UNIT 3.4: Management of Heat Stress

### Unit Objectives

**After completing this session the trainees will be able to understand:**

- Scientific planning to manage the birds during summer months

### Say

- This chapter says reasons for heat stress and how to manage to alleviate heat stress.

#### Introduction

- Normal body temperature of chicken – 105 to 107°F
- The birds with high producing nature are more susceptible to various stress problems, which lowers the profit margin due to higher percentage of morbidity and mortality especially during extreme hot season

#### List of problems during severe summer

1. Managerial planning
2. Nutritional manipulations
3. Disease problems

### Explain

#### Explain Managerial planning

- The cage reared birds are more prone to stress during summer than birds reared in floors, since the space allowance provided is limited
- In cage houses effective cross ventilation should be provided with an extra care
- Provide cool, fresh drinking water with anti-stress vitamins should be provided

- If the litter depth is not kept as recommended the heat built up in the litter will be comparatively increased that adds the harmfulness to the birds in addition to the atmospheric heat increase
- Hence provide recommended level of litter thickness
- The heat produced from the birds is more when the usual stocking density is followed which causes more stress to the bird
- Hence it is advisable to reduce the stocking density by increasing the floor space allowances
- During extreme summer season the environmental heat causes a severe threat to the birds, in addition to the heat disseminated from the birds
- Hence it is advised to eliminate the total heat by installing pedestal fans / exhaust fans/ providing additional ridge ventilation
- To reduce the heat radiated from the roof, the top of the roof should be painted with white colour and the bottoms of the roof should be painted with black colour
- If the roof is of asbestos or tiles, it can be insulated by spreading paddy straw or thatches on the top of the roof
- If the temperature is too high, sprinkling of water on the top of the roof should be advised
- Wet gunny bags should be screened on the sides of the poultry houses. This will reduce the heat considerably
- Before constructing the poultry house, short growing plants and trees like soobabul, agathi, neem trees etc, should be planted around the sides of the houses

### Describe Nutritional manipulation

- During summer months, the birds consume less quantity of feed than the usual consumption which leads to less consumption of nutrients intake and thereby resulting in poor weight gain, drop in egg production and egg size
- Hence it is suggested to increase the density of the nutrients in the ration
- The energy level should be reduced and protein, calcium, phosphorus and all other important vitamin levels in the ration should be increased in extreme hot seasons
- It is advisable to encourage the birds for consuming their maximum quantity of feed during the cooler parts of the day
- Wet mash feeding is advisable during extreme hot summer
- Increasing the frequency of feeding and raking the feed often will increase the feed consumption during summer
- Provision of cool, clean, fresh and wholesome water is advocated
- Ice cubes should be added to the water at extreme hot temperature period
- Incorporation of antistress vitamins like vitamin C in water should be advised
- Frequency of watering the birds should be increased

### Outline Disease problems

- General disease resistance of the birds is declining during summer season
- Extreme temperature during hot season is the predisposing factors for the outbreak of the various diseases like Ranikhet, Infectious bronchitis, Infectious laryngeotrachitis, Infectious bursal diseases, Fowl pox etc, in poultry.
- Hence necessary precautions are to be carried out to check these diseases by preventive vaccinations, following strict sanitations and disinfection procedures along with proper medications

Based on this, the poultry farmers are advised to strictly follow the basic principles for improving their flock performance during summer

### Do

- Assessment of environment factors in a commercial farm
- Practice summer management procedures

### Notes for Facilitation

- Explain the heat stress
- Discuss the factor responsible for heat stress
- Hints for alleviation of heat stress

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## UNIT 3.5: Management of cold stress

### Unit Objectives

**After completing this session the trainees will be able to gain:**

- Skill and knowledge on micro environmental manipulation, nutritional correction and disease control procedures during winter stress

### Say

- This chapter attributes problems due to lowering of micro environmental temperatures in farm house, water hygiene maintenance, litter management practices and disease control management procedures during winter season

#### Discuss Winter Management

- Body condition and physiological activity of the bird changes according to environmental temperature
- Drop in environmental temperature affects the birds with wet condition. In this condition, the chicks huddle together under the electric bulb as to keep them in warm condition. Severe huddling leads to mortality in huge number. Both day and night time artificial warmth is compulsory by electric brooding
- Cold winds should not enter the farm house
- Gunny bags should be hanged in proper direction to prevent the entry of cold wind
- In adult birds, preventive screening must be in one side only, where there is much possibility for the entry of wind with velocity. This basic factor is important to keep the ammonia level in the farm within permissible level
- Leaking and splashing of rain in the farm house must be totally avoided

#### Outline Water hygiene

- Provide clean lukewarm water
- In the rainy season, generally the drinking water is contaminated. All preventive measures have to be taken up to store drinking water properly
- Easily available bleaching powder of 4 to 7 gm/1000 litres of drinking water with a contact period of half an hour is advisable
- Stagnation of water at any point outside the farm house should not be seen

**Describe Litter management**

- Moisture content in the litter should not exceed 20% at any time
- Owing to the higher relative humidity in the winter season excess moisture present in the litter cannot get evaporated which leads to caking of the litter. Raking of litter is to be done daily
- In the waterer, the spilling of water should be avoided
- Such measure avoids foul smelling and ammonia irritation from the litter

**Caged birds**

- Accumulation of droppings under the cages are need to be avoided, such accumulation increase the domestic fly nuisance
- Appropriate disinfectant should be sprayed over the litter
- Increase in ventilation rate can reduce the moisture level

**Feed**

- Moisture content of feed should not exceed 12% in winter season
- Increase in moisture content favours the growth of fungus leading to production of mycotoxin.
- As such, it is necessary to keep good quality feed

**Tell about control of Disease outbreak**

- In the winter, the birds are exposed to stress due to low environmental temperature
- Coccidiosis, respiratory disease and mycotoxicosis are such common disease in the winter season
- Moisture content in litter if it exceeds 20% makes the oocytes of coccidian become infective by sporulation. Preventive coccidial medication in feed and water is advisable
- Ammonia problem should be avoided
- Antibacterial or antibiotic medication is necessary as a preventive measure of respiratory disease
- Planned winter management practices protect the birds and keep up the production level continuously.



- Winter management practices to protect the birds and keep up the production level continuously



- ## Notes for Facilitation
- Explain the impact on production due to lowering the micro environmental temperatures
  - Discuss the Managemental practices during winter season

[illegible]





## Key Learning Outcomes

**At the end of the session the participants will be able to:**

- Understand the Poultry farming economics and finances
- Market the harvested products (Meat and eggs)

## UNIT 4.1: Poultry Feeds, Feed Additives And Supplement

### Unit Objectives

After completing this session the trainees will be able to gain:

- Skill and knowledge of different feed ingredients for preparation of rations
- This chapter says feed ingredient classification and feed ingredients role in poultry ration and define importance of feed additives in poultry ration

### Say

- **Outline classification of Poultry feed ingredient sources**

Energy rich source – cereals and cereals and its by products

1. Protein rich source – vegetable and animal proteins
2. Fat source – oil
3. Feed supplements – vitamin and minerals
4. Feed additives – vitamins, growth promoters, anti-coccidial, anti-bacterial, detoxifier and liver stimulant

#### Cereals

S.No.	Ingredients	Energy (Kcal/Kg)	Crude Protein
1	Yellow maize	3340	8-9
2	Sorghum or Jowar	3200	10-11
3	Broken rice	2900	8-9
4	Wheat	3100	10
5	Small millets Bajra, Ragi, etc	2800-3000	9-12

### 1. Maize

- Energy source
- Well accepted feed ingredient
- It has a xanthophyll content and imparts yellow pigment to the egg yolk and the skin
- Good source of vitamin A, linoleic acid and also essential fatty acid
- Has a good digestibility capacity

### 2. Sorghum or Jowar

- Different colored sorghum varieties are available.
- It ranges from white to dark tan.
- Light brown varieties can be used for making poultry feed
- Don't use darker color sorghum varieties because it may cause growth depression and mottling of egg yolk in chicken
- Deficient in lysine, methionine and arginine

### 3. Broken rice

- It can be added up to 20% in the feed
- Provide good quality broken rice

### 4. Wheat

- Good source of energy
- Can be added up to 20% and 30% in broiler and layer diet respectively
- Don't use higher percentage because it has a tendency to paste on the beak of the bird and lead to beak necrosis

### 5. Small millets

- Bajra (pearl millet), Ragi (finger millet), etc.,
- Mostly Ragi is used in layer diets.

## Cereal by products

### 1. Rice bran

- Consists of the pericarp and germ of the rice
- The product after polishing the rice is the rice polish
- Good source of energy and B-complex vitamin
- The protein content is about 13 %
- Slightly deficient in lysine
- Rice bran if stored must be mixed with an antioxidant to maintain its quality

### 2. Rice polish

- Rice polish contains higher energy of 3000 Kcal/Kg with a relatively higher crude protein level of 14%

### 3. Deoiled rice bran

- Rice bran with its oil extracted and having 1% oil is known as deoiled rice bran
- This contains a lower energy level of just 1800 to 1900 Kcal/Kg but a higher crude protein level of 13 to 14%

### 4. Wheat bran

- By product of wheat milling and contains about 14 to 15% crude protein
- Less used in poultry feeds
- Good source of manganese and iron

### 5. Molasses

- By product of the sugarcane industry
- Energy – 2000 Kcal/Kg
- It increases the palatability of the feed and reduces dustiness
- If used beyond 5% there will be a wet litter problem because of high potassium content
- Rich in pantothenic acid, riboflavin, niacin and choline

## Vegetable protein sources

### 1. Groundnut oil cake

- Deoiled or solvent extracted groundnut oil cake
- It has lower oil content (less than 1.5%) and does not get rancid easily
- Nutrient composition of the cake varies based on the oil extraction methods used
- Poor amino acid profile and deficient in methionine, lysine and tryptophan
- Easily attacked by fungus and may cause a severe mycotoxin problem in poultry
- During monsoon this vegetable protein is better avoided in poultry feed
- Not suitable to store the groundnut oil cake during warm and humid climate

### 2. Soya bean meal

- It is with many anti-nutritional factors in raw and unroasted soyabean that affect the digestion and utilization of many nutrients
- Two types of soya bean meal - Solvent extracted and Full fat soya bean – this contains about 18 to 20% fat
- Processed soya bean comes with all the anti-nutritional factors removed.
- Soya bean meal is very good source of lysine, tryptophan and threonine but it is deficient in methionine
- If soya bean is properly processed the lysine and methionine digestibility will be over 89%
- Dehulled meal has higher energy, and this depends on residual oil, fibre content and ash level

### 3. Sunflower oil cake

- Two types – Expeller and Oil extracted
- High in methionine and but low in lysine and threonine
- Dehulled sunflower oil cake have a higher crude protein level of 40%, while the non hulled variety have a lower crude protein level of just 25 to 30%
- The crude fibre of sunflower cake available in India exceeds 20% and is a major limiting factor for use in poultry feeds
- This cake contains a high level of chlorogenic acid which is tannin, the requirement for methionine and lysine is increased when sunflower cake is used in the feed

#### 4. Gingelly oil cake

- Good profile of essential amino acids but is deficient in lysine
- It has a high hytic acid and oxalic content that is known to bind calcium and decrease availability of phosphorous, magnesium, zinc and iron in the poultry diet
- Removal of the hull lowers the fibre level by 50% and increases the crude protein content, digestibility and palatability
- It has a high content of sulphur amino acids and essential amino acid

#### 5. Cotton seed meal

- It has high crude protein content but is deficient in lysine
- Due to the presence of free gossypol the use of cotton seed meal is limited as it depresses growth in chicks and discolors egg yolk in stored eggs due to the presence of gossypol
- Linseed meal
- This can be used in poultry feed only to a minimal level of 2 to 3% as it contains toxic principles like cyanogenic glycosides that are harmful to the bird

### Animal protein

#### 1. Dried fish or fish meal

- Crude protein – 40 and 60%
- Inclusion level – up to 10%
- Fish meal can be vacuum dried or steam dried
- Good source of lysine and methionine, calcium and phosphorous, iodine and selenium and vitamin B<sub>12</sub>
- Maximum permissible level of salt is 3 per cent

#### 2. Meat and bone meal

- By products – meat trimmings, inedible parts and organs and certain condemned carcasses
- They are cooked (rendered) to produce a nutritional and economical feed ingredient

#### 3. Dried poultry waste

- Ten thousands of layers kept in cages will produce 12 tonnes of manure per day and in a year 4380 tonnes
- Nutritive value of dried poultry waste depends on type and age of the bird, the management system (floor or cages), extent of feed spoilage, quantity of feathers present, present spillage of feed, drying temperature and duration
- Low in the availability of energy and NPN (Non Protein Nitrogen)

## Explain



### Explain Feed additives

- The nutritional quality of a feed also depends on a variety of other factors, including feed presentation, microbial contamination, and content of anti nutritional factors, digestibility, palatability, and intestinal structure. A variety of feed additives are available to improve the efficiency.

### Antioxidant

- Antioxidant in feeds prevents oxidation. Antioxidants are able to stop food spoilage, and their preventative properties last until the reserves of the antioxidants are available.
- Compounds with antioxidant properties include ethoxyquin, butylhydroxytoluene (BHT), butylhydroxyanisole (BHA), vitamin C, and vitamin E

### Free-flowing agents

- These substances added to feed to improve the pourability and storage stability of slow-flowing, moisture-sensitive materials.
- Most free-flowing agents are fine particulate structures that are resistant to compression and exhibit chemical neutrality. The fine particles surround the particles of other ingredients in feed and prevent clumping. They also bind fluids in the feed.
- An example of a flowing agent is hydrated sodium aluminosilicate.

### Pelleting Additives

- They are added to feeds prior to pelleting to help improve the quality of the pellets.
- These additives can, for example, reduce feed dust and help pellets better adhere.

### Intestinal Health - Coccidiostat

- **Coccidiosis** in poultry is caused by a single-cell protozoa (Coccidia) that lives much of its life in the digestive tract of a host animal.
- During their development, they enter the cells lining the gut, multiply, and destroy the cells. The damaged intestines cannot absorb nutrients properly.

- Coccidiostats are used to prevent coccidiosis. They do not treat the condition, but help in preventing it.
- Common coccidiostats include amprolium (Aprol, Corid), decoquinate (Deccox), diclazuril (Clinacox), halofuginone (Stenorol), lasalocid sodium (Avatec, Bovatec), monensin (Coban), robenidine (Robenz), and salinomycin (Bio-Cox, Sacox).

### Mycotoxin binders

- **Mycotoxins** are toxic chemical compounds produced as secondary metabolites by actively growing molds. There are more than 300 types of mycotoxins that affect animals, but aflatoxin, vomitoxin, zearalenone, ochratoxin, and trichothecenes are the most common.
- Even if the mold is no longer visible, the mycotoxins remain. For this reason, many poultry feeds contain a mycotoxin binder that binds to the mycotoxins and prevents them from being absorbed through the gut and into the bloodstream.
- Common mycotoxin binders are Mycosorb, Mycofix, ProSid, Mycoad—which appears on the Organic Materials Review Institute (OMRI) list—and Toxisorb.

### Describe Feed supplement

#### Vitamins

- The main vitamins normally added in poultry feed are A, B<sub>2</sub>, D<sub>3</sub>, E and K.
- During periods of stress the birds are provided with vitamin C in water
- Vitamins are required in small amounts as organic catalysts of metabolic reaction

#### Minerals

- They consist of calcium and phosphorus followed by sodium, potassium, chloride and magnesium
- Calcium is required comparatively at larger amounts for a layer compared to the requirements of zinc, copper, etc.



- Identifications of different feed ingredients and its quality



- ## Notes for Facilitation
- Discuss different feed ingredients and its nutrient content
  - Explain the importance of feed ingredients quality in poultry ration production

[illegible]

## UNIT 4.2: Poultry Mini Feed Mixing Unit

### Unit Objectives

**After completing this session the trainees will be able to gain:**

- Scientific knowledge on preparation of compound balanced feed using specific machineries in feed mixing unit

### Say

- This chapter says mechanized feed mixing unit and its parts and explain grinding, mixing, packing and storage of compound feed

#### Introduction

- The process of manufacturing feed is a means whereby raw materials of widely ranging physical, chemical and nutritional composition can be converted into a homogenous mixture suitable for producing a desired nutritional response.

#### List out Utilities for feed mixing unit

The raw and auxiliary materials are first charged into silos and tanks where they are made ready for further processing. The ingredients are crushed in the primary crusher. The crushed materials are further separated by means of sieves, after which they are stored in assorting tanks in accordance with the kind of raw materials.

During assorting and measuring, small amounts of additives are charged into the bins containing different assortments of raw materials. The raw materials from the assorting tanks are measured in accordance to their use and then mixed by using a mixer. During mixing, fatty ingredients are added to the mix in order to raise the nutrient value of the feed.

#### Tell types of Grinding

- Grinding or particle-size reduction is a major function of feed manufacturing.
- The grinding of ingredients generally improves feed digestibility, acceptability, mixing properties, pelletability, and increases the bulk density of some ingredients

**Parts of grinder****Hammermills**

- Hammer mills are mostly impact grinders with swinging or stationary steel bars forcing ingredients against a circular screen or solid serrated section designated as a striking plate.
- Material is held in the grinding chamber until it is reduced to the size of the openings in the screen.

**Attrition Mills**

- Attrition mills use the hammer mill principle to a certain extent; i.e., shattering by/impact. However, they also impart a shearing and cutting action. Grinding is done between two discs equipped with replaceable wearing surfaces

**Outline Roller Mills**

- A combination of cutting, attrition, and crushing occurs in roller mills. These are smooth or corrugated rolls rotating at the same speed set at a pre-determined distance apart with material passing between the two.

**Cutters**

- Rotary cutters are a type of grinder which reduces dry particle solids mainly by shearing with knife edges against a striking plate.

The mill also includes the processes of attrition and impact, although these actions are limited if the material is easily reduced by cutting and the screen limiting discharge has large perforations

**Screening**

- Associated with grinding feeds for removal of dust from grinded feeds
- Feeds sifted through a 177-micron opening (a U.S. No. 100 sieve) have been successfully used for quality of the feed

### List out Mixing

- The objective of feed mixing is to start with a certain assortment of ingredients called a "formula", totaling some definite weight.
- This is processed so that each small unit of the whole, either a mouthful or a day's feeding, is the same proportion as the original formula.

### Mixer

#### Horizontal Mixers

##### Continuous ribbon mixers

- The continuous or "twin-spiral" mixer consists of a horizontal, stationary, half-cylinder with revolving helical ribbons placed on a central shaft so as to move materials from one end to the other as the shaft and ribbon rotate inside
- Capacity can be from a few litres to several cubic metres.

##### Non-continuous ribbon mixers

- Non-continuous or interrupted ribbons are similar to the continuous ribbon mixers except that short sections called "paddles" or "ploughs" are spaced in a spiral round the mixer shaft.
- Action is different from that of continuous ribbon mixers, and may be more satisfactory for mixing liquids with dry solids.

### Vertical Mixers

- Vertical mixers may consist of a cylinder, cone, or hopper-shaped container, with a single or double screw (auger) located vertically through the centre.
- The screw operates at speeds of 100 to 200 rpm and vertically conveys incoming materials from the bottom (generally the intake) end, like a screw conveyor, to the top where they are scattered and fall by gravity.
- This sequence is repeated several times until a blend is attained (usually from 10 to 12 minutes).

### Mixing Operation and Evaluation

- Accurate mixing requires the addition of ingredients in a tested sequence from batch to batch. The usual practice is to add large-volume ingredients first, then those of smaller amount. Unless already premixed, liquids should be added after all dry ingredients have been mixed.
- Each mixer should be calibrated for its mixing time and capacity by volume for best results.

### Discuss Packing methods

- The automatic feed weighing and packing machine is suitable for large and medium sized feed production plants.
- It is always applied to a automatic weighing and packing system combined with the transport mechanism and the sewing machine.
- It composed of three parts: storage bin, weigher(s), and the control system.
- Storage Bin: The storage bin is used to take over the feed materials to weigh and pack and to store them temporarily for further processing.
- Weigher(s): By setting data, the weigher(s) can weigh specific weight of material.
- Control System: It is the brain of the feed weigh and packing machine. With the control system, the packing machine works automatically and accurately.
- The sacked bags are then sent to the warehouse for distribution.

### Storage

- Bulk products are stored in large bins.
- Feed is loaded into specially constructed bulk carriers and delivered to the customer.
- Feed is discharged from the truck into customer storage facility by means of an auger system, paddle conveyor, or pneumatic system.



- Identifications of different feed mixing machineries
- Give practices to preparation one feed lot



- ## Notes for Facilitation
- Discuss different feed mixing machineries
  - Hands on training and field visit is necessary

[illegible]

## UNIT 4.3: Computation of Poultry Ration

### Unit Objectives

**After completing this session the trainees will be able to gain:**

- Scientific knowledge on computation of different types of ration for broiler and layer

### Say

- This chapter says scientific basis for computation of ration and explain different types of compound feed preparation

#### Define Poultry ration

- The ration fed to poultry vary according to species, age and the purpose for which the stock are kept

#### Most poultry feeds are

1. Mash – grind medium to fine
  2. Pellets – composed of mash feeds that are pelleted
  3. Crumbles – produced by rolling pellets
- Pellets or crumbles – cost slightly more, but can reduce feed wastage and sorting, readily adapted to automatic equipment, less feeder and storage space, and possibly improve palatability and feed efficiency

#### Outline Principles of feed computation

- To find out the requirements of nutrients
- Whether the requirements will meet the productivity of the birds
- Quantity that will be consumed by the bird in a specific time
- Will this intake by the bird provide the requirements tabulated

#### Discuss Selecting feedstuffs

- Nutrient availability – affected by the energy, crude protein, fiber content, fat content and amino acid balance

- Palatability – affected by the moisture content and contaminants
- Content of growth inhibitors, undesirable chemicals and pigments
- Cost and availability of feed ingredients
- Nutrient utilization

#### Specific information for feed computation

- Requirements of nutrients for poultry and composition of a formula in terms of nutrient availability
- Feed analytical values
- The average nutrient content of the feed ingredient based on the analysis done previously available in the form of published table

#### Skill on Poultry ration computation – flow chart

- In practical diet formulation by calculation, the essential steps are as follows: the ingredients are added to the formula to provide the nutrients per kg or 100 kg or 1000 kg ration
- Start by satisfying the crude protein requirements, both for quantity and quality (amounts of essential amino acids)
- The maximum levels of animal protein sources are fixed because of the cost factor
- The level of cereal by-products if to be added may be fixed
- Vegetable protein sources and energy sources are added to provide the required amount of protein
- The metabolizable energy content of the diet has to be balanced. The shortfall if any can be met by supplementation of fats and oils
- Balance the protein and energy contents. Keep the ratio of calories to protein in line with the recommended levels of the birds. Try to limit maximum variation within two percent of the ratio. The number or ratio is useful only as a guideline in checking if there is enough protein in the feed
- Calculate the total crude fiber content of the feed. Try to keep it below five percent
- The phosphorus content of the diet need to be calculated in terms of available phosphorus. Phosphorus from animal and inorganic sources is considered completely available, whereas that from plant sources is considered to be 30 per cent available
- The calcium content of the diet need to be calculated. The shortfall in calcium requirement can be met by the addition of limestone. Keep the calcium/phosphorus ratio in the recommended range
- The limiting amino acid (lysine and methionine) in synthetic form can be supplemented to meet the essential amino acid requirement
- Balancing the vitamin and mineral contents of feed. To meet the needs add a commercial vitamin-mineral supplement. If the supplement's directions are followed the, the birds get enough of their needs
- A check is need to be made for the total of the ingredients and also for all the nutrients if desired

## Inclusion level and nutrient content of commonly used feed ingredients

Feed ingredient	Inclusion level (%)	Crude protein (%)	Energy (Kcal/Kg)	Lysine (%)	Methionine (%)	Calcium (%)	Phosphorus (%)
Maize	0-60	9	3370	0.20	0.20	0.03	0.10
Sorghum	0-40	10	3260	0.20	0.20	0.04	0.10
Cumbu	0-40	12	2880	0.40	0.20	0.07	0.20
Broken rice	0-30	9	3090	0.10	0.10	0.04	0.02
Wheat	0-50	10	3100	0.30	0.20	0.10	0.10
Rice bran	0-20	14	2890	0.60	0.20	0.07	1.60
Sunflower oil cake	0-15	27	1900	1.10	0.70	0.10	0.10
Groundnut oil cake	0-20	45	2420	1.50	0.42	0.23	0.54
Soya bean meal	0-40	44	2420	3	0.60	0.30	0.30
Fish meal	10-15	45	2420	3	0.60	0.30	0.30
Molasses	5-10	3	2000	-	-	0.10	1.10
Mineral mixture	2-3	-	-	-	-	30	6
Vegetable oil	0-5	-	-	-	-	-	-

Do 

- Give practical's for computation of poultry ration
- Allow them to select feed stuff and evaluate their selection

Notes for Facilitation 

- Discuss importance feed stuff selection
- Explain steps involved in poultry ration computation

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## UNIT 4.4: Feeding Management of Different Classes of Birds

### Unit Objectives

**After completing this session the trainees will be able to gain:**

- Scientific knowledge on feeding management of different classes of birds

### Say

- This chapter says feeding management of desi birds, improved desi varieties and commercial strains

#### Interact Feeding management of desi birds (Aseel, Kadaknath, etc)

- The rural type chicks need balanced feed during the initial 6 weeks of age under nursery rearing/brooding. In the nurseries, the chicks are reared on standard chick starter ration.
- Grower birds in the second phase, besides the feed material available in the free range, natural food/greens like waste grains germinated seeds, mulberry leaves, azolla, drumstick leaves and subabul leaves ( high protein sources).
- The need for extra feed depends on the free range available, intensity of vegetation, availability of waste grains, insects, grass seeds. The average body weight of 1.3 to 2.4 kgs will be attained by 120 days and if required should be provided with supplemental calcium sources like lime stone powder, stone grit, shell grit at 4 to 5 gms/bird/day.

#### Describe Feeding management of improved desi birds

- The feed cost alone is 65% of total expenditure in poultry production. In small scale poultry farming the feed cost is considered to be minimum. Hence, the birds are let loose for scavenging in the open yard and collect the required protein, energy, minerals and vitamins etc from insects, snail, termites, seeds of grasses and weeds, leftover grains, crop residues and household wastes. Feed ingredients like broken rice, ground nut straw, wheat grain, rice bran etc also can be given to the birds.
- During rainy season poultry feed should not be stored more than 30 days to avoid fungus growth (Aflatoxicosis).
- In this poultry farming generally two times feeding is practiced; once at morning and another at evening.

- The space requirement for feeder is 2 to 7 cm at brooding period, 7 to 10 cm during growing stage and 12 to 15 cm / bird at laying stage. The water space should be 0.5 to 1.5 cm during brooding, 1.5 to 2.5 during growing and 2.5 cm during laying period.
- The birds may be supplied with extra concentrate ration @ 30 to 60 gm/ day/ bird for better performance.

#### Discuss Feeding management for commercial strains (Cobb, Ross, etc)

- Using scientifically calculated specific ration are available for each commercial strain is beneficial

#### Standards

- India has the BIS standards for all these ingredients for each type and age group of bird

#### Specifications of nutrient content in layer feed (BIS)

S.No	Specifications					
	Nutrient	Unit	Brooder 0-8 weeks	Grower 9- 20 weeks	Layer 21-45 weeks	Layer 46-72 weeks
1	Moisture	Max %	11	11	11	11
2	Crude Protein	Min %	18	16	18	16
3	Metabolizable energy	Min Kcal/Kg	2800	2500	2600	2400
4	Ether extract	Min %	2	2	2	2
5	Crude fibre	Max %	7	9	9	10
6	Acid insoluble ash	Max %	4	4	4	4.5
7	Calcium	Min %	1	1	3	3.5
8	Total phosphorous	Min %	0.7	0.65	0.65	0.65
9	Available phosphorous	Min %	0.45	0.4	0.4	0.4
10	Lysine	Min %	1	0.7	0.7	0.65
11	Methionine	Min %	0.4	0.35	0.35	0.30
12	Salt as NaCl	Max %	0.5	0.5	0.5	0.5

**Specifications of nutrient content in layer feed (BIS)**

S.No	Specifications				
	Nutrient	Unit	Pre starter 0-7 day	Starter 8-21 day	Finisher from 22 days onwards
1	Moisture	Max %	11	11	11
2	Crude Protein	Min %	23	22	20
3	Metabolizable energy	Min Kcal/Kg	3000	3100	3200
4	Ether extract	Min %	3	3.5	4
5	Crude fibre	Max %	5	5	5
6	Acid insoluble ash	Max %	2.5	2.5	2.5
7	Calcium	Min %	1	1	1
8	Total phosphorous	Min %	0.7	0.7	0.7
9	Available phosphorous	Min %	0.45	0.45	0.45
10	Lysine	Min %	1.3	1.2	1.0
11	Methionine	Min %	0.5	0.5	0.45
12	Salt as NaCl	Max %	0.5	0.5	0.5

**Do** 

- Give practices for feeding management of desi birds in commercial farm

**Notes for Facilitation** 

- Explain cost effective feeding management of desi birds
- Discuss importance of BIS standards in feeding management

[illegible]





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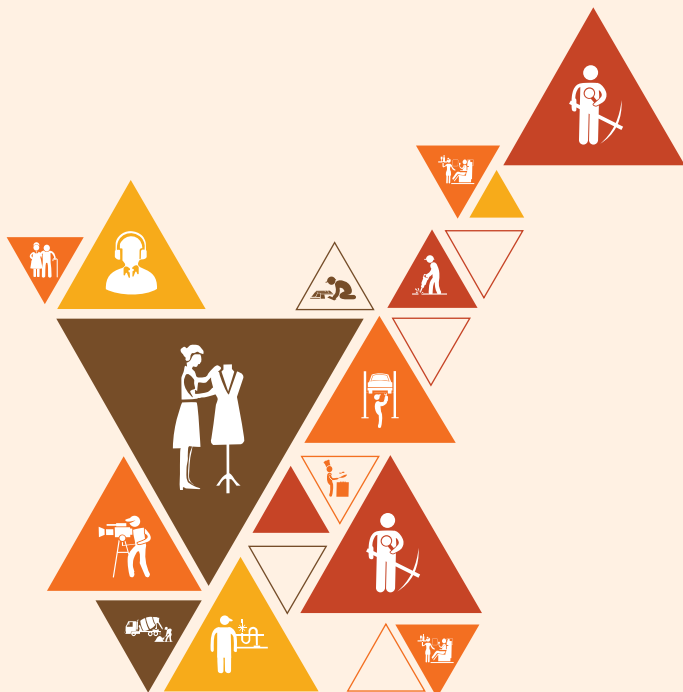
## 5. Maintain Health of Birds at Poultry Farm

Unit 5.1 – Symptoms of common diseases and its prevention

Unit 5.2 – Vaccination

Unit 5.3 – Management Disorders of Poultry

Unit 5.4 – Debeaking, Deworming and Delicing



AGR/Q4331

## Key Learning Outcomes

**At the end of the session the participants will be able to:**

- Understand the different types of vaccines and
- Understand the diseases and management
- Record the weight of the birds at regular interval
- Monitor the physical condi
- abnormal signs
- Manage waste safely and correctly in accordance with regulatory requirements
- use and store drugs, medica
- Record and maintain the complete medica

## UNIT 5.1: Symptoms of common diseases and its prevention

### Unit Objectives

After completing this session the trainees will be able to gain:

- Common diseases affecting the layers and broilers

### Say

- This chapter briefly covers various diseases that affecting layer and broiler and how to manage the those disease problems

S.No	Disease	Symptoms	Prevention
1	<b>Ranikhet disease</b>	<ul style="list-style-type: none"> <li>• Whitish diarrhea, characterize by the passing of a watery stool with an offensive smell</li> <li>• Sneezing, gasping and often droopiness</li> </ul>	<ul style="list-style-type: none"> <li>• Proper housing and general good care</li> <li>• Sanitary measures</li> <li>• Vaccination at correct time</li> <li>• Birds should be dewormed starting from one week prior to R2B/RDVK vaccination and repeated at 3-week intervals so as to give a total of 4 deworming before housing at 18 weeks of age</li> </ul>
2	<b>Fowl cholera</b>	<ul style="list-style-type: none"> <li>• Acute form - birds may die without showing any symptom</li> <li>• Less severe form -breathing rapid with open beak, feather ruffled, comb and wattle become cyanotic</li> <li>• Yellowish diarrhea Chronic form - swollen comb and wattle, joints hot and painful</li> </ul>	<ul style="list-style-type: none"> <li>• Medication and Vaccination</li> </ul>
3	<b>Infectious coryza</b>	<ul style="list-style-type: none"> <li>• Respiratory complications, swollen head syndrome, nasal discharge and severe drop in egg production</li> </ul>	<ul style="list-style-type: none"> <li>• Protection of birds from extreme climatic conditions</li> <li>• Maintenance of good hygiene</li> <li>• Antibiotic therapy along with vitamin C or ascorbic acid</li> </ul>

4	<b>Infectious bronchitis</b>	<ul style="list-style-type: none"> <li>Respiratory symptoms, increased mortality and decreased egg production</li> </ul>	<ul style="list-style-type: none"> <li>Protection of birds from extreme climatic conditions</li> <li>Maintenance of healthy environment</li> </ul>
5	<b>Mycoplasmosis</b>	<ul style="list-style-type: none"> <li>Reduced egg production and higher mortality; eggs with pimpled shells</li> </ul>	<ul style="list-style-type: none"> <li>Heating eggs prior to incubator placement at a temperature 460°C – prevents egg transmission</li> </ul>
6	<b>Salmonellosis (Pullorum disease)</b>	<ul style="list-style-type: none"> <li>Chicks hatched from infected egg, moribund or dead chick may be seen in the incubator</li> <li>Peak mortality during second or third week</li> <li>Affected birds may exhibit a shrill cry when voiding excreta, which is white or greenish brown</li> <li>Infection spread within the flock for a long time without any distinct signs</li> </ul> <p>Reduction in egg production, fertility and hatchability</p>	<ul style="list-style-type: none"> <li>Regular blood testing of the parent flock; eliminating of infected and carrier birds – prevents vertical transmission</li> <li>Preventing entry of rodents, vermin or other wild animals</li> <li>Assurance of improved hygienic conditions</li> </ul>
7	<b>Coccidiosis</b>	<ul style="list-style-type: none"> <li>Blood tinged feces, ruffled feathers, loss of appetite, poor growth and reduced egg production</li> </ul>	<ul style="list-style-type: none"> <li>Assurance of a healthy environment and the elimination of moisture and increased heat conditions within the house</li> <li>Addition of coccidiostats in the ration but avoid coccidiostat during egg laying period</li> </ul>
8	<b>Yolk sac infection</b>	<ul style="list-style-type: none"> <li>First few weeks of chicken's life</li> <li>Drowsiness, minimal mobility, vent pasting and lack of interest of feeding in the chicken</li> </ul>	<ul style="list-style-type: none"> <li>Hygienic collection of eggs for incubation</li> <li>Better management of the chicks during brooding</li> <li>Avoid overcrowding and other stressful conditions</li> </ul>
9	<b>Escherichia coli</b>	<ul style="list-style-type: none"> <li>No pronounced signs, severe drop in egg production</li> <li>Association with concurrent infections IBD and coccidiosis</li> </ul>	<ul style="list-style-type: none"> <li>Good water management</li> <li>Proper disposal of poultry waste</li> <li>Antibiotic therapy</li> </ul>



- Allow them to identify different diseases by seeing symptoms
- Practice disease prevention procedures



- ## Notes for Facilitation
- Explain the different diseases affecting birds
  - Provide slide show to know about symptoms related to various disease

[illegible]

## UNIT 5.2: Vaccination

### Unit Objectives

**After completing this session the trainees will be able to gain:**

- Learning critical skill in handling of vaccines, vaccination technique and adopting the specific vaccination schedule

### Say

- This chapter says common vaccination schedule for layers and broilers and explain vaccination technique

#### Introduction

"Prevention is better than Cure". Many viral diseases cannot be treated but can be controlled only by preventive vaccination.

### Explain

#### Explain different routes of administration

##### Drinking Water

It is time and labour saving method. Vaccine is reconstituted in cold drinking water along with skim milk powder at the rate of 4 gram per litre of water and used immediately. For example RDV Lasota Vaccine.

##### Intra ocular - Intra nasal instillation

The vaccine is reconstituted in normal saline solution. One drop of diluted vaccine is applied to the nostrils or eye. Ex : RDVF . The virus particle gets absorbed in the mucous membrane and immunization is obtained.

### Spray Vaccine

Spray or mist spraying is done on chick in the hatcheries. Small drops of equal size is sprayed and the boxes are allowed for 10 to 15 minutes for drying. Drying should not be done near light or by hot air.

### Wing Web puncture method

Fowl pox vaccine is reconstituted in 50% glycerol saline and taken in forked needle and vaccination is done by puncturing through wing web. Care should be taken that muscle, nerve and blood vessels are damaged by the vaccination.

### Feather Follicle Method

Pigeon pox vaccine is reconstituted with 50% glycerol saline. After plucking of the feather follicles in the internal thigh region, with the help of a glass rod, the vaccine is smeared and rubbed. After 5 days the birds have to be examined for "Takes". Takes are cellular reaction taking place in the nervous system.

### Subcutaneous injection

Ranikhet K vaccine is reconstituted with normal saline and 0.5ml is given between two layers of skin in the wing web region without damaging nerves, blood vessels and muscle. The vaccine should be protected in ice box during vaccination and should be used within one hour.

### Discuss Vaccination for broilers

S.No.	Age	Name of the vaccine	Route of administration
1.	1 <sup>st</sup> day	Marek's Disease vaccine	Subcutaneous injection at Hatchery
2.	5-7 <sup>th</sup> day	Ranikhet Disease F Strain	Eye drop or Nasal drop
3.	14 to 16 days (II week)	Infectious Bursal disease(live) IBD(killed)	Eye drop or Nasal drop
4.	21 to 24 th day (III week)	Lasota – Ranikhet	Eye drop or Nasal drop or drinking water

**Describe Vaccination for layers**

S.No.	Age	Name of the vaccine	Route of administration
1.	1 <sup>st</sup> day	Marek's Disease vaccine	Subcutaneous injection at Hatchery
2.	7 <sup>th</sup> day	Ranikhet Disease F Strain/Lasota. RD killed.	Eye drop or Nasal drop.0.2 ml S/C.on the same day
3.	14 to 16 days (II week)	Infectious Bursal disease(live) IBD(killed)	Eye drop 0.2 ml. S / C on the same day
4.	21 to 24 th day (III week)	Infectious Bronchitis	Eye drop
5.	30 to 35 days	Ranikhet disease -Lasota strain	Eye drop
6.	42 to 45 days	Infectious Bursal disease (live)	Eye drop
7.	56 to 70 days (8-10 th week)	Ranikhet disease "K" (Mesogenic)	Subcutaneous
8.	84 to 91 days (12 - 13 <sup>th</sup> week)	Fowl Pox vaccine	Wing web puncture or Intramuscular
9.	91 to 98 days (13 to 14 <sup>th</sup> week)	Infectious Bronchitis Vaccine	Through Drinking Water
10.	126 to 133 days	Ranikhet disease K" (Mesogenic)	Subcutaneous Injection
11.	After peak production , every 8 Weeks	Ranikhet Disease Vaccine "Lasota"	Through Drinking Water

1. Live vaccine and killed vaccine should be administered on the same day by different persons.
2. In the pullet( nearing egg laying stage)or during outbreak of Ranikhet disease the RDVK Lasota strain vaccine should be preferred.
3. Before RDVK vaccination the birds should be dewormed.



- Allow them to get skill of different routes of vaccination



- ## Notes for Facilitation
- Explain the vaccination schedule of layer and broiler
  - Demonstration of different kind of vaccination procedures



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## UNIT 5.3: Management Disorders of Poultry

### Unit Objectives

**After completing this session the trainees will be able to gain:**

- Scientific knowledge on Managemental disorders causes and its prevention

### Say

- This chapter says common Managemental and nutritional related disorders and its prevention

#### Introduction

- Some disorders which are all affecting chicken are mainly due to defects in farm management especially feeding methods. In this chapter, some Mangemental disorders of poultry are viewed

### Explain

#### Explain prolapse

- Due to deficiency of fiber in feed and management faults

#### Cannibalism

- Cannibalism usually occurs when the birds are stressed by a poor management practice. Once becoming stressed, one bird begins picking the feathers, comb, toes or vent of another bird.
- Once an open wound or blood is visible on the bird, the vicious habit of cannibalism can spread rapidly through the entire flock.
- Cannibalism will lower the birds value due to torn and damaged flesh, poor feathering and can result in high death losses.
- Once this habit gets out of hand it is difficult to eliminate. Hence this habit is necessary to prevent.

### Causes and prevention of cannibalism

#### 1. Overcrowding:

Chicks should be allowed following space

- 1/4 sq. ft./bird for first 2 weeks
- 1/2 sq. ft./bird for 3-8 weeks
- 1 sq. ft./bird from 8 to 16 weeks of age
- 1.5 sq. ft./bird from 16 weeks on

#### 2. Excessive heat:

- When the birds become uncomfortably hot they can become extremely cannibalistic.
- Be sure to adjust the brooding temperature as the young chicken get older. Brood young chicken at 95°F. for the first week and then decrease the temperature 5°F. per week, until you reach 70°F. or the outside temperature.
- The temperature should be measured at the height of the birds back directly under the heat source. Do not heat the entire brooding facility to the recommended temperature.

#### 3. Excessive light:

- Extremely bright light or excessively long periods of light will cause birds to become hostile toward one another.
- Never use white light bulbs larger than 40 watts to brood chicken. If larger bulbs are required for heat, use red or infra-red bulbs.
- In birds 12 weeks of age or older, use 15 or 25 watt bulbs above feeding and watering areas. Don't light chicken more than 16 hours per day. Constant light can be stressful to the birds.

#### 4. Absence of feed or water or a shortage of feeder and waterer space:

- If the birds have to fight for food and water, or if the birds are always hungry they will increase pecking. Be sure that birds have free access to water and feed at all times.

**5. Unbalanced diets:**

- Extremely high energy and low fiber diets cause the birds to be extra active and aggressive. Feed lacking protein and other nutrients, particularly Methionine, will also cause birds to pick feathers.
- Make sure feed a diet balanced appropriately for the age and types of chicken which are raising.

**6. Mixing of different types and colors of chicken:**

- Mixing different ages of chicken or chicken with different traits promotes pecking by disrupting the flocks normal pecking order.
- Never brood different species of birds together.
- Curiosity can also start pecking.

**7. Abrupt changes in environment or management practices:**

- If you plan to move young birds to a new location, it is best to move some of their feeders and waterers with them in order to help them adapt.
- When you change over to larger feeders and waterers it is helpful to leave the smaller equipment in the pen for a few days to help during the change.
- Beak trimming avoid cannibalism

**8. Brightly lit nests or shortage of nesting boxes:**

- Don't place bright lights near the nesting areas. Also, allow 1 nest for every 5 hens.
- Vent pecking by layers is also a common problem.

**9. Allowing cripples, injured or dead birds to remain in a flock:**

- Chicken will pick on cripples or dead birds in their pens because of the social order and curiosity.
- Once pecking starts it can quickly develop into a vicious habit.

**10. Slow feathering birds are most prone to cannibalism:**

- Birds with slow feathering have immature tender feathers exposed for longer periods of time leaving them open to damage from pecking. Don't raise slow feathering birds with other chicken.

### Aflatoxicosis

- Causes – contaminated feed
- High mortality and severe drop in egg production
- Regular monitor of feed quality
- Proper storage of feed
- Provide fresh feed rather than stale feed

### Rickets

- Due to deficiency or imbalance of circulating calcium, vitamin D3 or phosphorus also due to mycotoxin
- Symptoms – the condition results in soft bones, which will often become bowed, thereby restricting the birds' ability to stand and walk
- Mycotoxin induced rickets can be treated by replacing toxin contaminated feed
- Supplementing vitamin D3 to three or four fold the usual levels

### Cage layer fatigue

- Occurs in birds during peak production
- Mainly due to delay in feeding with high calcium feeds during high production and also metabolic malfunction
- Osteoporosis (brittle bones), bird lose control of their legs and lie on their side
- Preventive measures – feeding the hens a diet with the right proportions of calcium in a timely manner will prevent the depletion of calcium from the medullary bones

### Fatty liver syndrome

- Metabolic disorders mainly observed during high production periods in laying hen
- Causes – toxins, nutritional imbalances, excessive consumption of high energy diets, deficiency of nutrients that mobilize fat from the liver, endocrine imbalances and genetic components
- Affected birds also have pale combs
- Preventive measures – substituting carbohydrate with supplemental fat will not increase the energy content of the diet; replacing of corn with other cereals such as wheat and barley; use of by-product feeds such as dried distillers' grains and solubles, fish meal oat hulls and alfalfa meal
- Prevent excessive positive energy balance in older birds; when increased body weight is observed, action should be taken to limit energy intake by feeding lower energy diets and or a change in feed management



- Allow them to identify Management disorders in birds at different farm level



- ## Notes for Facilitation
- Detailed explanation of cannibalism
  - Discuss steps for prevention of fungal growth in feed and metabolic disorders in chicken
  - Field trip is necessary

[illegible]

## UNIT 5.4: Debeaking, Deworming and Delicing

### Unit Objectives

**After completing this session the trainees will be able to gain:**

- Scientific skill and knowledge on debeaking, deworming and delicing

### Say

- This chapter says method and procedure of doing the three important practices of debeaking, deworming and delicing

### Explain

#### Explain Debeaking

- It is recommended to trim the beaks of the layer birds to control feed wastage, feather pecking and cannibalism. It is carried out by means of electrocautery.
- It is important to remove only one third of the upper beak taking care to avoiding tongue. It is usually practiced at the age of 10-14 days and repeated at the age of 14-16 weeks. Beak trimming should never be done with penknife.

#### Procedure

The bird has to be restrained by holding wings and legs by left hand and the tongue is pushed backwards by opening mouth and introducing index finger of right hand so that the tongue is not cut. The upper beak is cut to  $\frac{2}{3}$ <sup>rd</sup> of its length and  $\frac{1}{3}$ <sup>rd</sup> of the lower beak. After beak trimming, vitamins and antibiotics are to be administered for 3-5 days to avoid stress and secondary infections.

#### Describe DEWORMING

Deworming is the process of removing worms from digestive tract of the birds. The tapeworm passes segments and is consumed by intermediate host (earthworm, cockroach) where intermediate stage gets developed and passed out, which in turn is consumed by host.

### Birds show the following symptoms when they are infested with worms

1. Dullness- weakness, emaciation
2. Paralysis-due to toxins produced from worms
3. Enteritis-diarrhea with blood
4. Anemia-due to sucking of blood by worms.
5. Drop in egg production.

Deworming is practiced at intervals of 45 days in layer birds and also before RDVK vaccination. Deworming is done against worms only if absolute necessity

### Discuss DELICING/DELOUSING

Delicing is the process of removing of external parasites like ticks, mites and fleas which suck the blood from the bird. The following symptoms are observed during external parasitic infestation: itching, restlessness, external wounds, loss of body weight, weakness, anemia and drop in production.

### Procedure

The dipping of the birds in sunny days has to be done with the following chemicals to remove the external parasites.

Sumathion or malathion - 0.2 %. The bird has to be immersed in the chemical solution avoiding eye and mouth. The dipped one has to be dried in a separate enclosure. The feeders, waterers and building should be sprayed with this chemical solution to remove the external parasites. After dipping, to relieve stress to the bird vitamin A, B complex has to be given to improve the health of the birds.

**Do**



- Practice them to do debeaking, deworming and delicing



- ## Notes for Facilitation
- Explain reasons for debeaking, delicing and deworming
  - Discuss precautionary measures before practicing debeaking, delicing and deworming
  - Hands on training is necessary for debeaking, delicing and deworming



Notes





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## Key Learning Outcomes

**At the end of the session the participants will be able to:**

- Estimate the number of eggs to be harvested from the shed
- Collection of eggs
- Handling of Eggs
- Time of harvesting
- Identify and harvest the birds for meat purpose

## UNIT 6.1: Handling Packing And Transport of Eggs

### Unit Objectives

**After completing this session the trainees will be able to gain:**

- Safety and quality intact egg during collection, handling, packaging and transport of the egg
- This chapter says hygienic collection, handling, storage, labeling, packaging and transport of the egg

### Say

#### Skill for Handling of eggs

1. Use clean container like coated wire baskets or plastic egg flats for egg collection.
  2. Do not stack eggs too high
  3. Never cool eggs rapidly before they are cleaned.
  4. Wash eggs as soon as you collect them.
  5. Wash eggs with water 10 degrees warmer than the egg.
  6. Never let eggs sit in water. Once the temperature equalizes the egg can absorb contaminants out of the water.
  7. Cool and dry eggs quickly after washing.
  8. Store eggs, large end up, at 50-55 °F and at 75% relative humidity. If eggs sit at room temperature (75°F) they can drop as much as one grade per day. If fertile eggs are kept at a temperature above 85°F for more than a few hours the germinal disc (embryo) can start to develop. If fertile eggs are kept above 85°F over two days the blood vessels of the embryo may become visible.
- ❖ If eggs are stored properly in their own carton or other stable environment they should hold a quality of Grade A for at least four weeks.

#### Enumerate Functions of packaging

Packaging is an important component in delivering quality eggs to buyers. It embraces both the art and science of preparing products for storage, transport and eventually sale.

Many factors must be taken into consideration for packaging eggs. It is important to obtain information regarding the necessary requirements for a particular market, such as:

- quality maintenance
- storage facilities
- type of transport
- distance to be travelled
- climatic conditions
- time involved
- cost

### Egg packages

- There are many different types of egg packages, which vary both in design and packaging material used.

#### Type 1.

- Packing eggs with clean and odourless rice husks, wheat chaff or chopped straw in a firm walled basket or crate greatly decreases the risk of shell damage.
- The basket has no cushioning material such as straw and therefore damage to the eggs may occur more easily. This kind of packaging may be fit for short distance transport.

#### Type 2.

- A very common form of packaging is the filler tray. The fillers are then placed in boxes or cases.
- Filler trays are made of wood pulp moulded to accommodate the eggs. They are constructed so that they can be stacked one on top of the other and can also be placed in boxes ready for transport.

#### Type 3.

- Eggs can also be packed in packages that are smaller and specific for retail sale. Each package can hold from two to twelve eggs.

- These cases can be made of paperboard or moulded wood pulp, or can be made of plastic.
- It is also possible to pack eggs in small paperboard cases and cover them with plastic film.

### Labeling

- Labels are a source of important information for the wholesaler, retailer and consumer and not just pieces of paper stuck onto cartons or boxes
- The important facts on the label contain information for buyers concerning the eggs, their size and weight and quality/grade description - AA, A or B
- Labels may also indicate the producer, when the eggs were laid, how to store them and their expiration date. Persuading the buyer to purchase the product without tasting, smelling or touching is another function of labelling.

### Outline Transport of eggs

1. The containers and packaging materials must be such that the eggs are well protected against mechanical damage.
2. Care should be taken at all stages of handling and transport. Workers handling eggs should be instructed so that they appreciate the need for careful handling. The eggs must be protected at all times against exposure to temperatures that cause deterioration in quality as well as contamination, especially tainting.

### Recommended temperatures for loading and transport

The following criteria should be taken into consideration.

- The need for a managerial and operational staff that is competent in all the operations involved in assembling, loading and distributing.
- The necessity of a sufficient volume of trade throughout the year.
- The possibility of making up loads with other compatible produce, e.g. dairy products.
- The possibility of carrying return loads, once eggs have been distributed.
- The degree to which the demand for refrigerated transport is concentrated geographically.

	Transport over 2 or 3 days	Transport over 5 or 6 days
Maximum on loading	+6° C	+3° C
Recommended for transport	-1° to + 3° C	-1° to + 1° C
Acceptable for transport	1° to + 6° C	1° to + 3° C



- Practice them to do skill of handling and packing of the eggs
- Allow them to identify different egg case



- ## Notes for Facilitation
- Explain soft handling of the egg
  - Discuss precautionary measures during storage, packing and transport of eggs
  - Hands on training is necessary

[illegible]

## UNIT 6.2: Slaughtering of birds Packing And Transport of Meat

### Unit Objectives

**After completing this session the trainees will be able to gain:**

- Scientific procedure for slaughter of birds and planning to reach consumers with quality dressed chicken

### Say

- This chapter says step wise procedure for slaughter of birds, grading of the dressed birds, packing, storage and transport of meat

#### Define Slaughter procedures

- Slaughtering involves stunning and bleeding

#### Stunning

- Stunning prevents struggling and relaxes the muscles holding the feathers.
- However, it is generally not practiced in case of chicken.
- A low voltage electric stunning of 50 volts AC for 1 minute has been found to be satisfactory.

#### Bleeding

- This process is carried out in an inverted cone shaped equipment to rest the body of the bird and keep the head out and down.
- There are several techniques of slaughtering poultry in order to seek proper bleeding.
- The technique most commonly used these days is “modified Kosher Method” in which jugular vein is severed just below the jowl taking care not to cut trachea and oesophagus.
- Another technique for slaughtering the birds is decapitation, which is not so common.
- Still another method, which involves piercing knife through the brain, has become obsolete.
- In general, a bleeding time of 1.5 to 2.0 minutes is allowed. Incomplete bleeding

### Scalding

- Scalding refers to immersion of birds in hot water for loosening the feathers. It should be done when all reflexes have ceased.
- The birds are transferred into scalding tank.
- Broiler and young birds are scalded at 55°C for 15 minutes whereas culled birds and spent hens are scalded at 60°C for 2 minutes.

### Defeathering

- The process is carried out in a feather plucker consisting of two drums with rubber fingers, which revolve in opposite directions pulling of feathers from the carcass. Any remaining feathers are picked up manually.

### Singeing

- The carcasses are now singed over a blue flame for 5 to 10 seconds to remove hair like appendages called filoplumes.

### Washing

- The singed carcasses are washed with spray water to remove dirt and reduce the microbial load.

### Removal of feet and oil gland

- The next step involves cutting of feet from tarso- metatarsal joint with a sharp knife and removal of oil gland.

### Evisceration

- The carcasses are hung by hooks to the shackles for evisceration.
- By a slit opening from the tip of breastbone, abdominal cavity is opened by means of a transverse cut.
- A circular cut is made around the vent.
- The viscera is drawn outside but allowed to remain attached to the carcass for postmortem inspection.
- Meanwhile, a slit is made in the skin of the neck for easy removal of crop and neck.
- After postmortem inspection, inedible offals, including trachea, lungs, oesophagus, crop, intestines, gall bladder and kidneys are removed whereas giblet consisting of heart, liver and gizzard should be collected, cleaned and packed in a wrapper.

### Chilling and draining

- After washing, the dressed birds are chilled in a chilling tank containing slush ice or crushed ice for 30-45 minutes in order to cool the carcasses to an internal temperature of about 4°C.
- The chilled birds are kept on the draining rack for 10 minutes to remove the excess water.

### Washing

- Dressed birds are thoroughly washed again with clean spray water preferably maintained at 15±5°C.
- Special care should be taken to wash the interior and sides.

### Grading

- Dressed chickens are graded on the basis of conformation, degree of fleshing, bruises, cuts and other quality attributes.
- Indian Standards for dressed chicken are given in the table below.

### Packaging

- Adequate packaging can prevent the contamination of meat and meat products.
- The packaging procedure results in an inner package, where the packaging material is in direct contact with the product. In some cases it is combined with an outer package often a cardboard boxes, or other materials.
- There are various synthetic packaging films available for the inner packaging, e.g. transparent or opaque, flexible or semi-rigid, gas proof or permeable to certain gases. These materials are selected to serve specific purposes, such as protection from unwanted impacts or attractive presentation.
- Before packaging, dressed chickens having gizzard without mucosal layer, heart without pericardium and liver without gall bladder are placed in the abdominal cavity of the carcass and packed in polyethylene bags (200 gauge).
- Shrink packaging may be adopted if dressed chickens are to be stored in a frozen condition.

### Storage

- Dressed chicken can be stored in a refrigerator at 2°C for 7 days and deep freezer at –18 to –20°C for a period of 4-6 months.

### Transport of meat

- The transportation of each of these products has different guidelines. Frozen meat products for example can be transported all over the world.
- Fresh meat products have a limited shelf life and therefore have to be in the supermarket within two days, and are normally not transported over long distances. Trucks are therefore the most common transportation method.
- Processed meat products can either be fresh or frozen. The transport conditions are similar to those mentioned before.
- Fresh meat products are transported with trucks from the slaughterhouse to the retailers and the super market.
- If a product is processed, the meat is transported from the slaughterhouse to the meat processing manufacturer and after that transported to retailers and super markets.
- To guarantee a healthy fresh product, the time of transportation from producer to consumer has to be as short as possible. Not only time is important to guarantee a fresh product.

**The following actions are further taken to ensure food safety during the transportation of fresh meat products:**

- Ensure carcasses and other meat products have been properly chilled to 4°C (40°F) or colder at the slaughter or cut-and-wrap facility before loading.
- Maintain a temperature of 4°C (40°F) or colder during transport.
- Hold frozen products at -18°C (0°F) or colder, and ship in a way that prevents thawing and refreezing.

### Do

- Practice them to do slaughter of bird individually
- Allow them to grade the dressed chicken



- ## Notes for Facilitation
- Detailed explanation on bird slaughter
  - Field visit (slaughter house) is necessary



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## Unit 7.2 – Meat by Product Utilization



## Key Learning Outcomes

**At the end of the session the participants will be able to:**

- Scheduling for post harvest clean out
- Follow the clean out activities
- Identify and use the tools/equipments required for the clean out process
- Use of disinfectants

## UNIT 7.1: Slaughter house Waste management

### Unit Objectives

**After completing this session the trainees will be able to gain:**

- Systematic and scientific utilization of slaughter house waste for recycling with cost effectiveness

### Say

- This chapter says nature of various slaughter house waste, recycling methods of slaughter house wastage

#### Introduction

Slaughterhouse wastes from poultry processing include processing water and organic solid by-products. As for poultry production wastes (manure and litter), these organic solids should be considered both potential resources and potential environmental pollutants, depending on how they are processed and managed.

#### Outline Incineration

- Incineration refers to technologies of thermal destruction, apparently among the most effective methods for destroying potentially infectious agents. Air-dried poultry litter is an established combustible solid fuel with a gross calorific value of about 13.5 GJ per tonne, about half that of coal.
- In incineration, the air emission, process conditions, and the disposal of solid and liquid residues need to be strictly controlled.

#### Describe Burial and controlled land filling

- Burial of dead birds on the farm has to be strictly monitored to avoid groundwater contamination.
- As the operation, monitoring, and control of land filling also became more tightly regulated due to its adverse effects on the local environment, particularly the pollution of surface water, groundwater, soil and air.

### Discuss Rendering

- Rendering refers to different heating applications to remove fat from meat. Rendering at 133°C for a minimum of 20 min at 3 bars or an alternative heat treatment is required for high-risk materials used for animal feed or as an intermediate product for the manufacture of organic fertiliser or other derived products.
- Rendering produces meat-bone-meal, which can be used in animal feed or as fertiliser or further processed via anaerobic digestion or composting.
- In addition, rendering produces fat, which may be used for animal feed, in chemical industry products, or burned as fuel.
- Slaughterhouse by-products are preserved with formic acid as it has good source of proteins and vitamins and are used as animal feed.

### Tell about Composting

- Composting is an aerobic biological process to degrade organic material. It is a common method to treat poultry slaughterhouse wastes, grease trap residues, manure, litter, and sometimes also feather.
- Composting reduces pathogens, and the resulting compost can be used as soil conditioner or fertiliser.
- However, wastes having high moisture with low fibre content need higher amounts of moisture-sorbing and structural support to compost well.

### Interact on Anaerobic digestion

- Anaerobic digestion is a biological process in which organic matter is degraded to methane.
- Methane can be used as a source of bio-energy to replace fossil fuels thereby reducing carbon dioxide emissions.

### Discuss Feather utilization

- Properties of a feather degrading bacterium, *Bacillus licheniformis*, which can ferment and convert feathers to feather lysate, a digestible protein source for feed use.
- An enzyme, keratinase, secreted by this bacterium, was purified and characterized. The keratinase is a potent proteinase that hydrolyses collagen, elastin and feather keratin.

### Methane production

- The biological methane production rate and yield of different poultry slaughtering residues differ from each other.
- Poultry offal, blood, and bone meal which are rich in proteins and lipids, showed high methane yields at different concentrations of volatile solids. Blood and bone meal produced methane rapidly.
- Sewage sludge at 35°C, have the shortest delay of a few days, while granular sludge did not produce methane within 64 days of incubation.

### Do

- Practice them to do any one of the recycling method of slaughter house waste

### Notes for Facilitation

- Detailed explanation post harvest technology after birds slaughter
- Field visit (post harvest unit) is necessary
- Demonstration of recycling methods of waste (like composting)

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## UNIT 7.2: Meat by Product Utilization

### Unit Objectives

**After completing this session the trainees will be able to gain:**

- Systematic and scientific knowledge on Profitable with free utilization of meat by products lie blood, inedible viscera and feather

### Say

- This chapter meat by products and utilization of chicken blood, inedible viscera and feather meal

### Explain

#### Explain use of Chicken blood

- Blood is approximately 2 percent of the live bird weight, and a source of highly concentrated protein when filtered and dried to produce blood meal.
- During slaughter, blood is typically collected separately from the other viscera and, depending on cooling conditions and storage time prior to further processing, may require chemicals to prevent coagulation.
- Processed blood meal can be used in animal and fish feed as well as fertilizer.

#### Outline Chicken inedible viscera

- The head, feet (recovered for human consumption in some regions) and inedible viscera make up the remainder of slaughterhouse solids.
- Following further processing by methods such as conventional rendering at specified temperatures and pressures, depending on the intended fate and risk factor of the material, sellable products in the form of protein-rich meals and fat are produced.

- Processed blood meal can be used in animal and fish feed as well as fertilizer.

### Outline Chicken inedible viscera

- The head, feet (recovered for human consumption in some regions) and inedible viscera make up the remainder of slaughterhouse solids.
- Following further processing by methods such as conventional rendering at specified temperatures and pressures, depending on the intended fate and risk factor of the material, sellable products in the form of protein-rich meals and fat are produced.
- Extensive further processing of these by-products may not be required in some areas, if bio security precautions are taken.
- Birds confirmed or suspected of carrying transmittable disease, especially a disease such as highly pathogenic avian influenza (HPAI), should be characterized as high-risk material (not suitable for consumption).
- Care and management steps should be taken to keep high-risk materials separate from low-risk materials, as mixing of the two results in the entire batch being classified as high-risk.

### Discuss Poultry feather

- Feathers comprise approximately 7 to 10 percent of the live bird weight and are another source of protein (75 to 90 percent crude protein), although the utilization value of feathers as an animal feed component depends on further processing methods (e.g., high-pressure cooking at >100°C or enzymatic treatment) to improve digestibility.
- Processed feathers can also be used for bedding, clothing and other niche market items for humans.
- Poultry feathers are also converted into biodegradable plastics by a process called polymerization.
- In this process, feathers which contain keratin protein are pulverized into fine dust. Chemicals that make keratin molecules to join together are used to form long chains (polymerization).
- It is further moulded into various shapes when heated at 170°C. These thermoplastics can be popularised to manufacture all kinds of products, from plastic cups and plates to furniture.
- The nonwoven textile materials prepared by chicken feathers are very versatile and have a wide application in the field of technical textiles.

Type of by-product	% of live weight	Uses
By-products of poultry dressing plant		
Feathers	7–8	Bedding material, decorative purpose, sporting equipment, manure or fertilizers, feather meal.
Heads	2.5–3.0	Poultry meal.
Blood	3.2–3.7	Blood meal.
Gizzard and proventriculus	3.5–4.2	Edible, source of chitinolytic enzyme.
Feet	3.5–4.0	Soup, technical fat/poultry grease
Intestines and glands	8.5–9.0	Sportgats,, meat meal, poultry grease and active principles (hormones and enzymes)

The utilization of slaughterhouse solid by-products for animal feed is becoming increasingly restricted in many parts of the world.

**Do** ☒

- Practice them to assess quality of inedible viscera



- ## Notes for Facilitation
- Detailed explanation of meat by products
  - Field visit (feather meal unit or other post harvest unit) is necessary



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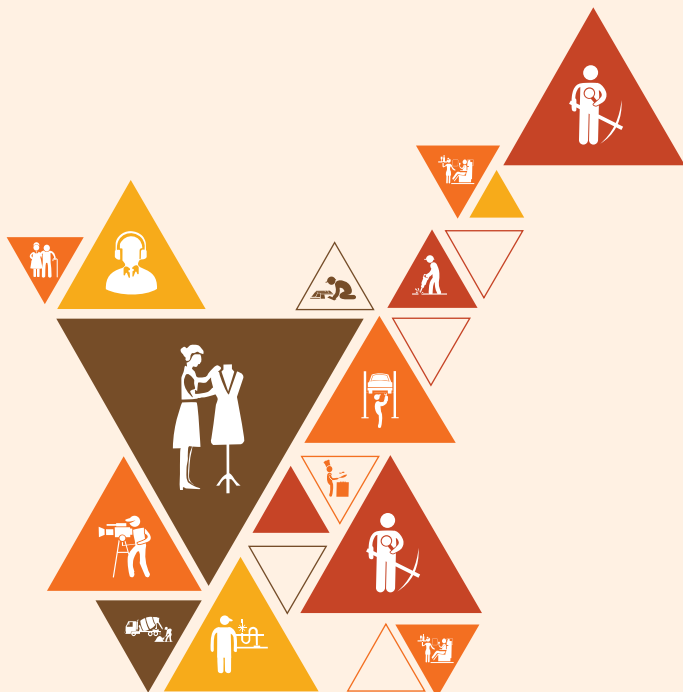
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## 8. Build Entrepreneurship And Marketing Skills

Unit 8.1 – Preparation of Project Report for Banking

Unit 8.2 – Poultry Insurance



AGR/Q4333

## Key Learning Outcomes

**At the end of the session the participants will be able to:**

- Understand the Poultry farming economics and finances
- Market the harvested products (Meat and eggs)

## UNIT 8.1: Preparation of Project Report for Banking

### Unit Objectives

**After completing this session the trainees will be able to perform:**

- Financial investment arrangements and safe guarding the farm through banks

### Say

- This chapter enlightens important points for applying bank loan for new farm construction and maintenance

#### Outline Project report formulation for Bank loan

- A project can be prepared by the beneficiary after consulting local technical persons of State Veterinary Department, Poultry Corporation or University.
- A regular and constant demand for meat and nearness of the farm to the market should be ensured
- The project should include information on land, water and electricity facility, marketing aspects, training facilities and experience of entrepreneurs and the type of assistance available from State Government, Poultry Corporation, local hatcheries.
- It can also include data on proposed capacity of the farm, total cost of the project, margin money to be provided by the beneficiary, requirement of bank loan, estimated annual expenditure, income and profit and the period for repayment of loan and interest

#### List out Requirements of a good project

- After the scheme is submitted to the bank it is examined for technical feasibility and economic viability

#### (1) Technical feasibility

- Suitability of climate and potentiality of the area
- Availability of inputs such as chicks, feed, medicines etc.
- Technical norms
- Infrastructure available for veterinary aid, marketing, training and experience of the beneficiary

## (2) Financial viability

- Unit cost and loan requirement
- Input costs for chicks, feed, veterinary aid, labour and other overheads
- Output costs i.e. sale of eggs, culled birds, for meat, manure, empty gunny bags etc.
- Income-expenditure statement and annual gross surplus
- Cash flow analysis
- Repayment schedule i.e. repayment of principal loan amount and interest

### Scrutiny of project by the bank

- After the scheme is submitted to the bank it is examined for technical feasibility and economic viability
- Other documents such as loan application forms, security aspects, margin money requirement etc. are also examined
- A field visit to scheme area is undertaken for conducting techno economic feasibility study for appraisal of the scheme

### Sanction of bank loan and its allocation

- After ensuring technical feasibility and financial viability the scheme is sanctioned by the bank
- The loan is allocated in 2 or 3 stages against the creation of specific assets such as construction of sheds, purchase of equipment and machinery, recurring cost during growing period on purchase of first batch of chicks, feed, medicines and vaccines, electricity and water, labour expenses etc.
- Constant follows up and supervision of the scheme is done by the bank

### Lending terms-General

#### Unit cost

- Each Regional Office (RO) of NABARD has constituted a State Level Unit Cost Committee under the Chairmanship of RO in charge and with the members from developmental agencies, commercial banks and cooperative banks to review the unit cost of various investments once in six months

### Margin money

- NABARD has defined farmers into three different categories and where subsidy is not available the minimum down payment as shown below is collected from the beneficiaries

S. No.	Category of farmer	Farmer level of predevelopment return to resources	Beneficiary's contribution
1	Small farmers	Up to Rs. 11,000	5%
2	Medium farmers	Rs. 11,001 to Rs. 19,250	10%
3	Large farmers	Above Rs. 19,251	15%

### Interest rate

- As per the RBI guidelines issued from time to time

Size of credit limit	Repayable up to 3 years	Repayable in 3 years and above
Up to Rs. 50,000/-	8.5%	9%
Over Rs. 50,000/- up to Rs. 2 lacs	9.5%	9.75%
Over Rs. 2 lacs up to Rs. 5 lacs	10.25%	10.25%
Over Rs. 5 lacs up to Rs. 25 lacs	11.25%	11.75%
Over Rs. 25 lacs based on credit risk assessment	10.75% to 12.25%	11.25% to 12.75%

### Security to be furnished

Amount of loan	Security to be furnished
A. Where movable assets are not created (eg. Dugwells, development of land etc.)	
a) Up to Rs. 10,000/-	b) Personal Guarantee
c) Above Rs. 10,000/-	d) i. Personal Guarantee ii. Mortgage of land
B. Where movable assets are created (pump set, pipeline etc.)	
a) Up to Rs. 50,000/-	a) Hypothecation of the asset created
b) Above Rs. 50,000/- to Rs. 1 lac	b) i. Hypothecation of the asset created ii. Mortgage of land or third party guarantee
c) Above Rs. 1 lac	c) i. Hypothecation of the assets created ii. Mortgage of land

### Security

- Security will be as per NABARD/RBI guidelines issued from time to time

### Repayment of loan

- Repayment period depends upon the gross surplus in the scheme

**Enumerate Documents to be produced by the applicant**

- Certified copies of records in respect of lands owned/leased
- NOC/No Due Certificate from other financial institutions wherever applicable
- Two passport size photographs
- Documents of title and other relevant documents, wherever landed properties are taken as security
- Plan and estimate in respect of construction/drilling/deepening of wells, proforma invoice/ quotations in case of machines, vehicle, etc.
- Valuation certificate of the land from a competent authority/panel valuer wherever applicable
- Other documents related to specific schemes

**Do**

- Preparation project report for getting bank loan under stipulated conditions
- Allow them to do analyze the technical feasibility report of given project

**Notes for Facilitation**

- Provide basic information on financial investment plan through nationalized banks

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## UNIT 8.2: Poultry Insurance

### Unit Objectives

**After completing this session the trainees will be able to perform:**

- Brief outline on facility, procedure, coverage and claim for poultry insurance

### Say

- This chapter enlightens important points for applying poultry insurance

### Explain

#### Explain Poultry Insurance Scheme

- There are comprehensive insurance schemes available with the General Insurance firms applicable to poultry farms consisting layer birds, broiler birds and parent stock (hatchery) which are exotic and cross-bred
- All birds in a farm have to be covered. After issuing policy, if additional birds are introduced in the farm, immediate notice to be given to insurer otherwise claim will be repudiated
- The schemes are applicable to poultry farms consisting of minimum number of birds as specifiedThe schemes are available for insuring birds in the following age groupsLayers
  - : 1 day to 20 weeks
  - 21 weeks to 72 weeks
  - 1 day to 72 weeks
- The premium rates are applicable on per cent basis which are applicable to the peak value of birds in the applicable categories
- The sum insured is the peak value and for layers is Rs.75. there is a week wise valuation table in-built in the policy which is applied for calculating indemnity. In case of parent stock the same is negotiable
- The policy is characterized by excess and final indemnity is restricted to 80% (60% in case of Gumboro)

### Insurance coverage

- The policy provides indemnity against death of birds due to accident (including fire, lightning, flood, cyclone/storm/tempest/earthquake, strike, riot, act of terrorism) or diseases contracted or occurring during the period of insurance subject to the exclusions

### Major exclusions

- Malicious/willful injury, neglect
- Transit by any mode of transport
- Improper management (including overcrowding) i.e. when the farm is not run on scientific poultry management guidelines and standards laid down by Poultry Corporations/Animal Husbandry Department in regard to housekeeping, watering, feeding, vaccination, deworming, debeaking, lighting/heating, culling etc.
- Loss/death due to natural mortality, non-specified or unknown diseases or reasons
- Undergrowth, cannibalism, action or predators like preying birds and carnivorous animal
- Theft and clandestine sale of birds
- Intentional slaughter of the birds except in cases where destruction is necessary to terminate incurable suffering on humane consideration and to protect remaining healthy flock to reduce additional losses on the basis of certificate issued by qualified veterinary surgeon or in cases where destruction is resorted to by order of lawfully constituted authority, under intimation to Insurance Company
- Consequential loss however caused
- Permanent and partial disablement of any nature
- Loss of production i.e. the failure due to any reasons what so ever to lay required number of eggs or small sized eggs in layers
- Marek's disease, Rankhet disease, Fowl Pox and Infectious Bronchitis are covered by the policy if the birds are successfully inoculated against these diseases and the necessary veterinary certificate to that effect is supplied to the company. Coccidiosis and other diseases are covered only if preventive and curative measures are taken from time to time
- Malnutrition/shortage of water, death due to starvation because of non supply of feed to birds or similar reasons of what so ever nature
- Undergrowth
- Cannibalism
- Loss due to huddling and/or piling of birds
- Avian Leucosis Complex (A.L.C.)
- War, invasion, act of foreign enemy, hostilities (whether war be declared or not), civil war, rebellion, revolution, insurrection, mutiny, tumult or usurped power or any consequences thereof or attempt threat
- Any accident, loss, destruction, damage or legal liability directly or indirectly caused by or contributed or arising from nuclear weapons

## Plan for Model economic for small poultry farmers in deep litter system

## Assumption

1.	Floor space requirement
2.	Cost of construction of shed
3.	Cost of equipment
4.	Cost of day old chick
5.	Price of broiler feed
6.	Cost of medication and electricity
7.	Labour cost
8.	Total no. of chicks
9.	Mortality
10.	Depreciation of building
11.	Depreciation of equipment
12.	Cost of litter and electricity equals the income from manure (35 days)
13.	Quantity of feed consumed by birds
14.	Average wt of bird
15.	Sales cost of a bird

**I. Fixed investment (Rs.)**

1.	Cost of building
2.	Cost of equipment
	Total cost

**II. Fixed cost (Rs.)**

1.	Interest on fixed investment
2.	Depreciation on equipment
3.	Depreciation on building
4.	Labour cost
5.	TOTAL FIXED COST

**III. Variable cost (Rs.)**

1.	Cost of chick - 23 x 500
2.	Cost of feed – 3.4x500x27
3.	Cost of medicine & electricity
	Total Variable Cost
	Total Cost Incurred (II +III)

**IV. Total returns (Rs.)**

1.	Total sale of chicks
2.	Cost of gunny bags
	Total Returns

**V. Net returns**

Total returns
<b>Net returns / bird</b>

**Do** 

- Allow them to do project for 500 number of broiler birds and layer birds separately

**Notes for Facilitation** 

- Provide complete picture on small-scale holder farm economics

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**AGR/Q4334**

## Key Learning Outcomes

**At the end of the session the participants will be able to:**

- Document and maintain records of layers and broilers ( related to small poultry farm)
- Document and maintain records related to poultry production ( related to small poultry farm)
- Document and maintain financial records (related to small poultry farm)

## UNIT 9.1: Record Keeping

### Unit Objectives

**After completing this session the trainees will be able to perform:**

- Understanding the purpose, type and maintaining the financial, production input and output register
- This chapter says purpose of record keeping in farm.

### Say

#### Purposes of Records

1. Measure profit and access the financial ability of the business/operation.
2. Provides data for business/operation analysis.
3. Assists in obtaining loans.
4. Measure the profitability of individual operation.
5. Assist in analysis of new investments.
6. Help prepare income tax returns.

In general, farm records can be broadly classified under two categories.

- Production/ Technical records
- Financial records
- The nature of the records varies, based on the type and volume of the enterprise.

#### List out various registers

##### Attendance and daily wages register

- These deals with the number of persons employed daily and wages dispersed to them; including the stamped acquaintance.

### Equipment Register

- This includes various farm equipment machineries like feed mill, vehicles, cages, incubators, feeders, waterers etc.
- The date, source, number and cost of purchase of equipment must be recorded.
- The repairs carried out along with the details of repairs also must be indicated.
- The annual depreciation should be calculated for equipment and the actual post-depreciation value for equipment must be brought forward for the next year.

### Feed and feed ingredient register

- Feed is the major item of expenditure in poultry production. Hence, much care should be exercised in maintaining this register.
- Few pages must be allotted for each feed ingredient of the feed.
- For each of these items, the opening balance, receipts, issues, storage loss, manufacturing cost and the closing balance has to be maintained.
- In the remarks column, the source of purchase, invoice number and date and cost per unit must be indicated.

### Feed additives and medicines register

- This register keeps track of the various feed additives, medicines, vaccines, disinfectants, chemicals purchased and utilized.
- The opening balance, receipts, issues, closing balance and a remarks column must be maintained for each item.
- In the remarks column, the invoice number, date, cost and source of each purchase have to be indicated.

### Petty items or miscellaneous purchase/ expenditure register

- In this register, all miscellaneous purchases like tools, stationary, bulbs, nails etc. and other day-to-day expenditure has to be recorded and a monthly and annual consolidated report has to be prepared to calculate miscellaneous expenditure.
- In addition to the above mentioned common registers, the following specific registers have to be maintained, depending on the nature of the farm and type of enterprise.

### Layer farm register

- For each batch, the production performance register has to be maintained from day one to disposal; with the following columns.
- Date, age in days, opening balance of birds, mortality, feed issued, feed/ bird/ day, eggs produced, % Hen-day egg production, Feed/ egg and remarks.
- The remarks column should deal with date of vaccinations, debeaking, medication, post-mortem report if any, sale of culled birds and any other relevant information.
- A separate book has to be maintained for each batch from day one to disposal, so that batch wise economics can be calculated.

### Egg out turn register

- This is a consolidated record of egg turnover by all batches maintained in the farm at a time.
- This will take into account the eggs produced by all the batches of layers in the farm.
- This register consists of the following columns namely: Date, opening balance of eggs, eggs produced, sold, and closing balance of eggs and remarks.
- Number and sale price of the pullet eggs and broken saleable eggs may also be maintained.
- Moreover, the day-to-day sale price of eggs must be recorded daily.
- The monthly and annual consolidated report, indicating the volume and value of the total eggs turnover may be furnished.

### Broiler farm records

- For broiler farms, batch wise performance sheet has to be maintained, with the following columns.
- Before the regular columns, the batch number, source of chicks, number of paid and free chicks received, date of hatch, cost per chick and strain, have to be recorded.
- The regular data to be recorded are date, age in days, opening balance of birds, mortality, total feed issued and remarks.
- In the remarks column the medication and vaccination details, cause of death may be indicated.
- These regular columns should continue up to 56 days; but recording should be done until the date of sale.
- Below these regular columns the following particulars like total live body weight of birds sold, number of birds sold, per cent mortality, total feed consumed, feed conversion ratio, cost of feed, sale price of broilers sold, cost of chicks and miscellaneous cost (electricity, labour, medicine, vaccination, fuel etc) have to be recorded.

### Breeder farm records

- The records will be similar to that of the layer farm. However, one more column, namely the number of hatching eggs produced daily has to be included in the batch wise performance and egg out turn register.

### Hatchery records

- The hatchery should maintain a register similar to that of egg out turn register but with some modified columns as follows:
- Date, opening balance, receipts, settings, discards and sales, chicks produced, chicks sold, chicks discarded, free chicks and remarks.

### Batch wise hatchery sheet

- This may be maintained, to provide the following information.
- Serial setting number, number of eggs set, type of eggs, strain, source of eggs, number of eggs discarded, number of eggs transferred to hatcher, number of good chicks hatched, number of weak chicks, number of pullet chicks (in case of egg-type only), number of male chicks and mode of disposal, per cent total hatchability and per cent fertility.

### Chick out turn and disposal register

- This register consists of strain wise chick out turn and disposal particulars, consisting of date, opening balance of chicks, chicks hatched, chicks sold, chicks used for own purpose, chicks discarded, chicks given as free margin, closing balance, price per chick and remarks.
- The remarks column should have the Marek's disease vaccination and other particulars.

### Feed mill record

- The feed mill registers will be similar to the general registers discussed above but with more details about individual feed ingredients.
- Instead of maintaining few pages for each ingredient and feed in the same register, a separate register has to be maintained for each ingredient and feed.
- An extra column showing the feed ingredient shortage due to storage, grinding and mixing loss has to be indicated at the expiry of each batch or lot received or mixed.
- Moreover, the remarks column must indicate the source of purchase, bill number, unit price and mode of payment, in case of feeding ingredient.



- Practicing recording of data in various registers



- ## Notes for Facilitation
- Enumerate and describe various types of record keeping followed in farm
  - Observation of various register



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## UNIT 9.2: Analysis And Interpretation of Record

### Unit Objectives

**After completing this session the trainees will be able to perform:**

- Know methods to analyze and interpret farm records for overall assessments of performance and efficiency

### Say

- This chapter says importance of record analysis and assess the flock performance based on the analysis

#### Reason for analysis of records

- Farm records are used to evaluate the performance of any farm or farm enterprise within a given period of time.
- Records are an aid to managerial control. With the help of records, a farmer can keep a close check on whether work on his farm is going according to his plans.
- Farm records provide figures for farm planning and budgeting.
- Farm records tell a farmer how much he is earning.
- Farm records tell the farmer where he is gaining progressively or losing.
- Banks normally give loans if only a farmer can produce adequate physical records with the corresponding accounting records as well as the overall farm plan.
- A measure which would project the degree to which a farm operator kept and used these records for analysis purposes in a certain area of the farm business was needed. To meet this requirement, record keeping and analysis indices, or index scores, were developed for the overall farm business.

### Explain

#### Explain Importance of flock record analysis

- At the risk of stating the obvious, it's important to always know how many birds you have on site. In computing your farm's value, the birds - and their eggs - are your farm's greatest asset (in equivalent market price monetary terms).

- It goes without saying therefore, that getting a loan (or attracting investors/partners) can be much easier, if you keep accurate records.
- **Opening Stock**
- For operational effectiveness, weekly and monthly stock count of layers in production can be done. At the start of the week for instance you would count and document the number of birds physically on the farm.

### 1. Losses (Dead/Killed, Missing or Culled)

- In every process, allowance is made for losses or waste. Poultry business is no different. But losses need to be kept as low as possible. Otherwise profit margins suffer. Good management may produce lower rates, but reports by extension specialists and farm owners suggest that a 10% mortality rate from start to end of laying would be normal.
- Record format could capture **Dead/Killed**, and **Missing** or **Culled** birds in separate columns because it will facilitate summing up the right numbers for use in computing the Mortality Rate (%).

### 2. Additions (Transfers and Purchases)

- Sometimes new batches of birds are brought in, and others are moved out.
- Proper documentation of these movements is crucial for effective planning and decision making.

### Closing Stock

- At the end of the week or month, should count and document the number of birds physically present in the pens or houses. Closing and opening stock values are required for computing the mortality rate for the flock.

**Layers' Strain (Genetic Record)**

- Egg laying performance is partly dependent on genetic quality of the laying bird. Hybrids have been in widespread use for decades in the poultry industry. Due to a variety of operational realities, farms are likely to have different strains and batches of birds in production.
- Without accurate record keeping, mix-ups can occur that could totally disrupt the farm manager's ability to accurately assess the performance of separate batches or strains.

**Age In Lay (Weeks)**

- For proper management of the birds during their laying cycle, and also to plan effectively for their replacement, you need to track their age in lay.
- Pullets usually start laying from about 20 to 21 weeks.

**Do** 

- Practicing them to calculate and interpret the record keeping and analysis indices, or index scores (feed consumption rate, flock egg production average, etc.)

**Notes for Facilitation** 

- Enumerate and describe various types of record keeping analysis indices

[illegible]





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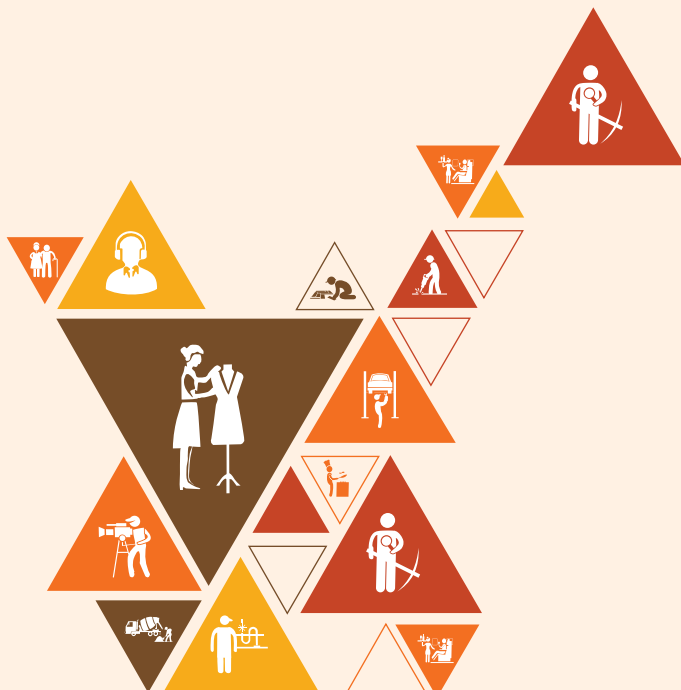
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## 10. Safety Hygiene And Sanitation Farm

Unit 10.1 – Farm Hygiene

Unit 10.2 – Water Hygiene

Unit 10.3 – Recycling of Poultry Waste



**AGR/Q4316**

## Key Learning Outcomes

**At the end of the session the participants will be able to:**

- Perform General safety Rules
- Gain Knowledge of various health hazards relevant to workplace and basic first aid training.
- Understand and handle the emergency situation in workplace and during any farm operation

## UNIT 10.1: Farm Hygiene

### Unit Objectives

**After completing this session the trainees will be able to perform:**

- After completing this session the trainees will be able to know the various critical factors to be introduced in the farm for keeping the health of the birds and biological means to control the entry of pathogenic organisms into the farm

### Say

- This chapter says various plans to keeping farm hygiene and introduce preventive measures for control of disease

#### Introduction

- Maintaining excellent health of poultry flocks is the primary objective of any producer, since a healthy flock can be translated into a profitable flock. Despite all progress in prevention and control of infectious diseases, it is still difficult to keep a commercial poultry facility completely disease-free.

**The following are examples of measures which can be taken to ensure good hygiene and to prevent disease at the farm:**

- The processing operation should be located as far away as possible from other similar operations
- Poultry houses and all equipment should be scrubbed clean with a high pressure hot water cleaner, detergents and disinfectants such as chlorine based chemicals, formaldehyde, 2% caustic soda solution or 1% quaternary ammonium compounds solution between raising batches of poultry
- Chicks or eggs should be purchased from disease free flocks
- Birds of one age only should be reared in each house. Birds of different ages can infect each other and young chicks are particularly vulnerable to adult disease
- Feed should be procured in proper packaging or by bulk transport
- The diet should be well balanced in sufficient quantities and obtained from a well known source
- Dirty litter & droppings should be removed from the poultry house

- Overheating and overcrowding of the birds should be prevented
- Poultry houses should be well ventilated; this is important in maintaining correct housing temperature and humidity.
- Clothing, footwear, cleaning facilities & materials should be provided and laundered for all staff and visitors.
- A foot-bath should be installed containing disinfectant (such as an Iodoform) at the poultry house entrance and its use made compulsory.
- Veterinary advice should be sought at the first sign of disease in the flock. If this is not available, the producer may be obliged to slaughter in order to prevent serious recurrence of the disease in subsequent flocks
- Dead birds should be removed as soon as possible from the rearing houses and disposed of by incineration or deep burial
- Although the poultry sheds are designed to prevent their entry, rats, mice and insects are difficult to keep at bay. They should be destroyed if they infest the poultry house and feed store as they are carriers of disease
- Cats, dogs and other animals should be prevented from entering the poultry house. Children should be discouraged from entry also unless they are attending to the birds or under instruction

### Bio security

- Bio security is a practice designed to prevent the spread of disease onto a farm
- Accomplished by maintaining the facility in such a way that there is minimal traffic of biological organisms (viruses, bacteria, rodents, etc.) across its borders

### Components

1. Isolation - confinement of animals within a controlled environment
2. Traffic control - includes both the traffic onto the farm and the traffic patterns within the farm
3. Sanitation - disinfection of materials, people and equipment entering the farm and the cleanliness of the personnel on the farm

## Types of bio security

### 1. Conceptual bio security

- Best to build the farm in an isolated area at least 1.6 km away from nearest poultry farm in case of commercial layer farm
- In case of breeders the farm should be away from the main high way that may be used to transport commercial and backyard poultry
- Maintain enough distance between breeders and grow out farms and facilities such as hatcheries and feed mills

### 2. Structural bio security

- Fencing of farm perimeter to prevent unwanted visitors
- Test water source for minerals, bacteria, chemical contamination and pathogen load
- Suitable water and power supply
- Suitable location for storage of bagged feed
- Facilities for safe scientific disposal of dead birds
- Wild birds and rodent proofing
- Separate section for storage of feed, litter and equipment
- Free of all vegetation around the farm
- Roads within the farm to ease cleaning

### Operational bio security

- Developing operation manuals for day-to-day activities carried out in feed mills, hatcheries, breeding and grow-out facilities incorporating emergency plans
- Proper decontamination and disinfection of equipment, houses etc., following depopulation
- All visitors and workers require to shower and use clean farm clothes
- Maintain record of visitors and the purpose of their visit
- Provide recommended inter flock interval
- No vehicles or equipment should be allowed within the farm area from the time of delivery of flock until depopulation
- Use an effective integrated pest management program
- Appropriate program of disease diagnosis and proper vaccination schedule
- Chicks should be obtained from a source free of vertically transmitted diseases

- Recycled egg filler flats etc. should be decontaminated at the point of entry of farm
- Routine disease monitoring procedures (post-mortem examination and periodic serum antibody assay)
- Regular culling of unhealthy, unproductive and diseased birds

#### **Infectious diseases can spread from farm to farm by:**

- Introduction of diseased birds
- Introduction of healthy birds who have recovered from disease but are now carriers
- Shoes and clothing of visitors or caretakers who move from flock to flock
- Contact with inanimate objects (fomites) that are contaminated with disease organisms
- Carcasses of dead birds that have not been disposed of properly
- Impure water, such as surface drainage water
- Rodents, wild animals and free-flying birds
- Insects
- Contaminated feed and feed bags
- Contaminated delivery trucks, rendering trucks, live hauling trucks
- Contaminated premises through soil or old litter
- Air-borne fomites
- Egg transmission

#### **Managemental procedures in disease prevention**

##### **1. Isolation**

- It is not advisable to rear birds of various age groups in same house

##### **2. Rodent control**

- Rodents act as carriers of many diseases
- They contaminate the feed with their urine and faeces
- Primary critical point in bio security

##### **3. Litter management**

- A poorly maintained or wet litter – potential source of disease transmission
- Poor litter – increased production of ammonia – decrease the egg production and severe economic loss

**4. Quality of chick**

- Ensure that good quality of chicks are received from a reputed hatchery – free from mycoplasmosis, salmonellosis and infectious bursal diseases

**5. Proper nutrition**

- Birds should be maintained on a good, well balanced feed as per prescribed standards

**6. Water quality**

- Microbial and chemical quality of water need to be tested before establishing a poultry farm in the area

**7. Dead birds' disposal**

- Follow scientific disposal of dead birds – burying, pit disposal, incineration (electrical, wood or oil), septic tank disposal consist of digesting the carcasses and by the action of mesophilic bacteria and composting

**8. Litter removal**

- Periodical removal of old and used litter material after depopulation is very essential

**9. Disinfection**

- To disinfect is to be free from pathogenic microorganisms

**10. Insect control**

- Regular fly control programmes must be followed if the problem is unbearable



- Allow them to create various bio security plans which will be required for poultry farm



- ## Notes for Facilitation
- Describe various types of bio security measures
  - Provide complete notes regarding farm hygiene



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## UNIT 10.2: Water Hygiene

### Unit Objectives

**After completing this session the trainees will be able to perform:**

- Methodology to provide wholesome drinking water to the birds

### Say

- This chapter covers importance of water hygiene in poultry farm

#### Water

- Water is a critical nutrient for all living organisms. Water is essential for health of the birds and hygienic surroundings of the farm

#### Water as a vehicle of infection for poultry

- This is particularly relevant in poultry production, where one single water source serves thousands of animals. Therefore, control measures must be considered as priority, in order to prevent the occurrence of diseases that are spread through water, and would certainly result in great economical losses.
- Although water does not provide ideal conditions for pathogenic microorganism to multiply, they will generally survive for enough time to allow waterborne transmission

#### Water analysis

- New poultry farms must get the analysed water samples before starting the farm
- Analytical report should contain mineral status and microbial load of the water samples
- Interpret the water sample analysis report with veterinary surgeon

#### Water hygiene

- Cleanliness of the water should be maintained from water yielding point to water usage point

- Water collection should be hygienic
- Five feet surrounding the well should be cement plastered to avoid possible subsoil water contamination
- Unused water from waterers should be discharged properly
- Waterer cleaning place should be an elevated place with proper drainage to avoid any stagnation
- There should not be any leakage in water lines
- Water storage places should be properly covered

### Microbial quality of water

- If the number of microorganisms found in a water sample is too high, it indicates that the water supply is contaminated
- Coliform bacteria are organisms normally found in the digestive tracts of livestock, humans, and birds. Their presence in water is used as a sign of fecal contamination
- Desirable bacterial count in water is 0/ml

Contaminant	Maximum acceptable level
Total heterotrophic bacteria	100 cfu/ ml
Coliform bacteria	50 cfu/ml

### Physical quality of water

#### 1. pH:

- A pH of 6.0 to 6.8 is preferred for better production
- pH lower than 6 can impair the bird performance.
- pH greater than 8 can cause reduce water consumption

#### 2. Hardness:

- Hard water may cause stain, stains, leave residues, or cause other physical problems in water-handling equipments
- No positive or negative effect on poultry performance

#### 3. Color:

- Pure water is colorless.
- Color change considered a sign of contaminant

**4. Turbidity:**

- Particles of silt, clay, algae, or organic material in suspension (muddy water)

**5. Total solids:**

- Represent the total amount of solid material in a suspension or solution

**6. Dissolved oxygen:**

- Key test for water pollution
- Normal level – 7 to 14 ppm
- Excess level may indicate algae growth and or pollution

**Routine monitoring of the watering system**

- Check of water pressure on individual lines
- Replacement of clogged filters and drinkers/nipples
- Residual chlorine levels
- Random sampling of drinkers in every line
- Inspection of pumping, water treatment, and storage sites

**WATERING SYSTEMS**

1. Nipple watering system
2. Cup watering system

**1. Nipple watering system**

- Nipple drinker system must be kept level to prevent air locks that could deprive birds of water.
- In general, nipple systems are designed to operate at low pressures.
- As birds grow, drinkers are raised and water pressure is increased.
- Filters should be used.
- Leaking valves should be replaced as soon as possible.

### Watering schedule

- Water should be turned on and available for one hour prior to feeding and turned off or removed one hour after all feed is consumed

### Water sanitation

1. Filtration
2. Sedimentation
3. Ozonisation
4. Ultraviolet treatment
5. Chemical treatment – Chlorination is best and cheapest method of water sanitation in poultry farm

### Chlorination

5 grams of stabilized bleaching powder (available chlorine lever 35%)

Add 1000 litres of drinking water

Minimum contact time 60 minutes

Residual chlorine level at collection point is 0.2 ppm

### Other chemicals

- Hydrogen peroxide (50%) solution, at 1ml/50 liters of water
- Iodophor compounds (1.6% available iodine)
- Quaternary ammonium compounds (1ml/10 liters of water).
- If water storage facility is not available then use liquid chlorine preparations like Clodox, Vaz, etc.,

### Ways to protect the water hygiene

- Contamination of water needs to be avoided
- Water stagnation should be avoided
- Inner side of water containers should be free from sliminess
- Water storage drum should be properly covered
- Water should not be contaminated with flying bird's droppings
- It is advisable to used plastic or mud waterers since they are rust proof
- Clean water has to be provided in waterer
- Water needs to be provided twice daily
- Water splashing in the feed need to be avoided
- Water should not be contaminated with rat droppings
- Water should be chlorinated continuously



- Provide calculation for usage of chlorine in different size of water tank



- ## Notes for Facilitation
- Explain different water sanitization methods followed in poultry farm
  - Demonstrate various sanitizer used in water hygiene

[illegible]

## UNIT 10.3: Recycling of Poultry Waste

### Unit Objectives

**After completing this session the trainees will be able to perform:**

- Safe and hygienic disposal of poultry waste and recycling of poultry waste

### Say

- This chapter says different types of poultry waste and hygienic handling and recycling of the poultry waste

#### Introduction

- Scientific research has documented that nutrients and energy from poultry waste by-products, including manure and litter, can be safely recycled as a component of livestock and poultry diets when pathogens are neutralized.
- Most of these by-products can provide organic and inorganic nutrients that are of value if managed and recycled properly, regardless of flock size.

#### Land application of crop nutrients

- Globally, poultry manure or litter has been applied to land to enhance crop production for centuries. When properly managed, this is an effective and beneficial option.
- Environmental pollution occurs when manure or litter is applied to the land in excess of the receiving crop's capacity to utilize the nutrients.
- Other factors that influence the environmental fate of the manure and litter applied include methods of collecting, storing, handling, treating, transporting and applying the waste by-products to the receiving land.

#### Composting

- Composting is the aerobic microbial breakdown of organic matter, usually incorporating a thermophilic phase. Composting can also reduce nuisance odour emissions from poultry waste storage and treatment areas.

- The adoption of composting systems for poultry waste has received attention due to its ability to reduce litter volume, dispose of carcasses, stabilise nutrients and trace elements and reduce pathogens.
- Agronomic benefits of composted litter include increased plant available nutrients and humic residues.
- The immobilization of nitrogen (N) and phosphorus (P) during composting reduces the risk of soluble N and P entering aquatic systems via surface flow and leaching.

### Direct combustion

- Direct combustion and incineration are recognised as efficient options for generating renewable energy and fertiliser grade ash from litter and could potentially close the nutrient loop for the poultry industry.
- There are currently successful large scales off-site electricity utilities operating in some countries that primarily use litter as a fuel.
- For on-site electricity and heat generation, smaller direct combustion systems are being researched and developed could supply both environmentally sustainable waste disposal and energy.
- Poultry litter and dry manure can be incinerated for on-farm production of heat in small furnaces, or transported to central locations where they are combusted on a large scale for the generation of electricity.

### Anaerobic digestion

- Anaerobic digestion could also promote a closed-loop system for the poultry industry, as the process could degrade and stabilise a wide range of organic poultry wastes including litter.
- Poultry manure and litter contain organic matter that can be converted into bioenergy under certain processing technologies. One of the most common approaches for poultry excrement managed by water flushing (e.g., some layer operations) is anaerobic digestion, which yields biogas, a gas mixture with varying concentrations of combustible methane.

### Gasification technology

- Gasification technology is a way of producing bioenergy that is receiving renewed interest for small on-farm systems and central electric power stations in some regions.
- The process involves incomplete combustion in a limited-oxygen environment.
- As noted for both anaerobic digester technology and incineration units, economic costs and returns, operational feasibility and emission issues have an impact on the implementation of this technology.

### Animal refeeding

- Poultry litter has been estimated to be as much as three times more valuable as a feedstuff than as a fertilizer for crop nutrients.
- The refeeding of poultry processing by-products is a common and acceptable practice in most, but not all, cultures.
- Advances in the treatment and processing of feathers and offal to produce value-added feed ingredients are making this practice more attractive in some regions, especially with the recent increases for feeds derived from grains.

### Ethanol production (biofuels)

- It is also likely that poultry litter could be suitable for lignocellulosic alcohol production. If this technology is viable, this waste could supply biofuels to Australia and potentially reduce the demand for grain destined for ethanol production.

### Vermiculture

- The use of specially selected earthworm species to degrade waste is known as vermiculture.
- This technique has been widely adopted by home gardeners to utilize green wastes and vegetable scraps.
- Vermiculture has the potential to produce both humic rich vermi-compost (vermicast) and meat meal (vermimeal) from litter.
- Traditionally, the vermiculture process has primarily been adopted to produce vermicast, a recognised valuable organic fertiliser.

### Do

- Advise them to put vermicompost in a farm



- ## Notes for Facilitation
- Describe recycling methods of poultry waste
  - Demonstration of vermicompost, incineration, rendering, etc.



Notes





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Transforming the skill landscape

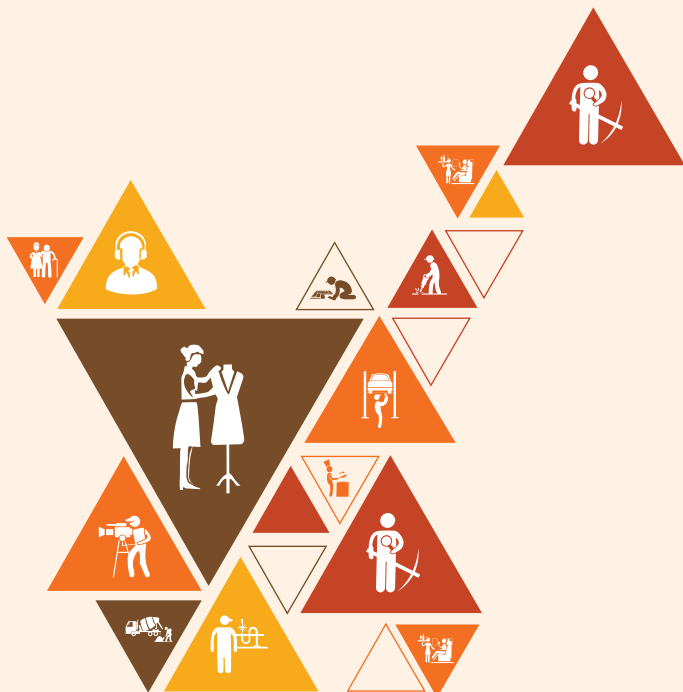


**ASCI**  
Agriculture Skill Council of India

## 11. Annexures

Annexure I : Training Delivery Plan.

Annexure II : Assessment Criteria



AGR/N9903

## Annexure I

### Training Delivery Plan

Training Delivery Plan			
<b>Program Name:</b>	Certificate Course in Small Poultry Farmer		
<b>Qualification Pack Name &amp; Ref. ID</b>	Small Poultry Farmer <b>AGR/Q4306,AGR/Q4327,AGR/Q4328,AGR/Q4329,AGR/Q4330,AGR/Q4331,AGR/Q4332,AGR/Q4333,AGR/Q4334,AGR/Q4316,AGR/N9903,</b>		
<b>Version No.</b>	1.0	<b>Version Update Date</b>	07-04-16
<b>Pre-requisites to Training (if any)</b>	No entry level barrier; 5th Standard Passed preferable One year prior experience in field (crop) operations		
<b>Training Outcomes</b>	<p><b>By the end of this program, the participants would have achieved the following competencies:</b></p> <ol style="list-style-type: none"> <li>1. Increased understanding of Small Poultry Farmer</li> <li>2. Increased knowledge about various aspects of Small Poultry Farmer system</li> <li>3. Enhanced knowledge of Small Poultry Farmer components</li> <li>4. Increased motivation to take Small Poultry Farmer as livelihood options</li> <li>5. Increased awareness about schemes like - NHM, NHB, NABARD, Central &amp; State Schemes</li> <li>6. Development of a strategy for adaptation of Small Poultry Farmer</li> </ol>		

S. No	Module	Session	Objectives	Methodology	Tools	Duration	Pre assessment	Post assessment
1	Internal assessment	Pre-training assessment	Assess the current knowledge on small scale poultry holders	Theory test	Assessment Guide Trainer's Guide	1 hour		
2	Ice Breaker	Ice Breaker	Introduce each other and build rapport with fellow trainees and the trainer	Group participation activity	Trainer's Guide	1 hour		
3	Brief outline about small poultry farmer	Interesting facts about small scale poultry farming	Outline all about small poultry operation and usefulness in utilizing different varieties and strains	Trainer led Discussion	Trainer's Guide	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>• Explain the farm capacity in small poultry farmer system</li> <li>• List out the indigenous birds</li> <li>• Enumerate improved varieties/strains of birds</li> <li>• Discuss use of commercial strains</li> <li>• Find out important technical inputs</li> </ul>
4	Prepare and maintain accommodation for poultry birds	Principles of land selection	State the criteria for site selection to construct poultry house  Information on needs and facilities for house construction	Trainer led Discussion and individual observation	Trainer's Guide  Field trip	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>• Outline factors influencing ideal land selection</li> <li>• List out basic facilities needed</li> <li>• Briefly describe environmental factors for land selection</li> <li>• Safeguarding the birds in land selection</li> </ul>

5	Prepare and maintain accommodation for poultry birds	Scientific planning of poultry housing	State basic principles of poultry houses and various scientific factors for construction of poultry sheds  Outline about ideal poultry house	Trainer led Discussion  Skill Observation	Trainer's Guide Field trip	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>Enumerate factors to be considered for construction of poultry sheds</li> <li>Define orientation, farm location and flooring</li> <li>Explain height, width and length of the poultry farm</li> <li>Ideal poultry house - outline</li> </ul>
6	Prepare and maintain accommodation for poultry birds	Building materials	State different construction materials for roofing, flooring and walls	Trainer led Discussion Skill Observation	Trainer's Guide	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>List out the various roofing materials</li> <li>Enumerate the different flooring system</li> <li>Outline materials used for construction of wall</li> </ul>
7	Prepare and maintain accommodation for poultry birds	Environmental factors of housing	Outline key factors involving to maintain ideal micro environmental condition for the birds	Trainer led Discussion Skill Observation	Trainer's Guide	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>Methodology to use construction of house with good micro environment</li> <li>List out important micro environmental factors</li> </ul>
8	Environmental factors of housing	Micro environmental factors	Explain importance of temperature and relative humidity in poultry house  Cross ventilation of the poultry house  Avoiding sound and dust problems	Trainer led Discussion Skill Observation	Trainer's Guide  Hands on training	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>Correlate temperature and relative humidity</li> <li>Importance of cross ventilation</li> <li>Preventive measures to eliminate toxic gases in environment</li> </ul>
9	Recap	Recap	Revise the learning of the "Prepare and maintain accommodation for poultry birds"	Group participation  Quiz	Trainer's Guide Questionaries	1 hour	Facts known by participators	Complete evaluation
10	Handle birds in poultry sheds	Design and construction of brooder house	Information on floor diagram and specification on brooder house	Trainer led Discussion  Skill  Practical	Trainer's Guide Field trip	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>Explain important norms for brooder house construction</li> <li>Specify floor area required for 500 number brooder chicks</li> </ul>

11	Handle birds in poultry sheds	Brooder house accessories	Discuss brooder house accessories, space allowance and preparation	Trainer led Discussion Hands on training	Trainer's Guide Field trip	1 hour	Facts known by participants	<ul style="list-style-type: none"> <li>Enumerate brooder house accessories</li> <li>Outline brooder house feeder and waterer</li> </ul>
12	Handle birds in poultry sheds	Design and construction of grower house	Information on floor diagram and specification on grower house	Trainer led Discussion Skill Practical	Trainer's Guide Field trip	1 hour	Facts known by participants	<ul style="list-style-type: none"> <li>What is the grower period</li> <li>How to maintain uniformity of the floor</li> <li>Floor, feeder and waterer space requirement for grower</li> <li>Light requirement for grower</li> </ul>
13	Handle birds in poultry sheds	Design and construction of layer house (maximum 200 birds)	Information on floor diagram of growers	Trainer led Discussion Skill Practical	Trainer's Guide Field trip	1 hour	Facts known by participants	<ul style="list-style-type: none"> <li>Draw the floor plan for 200 number of birds</li> </ul>
14	Handle birds in poultry sheds	Layer housing system	State housing and rearing system of layer birds	Trainer led Discussion Skill Practical	Trainer's Guide Field trip	1 hour	Facts known by participants	<ul style="list-style-type: none"> <li>Explain different system of rearing</li> <li>Outline floor rearing of the birds</li> <li>Discuss cage system of rearing</li> <li>1+1+5 system of rearing – Describe</li> </ul>
15	Handle birds in poultry sheds	Heat stress in layer birds	State mechanism of heat stress of the bird	Trainer led Discussion	Trainer's Guide	1 hour	Facts known by participants	<ul style="list-style-type: none"> <li>List out reason for heat stress</li> </ul>
16	Handle birds in poultry sheds	Management of heat stress during summer season	Explain preventive measures of heat stress in birds	Trainer led Discussion	Trainer's Guide	1 hour	Facts known by participants	<ul style="list-style-type: none"> <li>Outline management practices during summer season</li> <li>Enumerate nutritional manipulation</li> <li>Steps to prevent disease outbreak</li> </ul>
17	Handle birds in poultry sheds	Winter management	State management procedures during winter season	Trainer led Discussion	Trainer's Guide	1 hour	Facts known by participants	<ul style="list-style-type: none"> <li>Outline water hygiene practices</li> <li>List out litter management practices</li> </ul>
18	Handle birds in poultry sheds	Problems during winter season	Enumerate the problems due to lowering of micro environmental temperatures in farm house	Trainer led Discussion	Trainer's Guide	1 hour	Facts known by participants	<ul style="list-style-type: none"> <li>Reason for excess moisture</li> <li>Problem due to excess moisture in environment</li> </ul>

19	Handle birds in poultry sheds	Disease control programmes during winter season	State medication during winter season	Trainer led Discussion	Trainer's Guide	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>Enumerate the medicine used in winter season</li> </ul>
20	Recap	Recap	Revise the learning of the "Handle birds in poultry sheds"	Group participation Quiz	Trainer's Guide Questionaries	1 hour	Facts known by participators	Complete evaluation
21	Provide feed and water for birds	Feed ingredients	Describe norms for feed ingredients selection and provide nutrition requirements for different feed ingredients	Trainer led Discussion Visual demonstration	Trainer's Guide Visual aids or exhibition	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>List out main cereals rich in carbohydrate</li> <li>Enumerate efficient plant and animal protein sources</li> </ul>
22	Provide feed and water for birds	Feed ingredient classification	Explain feed ingredient classification based on nutrient availability	Trainer led Discussion	Trainer's Guide	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>Explain nutritional classification of different feed ingredients</li> </ul>
23	Provide feed and water for birds	Micro nutrients and feed additives	Impart of micro nutrients in layer feeding management	Trainer led Discussion	Trainer's Guide	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>Purpose of using feed additives</li> </ul>
24	Provide feed and water for birds	Utilities of feed mixing unit	Outline the complete procedure of feed mixing unit	Trainer led Discussion	Trainer's Guide	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>Why compound feed need to be prepared</li> <li>Basic requirements of feed mixing unit – Outline</li> </ul>
25	Provide feed and water for birds	Poultry mini feed mixing unit (small scale)	Explain different section of feed mixing unit	Trainer led Discussion	Trainer's Guide Field trip	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>Discuss different grinders for breaking the feed ingredients</li> <li>Mechanism of mixing of compound feed</li> </ul>
26	Provide feed and water for birds	Storage and quality control in feed mixing unit	State the criteria for storage, grading and transport of feed for dispatch	Trainer led Discussion	Trainer's Guide Field trip	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>List out storage criteria of feed in mixing unit</li> </ul>
27	Provide feed and water for birds	Feeding management Norms for selection of feed ingredients	Describe different norms that important (Nutrient availability, palatability, utilization, etc.) for feed ingredient selection	Trainer led Discussion Skill doing	Trainer's Guide	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>How the feed ingredients quality is checked during procurement</li> <li>Maximum inclusion level of maize in feed</li> </ul>
28	Provide feed and water for birds	Feed types	Explain mash, crumble and pellet type feeding system	Trainer led Discussion skill doing	Trainer's Guide Field trip	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>Advantage and disadvantage of crumble feed</li> </ul>

29	Provide feed and water for birds	Computation of poultry ration	Stepwise procedure involved in feed computation	Trainer led Discussion  Practical Skill practical	Trainer's Guide Field trip	1 hour	Facts known by participants	<ul style="list-style-type: none"> <li>Steps in computation of ration</li> <li>Why computation of ration is necessary</li> </ul>
30	Provide feed and water for birds	Feeding management	State feeding management of different classes of birds (Country, desi, broiler and layer)	Trainer led Discussion  Practical Skill practical	Trainer's Guide	1 hour	Facts known by participants	<ul style="list-style-type: none"> <li>Specify cost effective feeding management of desi birds</li> <li>Define feeding management to dual purpose bird</li> <li>Explain feeding management to commercial broiler of small scale operation</li> </ul>
31	Provide feed and water for birds	Balanced ration calculation	Detailed calculation of broiler and layer balanced ration calculation	Trainer led Discussion  Skill learning	Trainer's Guide	1 hour	Facts known by participants	<ul style="list-style-type: none"> <li>What is BIS standards</li> </ul>
32	Recap	Recap	Revise the learning of the "Provide feed and water for birds"	Group participation  Quiz	Trainer's Guide  Questionaries	1 hour	Facts known by participants	Complete evaluation
33	Maintain health of birds at poultry farm	Common diseases	Describes briefly common on diseases affecting the layers and broilers	Trainer led Discussion	Trainer's Guide  Visual aids	1 hour	Facts known by participants	<ul style="list-style-type: none"> <li>Specify the disease having whitish diarrhea</li> <li>Explain symptoms in chronic form of fowl cholera</li> </ul>
34	Maintain health of birds at poultry farm	Disease prevention	Explain preventive measures to reduce disease outbreak	Trainer led Discussion	Trainer's Guide	1 hour	Facts known by participants	<ul style="list-style-type: none"> <li>In which disease prevention hygienic egg collection is necessary</li> </ul>
35	Maintain health of birds at poultry farm	Vaccination in chicken	Vaccination schedule for important which diseases affecting the chicken	Trainer led Discussion  skill demonstration	Trainer's Guide  Exhibition Field trip	1 hour	Facts known by participants	<ul style="list-style-type: none"> <li>List out common vaccines for Ranikhet disease</li> <li>Schedule of vaccination for broilers</li> </ul>
36	Maintain health of birds at poultry farm	Vaccination technique	Discuss various vaccine techniques	Skill demonstration	Trainer's Guide  Visual aids	1 hour	Facts known by participants	<ul style="list-style-type: none"> <li>Enumerate different vaccination techniques followed in chicken</li> </ul>
37	Maintain health of birds at poultry farm	Precautionary measures during vaccination	State pre and post precautionary measures during vaccination	Trainer led Discussion	Trainer's Guide	1 hour	Facts known by participants	<ul style="list-style-type: none"> <li>Precaution during vaccination of Ranikhet disease</li> <li>Norms for storage of vaccines</li> </ul>
38	Maintain health of birds at poultry farm	Managerial disorders	Explain causes and prevention of cannibalism and egg bound in chicken	Trainer led Discussion	Trainer's Guide  Visual aids	1 hour	Facts known by participants	<ul style="list-style-type: none"> <li>List out cause for cannibalism</li> </ul>

39	Maintain health of birds at poultry farm	Nutritional related managemntal disorders	Discuss fatty liver syndrome, aflatoxicosis, rickets and cage layer fatigue in detailed	Trainer led Discussion	Trainer's Guide Visual aids	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>Steps to prevent fungal growth in feed</li> <li>Calcium deficiency disorder</li> <li>List out metabolic disorder in chicken</li> </ul>
40	Maintain health of birds at poultry farm	Debeaking	State debeaking procedure and schedule of chicken	Trainer led Discussion Skill doing	Trainer's Guide Demonstration	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>List out reasons for debeaking</li> <li>Why cannibalism occurs in birds</li> </ul>
41	Maintain health of birds at poultry farm	Delicing	State delicing procedure and schedule of chicken	Trainer led Discussion Skill doing	Trainer's Guide Demonstration	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>Precaution to be taken during delicing</li> </ul>
42	Maintain health of birds at poultry farm	Deworming	State deworming procedure and schedule of chicken	Trainer led Discussion Skill doing	Trainer's Guide Demonstration	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>Periodicity of deworming practices</li> </ul>
43	Recap	Recap	Revise the learning of the "Maintain health of birds at poultry farm"	Group participation Quiz	Trainer's Guide Questionaries	1 hour	Facts known by participators	Complete evaluation
44	Harvest eggs from the birds	Handling of eggs	State soft handling of eggs	Trainer led Discussion Visual demonstration	Trainer's Guide Visual aids	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>Why soft handling of the egg is necessary</li> <li>Precaution during the storage of eggs</li> </ul>
45	Harvest eggs from the birds	Packing of eggs	Explain the importance of egg packing	Trainer led Discussion Visual demonstration	Trainer's Guide Visual aids or exhibition	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>Method of packing of the egg</li> </ul>
46	Harvest eggs from the birds	Transport of eggs	Discuss different parameters during egg transport	Trainer led Discussion	Trainer's Guide	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>Planning of the egg for easy transport</li> </ul>
47	Harvest meat from the birds	Slaughtering of birds	State stepwise procedure involved in birds slaughtering	Trainer led Discussion Skill practices	Trainer's Guide Visual aids Field trip	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>How the birds are slaughtered</li> <li>Method of removing the feather</li> <li>Procedure for removal of the internal organs</li> </ul>
48	Harvest meat from the birds	Packing of dressed chicken	Explain materials used for packing of dressed chicken	Trainer led Discussion Visual demonstration	Trainer's Guide Visual aids	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>Points used for grading</li> <li>List of packing materials used for dressed meat packaging</li> </ul>

49	Harvest meat from the birds	Transport of packed chicken	Discuss favorable conditions during transport of packed chicken	Trainer led Discussion	Trainer's Guide	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>Planning of the dressed meat for easy transport</li> </ul>
50	Recap	Recap	Revise the learning of the "Harvest eggs and meat from the birds"	Group participation Quiz	Trainer's Guide Questionaries	1 hour	Facts known by participators	Complete evaluation
51	Maintain post harvest cleanliness	Slaughter house waste	Defines slaughter house waste	Trainer led Discussion	Trainer's Guide	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>Explain different types of slaughter waste</li> </ul>
52	Maintain post harvest cleanliness	Slaughter house waste	Explain possible methods for slaughter house waste utilization	Trainer led Discussion Skill practices	Trainer's Guide	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>What is the purpose of effluent treatment plant</li> <li>Different ways to use solid waste</li> <li>Main use of rendering process</li> </ul>
53	Maintain post harvest cleanliness	Meat byproduct utilization	Explain meat by product utilization	Trainer led Discussion	Trainer's Guide	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>List out various meat by products</li> </ul>
54	Meat byproduct utilization	Blood meal	State blood meal preparation of chicken blood	Trainer led Discussion	Trainer's Guide Field visit	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>What is important nutrient in blood</li> </ul>
55	Meat byproduct utilization	Inedible viscera utilization	Explain inedible viscera utilization	Trainer led Discussion	Trainer's Guide Field visit	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>How to assess the quality of inedible viscera</li> </ul>
56	Meat byproduct utilization	Feather meal	State feather meal preparation of chicken feather	Trainer led Discussion	Trainer's Guide Field visit	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>Use of feather meal – Explain</li> </ul>
57	Recap	Recap	Revise the learning of the "Maintain post harvest cleanliness "	Group participation Quiz	Trainer's Guide Questionaries	1 hour	Facts known by participators	Complete evaluation
58	Build entrepreneurs hip and marketing skills	Bank loan and insurance	Explain the financial investment arrangements and safe guarding the farm through banks	Trainer led Discussion	Trainer's Guide Data sheet	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>Specify margin money for medium farmers</li> </ul>
59	Build entrepreneurs hip and marketing skills	Project preparation	State requirements of good project and stepwise formulation for project preparation	Trainer led Discussion	Trainer's Guide Data sheet	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>Define security for getting loan</li> <li>What is maximum repayment period</li> </ul>

60	Build entrepreneurs hip and marketing skills	Project feasibility	Assess technical and financial feasibility of the project	Trainer led Discussion	Trainer's Guide Data sheet	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>Explain two viability of the project</li> </ul>
61	Build entrepreneurs hip and marketing skills	Poultry insurance scheme	Enumerate various poultry insurance scheme	Trainer led Discussion	Trainer's Guide Data sheet	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>Outline the insurance facility for poultry</li> <li>List out the procedure for the insuring the bird</li> <li>Specify the premium rate</li> <li>Enumerate list of norms for affecting the insurance</li> </ul>
62	Build entrepreneurs hip and marketing skills	Small poultry farm economics	State assumption and model for preparation broiler farm economics	Trainer led Discussion skill Observation	Trainer's Guide Data sheet	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>How important demand and supply</li> <li>Mention profit percentage for desi birds rearing for meat</li> </ul>
63	Build entrepreneurs hip and marketing skills	Small poultry farm economics	State assumption and model for preparation layer farm economics	Trainer led Discussion skill Observation	Trainer's Guide Data sheet	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>Reason for premium price for desi egg</li> <li>Explain various input and output costs</li> </ul>
64	Recap	Recap	Revise the learning of the "Build entrepreneurship and marketing skills"	Group participation Quiz	Trainer's Guide Questionnaires	1 hour	Facts known by participators	Complete evaluation
65	Complete documentation and record keeping related poultry farming	Record keeping	State the importance of recording the daily input and output data to analyze the profit margin	Trainer led Discussion skill learning	Trainer's Guide Data sheet	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>Outline the main purpose of record keeping</li> <li>List out various financial asset register</li> <li>Enumerate production input register</li> </ul>
66	Complete documentation and record keeping related poultry farming	Record keeping parameters	Note daily inspection of production data	Trainer led Discussion	Trainer's Guide Data sheet	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>Discuss production output register</li> </ul>
67	Complete documentation and record keeping related poultry farming	Analysis interpretation of records	Explain interpretation and analysis of different register	Trainer led Discussion Observation	Trainer's Guide Data sheet	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>Necessity for analysis of the records</li> <li>How to arrive farm stock position</li> <li>Interpretation of feed consumption rate</li> </ul>

68	Recap	Recap	Revise the learning of the “Complete documentation and record keeping related poultry farming”	Group participation Quiz	Trainer’s Guide Questionaries	1 hour	Facts known by participators	Complete evaluation
69	Safety, hygiene and sanitation farm	Farm hygiene	Overview of farm hygiene	Trainer led Discussion	Trainer’s Guide	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>List out common managerial factors to prevent entry of disease</li> </ul>
70	Safety, hygiene and sanitation farm	Bio security	Outlines various biological means to control the entry of pathogenic organisms into the farm	Trainer led Discussion	Trainer’s Guide	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>Explain bio security</li> </ul>
71	Safety, hygiene and sanitation farm	Bio security types	Explain conceptual, structural and operational bio security	Trainer led Discussion	Trainer’s Guide	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>Role of different bio security types in poultry house</li> </ul>
72	Safety, hygiene and sanitation farm	Components of bio security	State managemental procedures in disease prevention (isolation, quarantine, rodent control, etc.)	Trainer led Discussion	Trainer’s Guide	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>Physical barrier to prevent entry of predators</li> </ul>
73	Safety, hygiene and sanitation farm	Water hygiene	Describe the methodology to provide wholesome drinking water to the birds	Trainer led Discussion	Trainer’s Guide	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>How water is important for birds</li> </ul>
74	Safety, hygiene and sanitation farm	Water sources	Enumerate water sources which are possible at farm level	Trainer led Discussion	Trainer’s Guide	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>Detailed about water sources</li> </ul>
75	Safety, hygiene and sanitation farm	Water properties	Defines the physical and microbial properties of water	Trainer led Discussion	Trainer’s Guide	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>Explain care on microbial quality of water</li> <li>List out physical qualities of water</li> </ul>
76	Safety, hygiene and sanitation farm	Watering system	Explain nipple and cup watering system	Trainer led Discussion	Trainer’s Guide Visual demonstration	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>Compare nipple and cup watering system</li> </ul>
77	Safety, hygiene and sanitation farm	Water sanitation	Describe various water sanitation methods followed in layer farm	Trainer led Discussion skill doing	Trainer’s Guide Field trip	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>Write on one cost effective water sanitation procedure</li> </ul>
78	Safety, hygiene and	Poultry waste	State types and value of poultry waste	Trainer led Discussion	Trainer’s Guide	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>List out common poultry waste in layer farms</li> </ul>

79	Safety, hygiene and sanitation farm	Waste management	Detail reports of hygienic farm waste disposable	Trainer led Discussion	Trainer's Guide	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>List out poultry waste disposable methods</li> </ul>
80	Safety, hygiene and sanitation farm	Recycling of poultry waste	Explain various recycling methods followed for effective utilization of poultry waste	Trainer led Discussion	Trainer's Guide	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>List out recycling ways of poultry waste</li> </ul>
81	Safety, hygiene and sanitation farm	Disinfectant and disinfection of poultry house	State the application of various basic principles of disinfection procedures	Trainer led Discussion Visual demonstration	Trainer's Guide Exhibition	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>Differentiate disinfection and disinfectant</li> <li>Properties of any two common disinfectants</li> </ul>
82	Safety, hygiene and sanitation farm	Disinfectant properties	Enumerate good properties of ideal disinfectant	Trainer led Discussion skill practicals	Trainer's Guide Field trip	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>List out properties of ideal disinfectant</li> </ul>
83	Safety, hygiene and sanitation farm	Disinfection plan	Explain systemic disinfection plan followed in farm	Trainer led Discussion	Trainer's Guide	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>Flow chart of disinfection procedure</li> </ul>
84	Safety, hygiene and sanitation farm	Precautionary measures during disinfection	State precautionary measures (both physical and chemical disinfectant) during disinfection	Trainer led Discussion	Trainer's Guide	1 hour	Facts known by participators	<ul style="list-style-type: none"> <li>List out precautionary measures during disinfection</li> </ul>
85	Recap	Recap	Revise the learning of the "Safety, hygiene and sanitation farm"	Group participation Quiz	Trainer's Guide Questionnaires	1 hour	Facts known by participators	Complete evaluation



## Annexure II

### Assessment Criteria

#### CRITERIA FOR ASSESSMENT OF TRAINEES

Assessment Criteria for ASCI- Small Poultry Farmer	
Job Role	Small Poultry Farmer
Qualification Pack	AGR/Q4306
Sector Skill Council	Agriculture Skill Council of India

S.No.	Guidelines for Assessment
1.	Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC.
2.	The assessment for the theory part will be based on knowledge bank of questions created by the SSC.
3.	Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below).
4.	Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training center based on this criteria.
5.	To pass the Qualification Pack, every trainee should score a minimum of 70% in aggregate.
6.	In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack.
7.	The marks are allocated PC wise, however, every NOS will carry a weight age in the total marks allocated to the specific QP.

		Marks Allocation			
Assessment Outcome	Assessment Criteria	Total Marks (100)	Out of	Theory	Skills Practical
<b>1.AGR/Q4327</b> Prepare and maintain accommodation for poultry birds	Pc1. prepare and develop bird accommodation/shed which achieves the best balance between bird health, well-being and available resources	<b>100</b>	10	3	7
	Pc2. specify a designated area for the construction of the shed.		5	2	3
	Pc3.prepare and maintain equipment, tools and materials required for bird accommodation.		10	3	7
	Pc4. follow cleaning routine on a regular basis.		10	3	7
	Pc5. keep accommodation in a safe and clean condition for the birds.		10	3	7

	Pc6. replenish materials and supplies as and when required		5	1	4
	Pc7. clean tools and equipment and maintain them, according to established workplace procedures.		10	3	7
	Pc8. store equipment safely and securely in the assigned location.		10	3	7
	Pc9. use working methods and systems which promote health and safety of the birds and which are in alignment with the standard operating procedures.		10	3	7
	Pc10. take appropriate action when monitoring of the accommodation/shed reveals problems or issues		10	3	7
	Pc11. dispose waste materials as per defined SOPs and industry requirements.		10	3	7
			<b>100</b>	<b>30</b>	<b>70</b>
<b>2.AGR/Q4328</b> Handle birds in poultry sheds	Pc1. wear suitable personal protective equipment when handling poultry birds in their accommodation/sheds	<b>100</b>	10	3	7
	PC2.check that the equipment, materials and accommodation are suitable for reception of the birds, prior to their arrival		10	3	7
	PC3.establish suitable environmental conditions for the poultry birds		10	5	5
	Pc4. handle and move the birds correctly and safely.		10	3	7
	Pc5. introduce birds into the accommodation in a way that minimizes stress and maintains their health and hygiene.		10	3	7
	Pc7. follow standard operating procedures while carrying out work		10	5	5
	Pc8. monitor the birds carefully, to ensure their on-going health and hygiene is maintained		10	2	8
	Pc9. adjust and replenish materials as required by the birds.		10	2	8
	Pc10. arrange for regular cleaning of the shed, floor and water containers and nests according to the bird accommodation and specification		10	2	8
	Pc11. arrange for regular disposal of bird waste and other wastes as per prescribed procedures.		10	2	8
			<b>100</b>	<b>30</b>	<b>70</b>

<b>3.AGR/Q4329</b> Provide feed and water for birds	Pc1. check that the correct quantities and types of bird feed have been delivered and that they are in an acceptable condition	<b>100</b>	5	2	3
	Pc2. report any issues in delivered bird feed to the supervisor		3	1	2
	PC3. handle bird feed safely, and in a way that protects it from damage and contamination and minimizes wastage		5	2	3
	Pc4. store bird feed safely as per SOP's, in the order in which it is to be used		5	2	3
	Pc5. check stored bird feed regularly for any signs of pest infestation and report this to the appropriate person		5	2	3
	Pc6. check stock levels regularly and tell the supervisor in case the stock drops below a certain level		5	2	3
	Pc7. wash hands effectively before and after handling bird feed		5	2	3
	Pc8. obtain the equipment and materials needed to prepare and serve bird feed		5	2	3
	Pc9. clean work surfaces, utensils and equipment effectively before and after use		5	2	3
	Pc10. arrange for various feed and feed supplements essential for bird nutrition and growth		5	2	3
	Pc11. mix the appropriate proportions of feed and feed supplements depending on the age and stage of growth of bird		5	1	4
	Pc12. prepare the correct amount of bird feed as directed in the feeding plan in a way that minimizes wastage		5	1	4
	Pc13. operate and maintain equipment used in feed preparation e.g. feed grinder		5	1	4
	Pc14. dispose off any stale and unusable bird feed in a safe place and put equipment and utensils away safely.		5	1	4
	Pc15. wear suitable personal protective equipment when providing feed and water to poultry birds		5	1	4
	Pc16. supply feed to birds according to SOP's.		5	1	4
	Pc17. supply clean, fresh water to the birds according to their needs		5	1	4
	Pc18. report concerns related to the feeding and drinking habits of birds to the supervisor		3	1	2

	Pc19. monitor the condition of feed and water and take appropriate action in case of issues.		5	1	4
	Pc20. clean and maintain feed and water equipment according to SOP's		4	2	2
	Pc21. dispose off waste from the feeding and watering systems safely and correctly, according to SOP's		5	1	4
			<b>100</b>	<b>30</b>	<b>70</b>
<b>4.AGR/Q4330</b> Maintain health of birds at poultry farm	Pc1. Treat birds in a manner which complies with relevant regulations, minimizes any likelihood of stress and injury, and maintains their health and well-being.	<b>100</b>	10	3	7
	Pc2. provide birds with sufficient and effective opportunities to move, and maintain physical functioning.		10	3	7
	Pc3. monitor the physical condition of the birds at suitable intervals, and recognize, record and report any abnormal signs.		5	2	3
	Pc4. check for presence of external parasites in the birds.		10	3	7
	Pc5. ensure specific measures are in place to promote and maintain birds' health and welfare and prevent diseases such as bird flu.		10	3	7
	Pc6. immediately call for assistance for any bird health emergency, and initiate action appropriate to the situation.		5	1	4
	Pc7. manage waste safely and correctly in accordance with regulatory requirements.		5	1	4
	Pc8. use and store drugs, medication and equipment in accordance with veterinary operating instructions.		10	3	7
	Pc9. Use uncontaminated prescribed medication only for the intended birds.		10	3	7
	Pc10. use the correct technique to give the specified treatment at the correct time.		10	3	7
	Pc11. report any difficulties, in administering treatments, immediately to the supervisor.		5	2	3
	Pc12. complete records of the treatment accurately, according to established safety procedures.		5	2	3
	PC13. observe the birds after treatment and report concerns immediately to the supervisor.		5	2	4
			<b>100</b>	<b>30</b>	<b>70</b>

<b>5.AGR/Q4331</b> Harvest eggs and meat from the birds	Pc1. assess the poultry sheds to roughly estimate the number of eggs laid by the birds and the birds which look fit for meat harvesting.	<b>100</b>	10	3	7
	Pc2. ensure personal hygiene by usage of gloves, hairnets, masks, goggles etc.		10	2	8
	Pc3. ensure that there is a cushioned container to collect the eggs to avoid breakage during collection.		15	5	10
	Pc4. ensure that the harvesting cycle is followed, as the first harvest might occur as early as 30-35 days or as late as 55-60 days.		10	2	8
	Pc5. collect the eggs in a container without disturbing the birds.		15	5	10
	Pc6. carry out harvesting activities preferably at night as it is cooler and the birds are more settled and therefore easy to handle.		15	5	10
	Pc7. ensure that the birds identified for harvesting meat are caught by hand and placed into plastic crates or aluminum modules designed for good ventilation and safety.		15	5	10
	Pc8. ensure that the crates or modules are loaded onto locomotive for transport to the progressing plant (if not processed in the farm itself)		15	5	10
			<b>100</b>	<b>30</b>	<b>70</b>
<b>6.AGR/Q4332</b> Maintain post-harvest cleanliness	PC1.plan in advance for the post-harvest clean out.	<b>100</b>	10	2	8
	Pc2. identify the shed that needs to be cleaned out after harvesting of all its birds.		15	5	10
	Pc3. carry out the following clean out activities: <ul style="list-style-type: none"> <li>• remove bedding</li> <li>• brush the floor</li> <li>• scrub feed pans</li> <li>• clean out water lines</li> <li>• scrub fan blades and other equipment's</li> <li>• check rodent stations.</li> </ul>		10	2	8
	Pc4. use a high pressure hose to clean the whole shed thoroughly.		10	3	7
	Pc5. ensure that the water used for cleaning does not collect in one area and gets washed away.		15	5	10
	PC6.disinfect the shed using low volumes of disinfectant which can be sprayed throughout the shed.		10	3	7

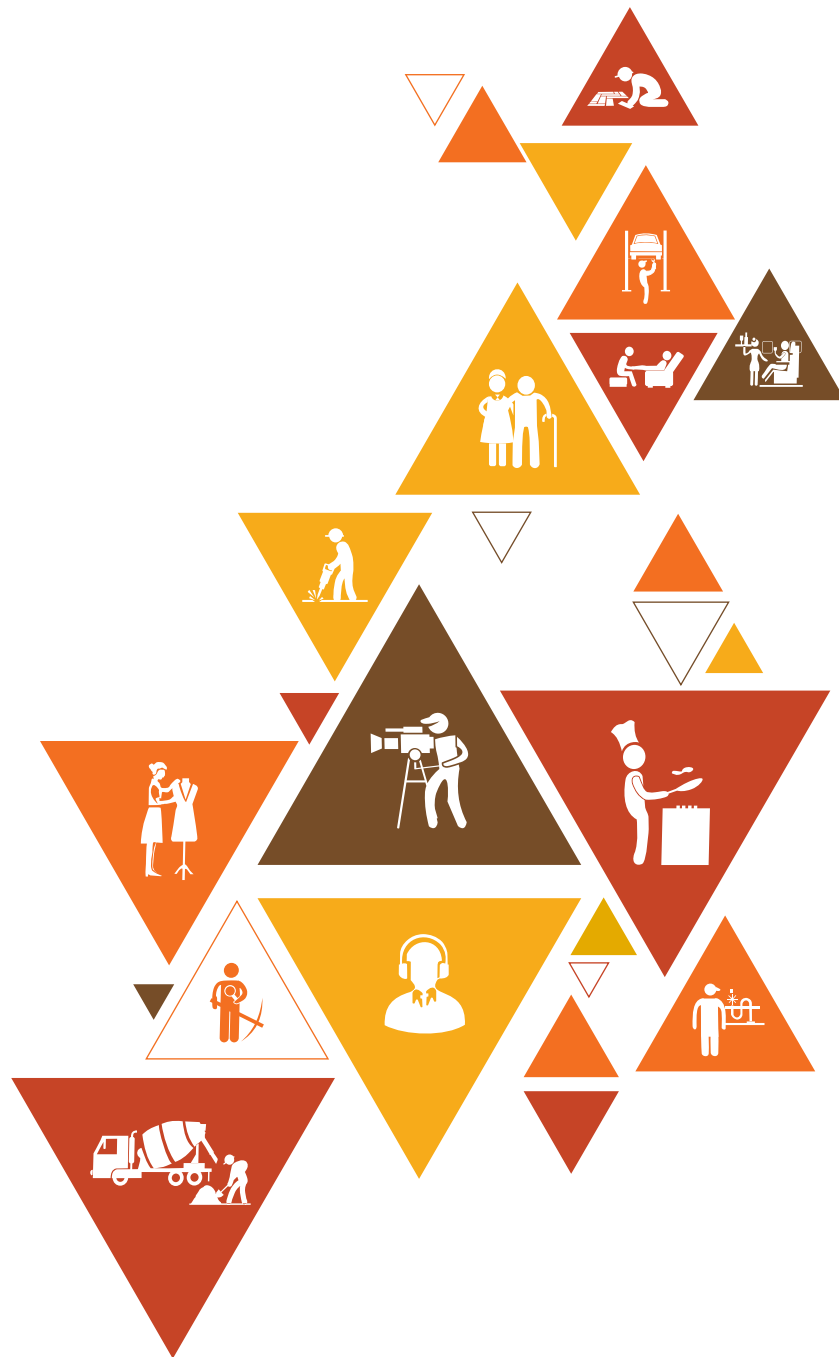
	Pc6. disinfect the shed using low volumes of disinfectant which can be sprayed throughout the shed.		15	5	10
	Pc7. minimize the risk of disease such as bird flu infection through human contact.		10	3	7
	Pc8. ensure that the following precautions are taken: <ul style="list-style-type: none"> <li>• proper sign age and gates at access points to the farm to discourage unauthorized entry</li> <li>• entry requirements for visitors</li> <li>• mandate service providers to wear overalls and boots provided by the farmer.</li> <li>• usage of proper disinfectants for footwear in foot washing baths at the entrance of each shed</li> <li>• minimize vehicle movements, and ensure mandatory washing down of vehicles or equipment that have visited other farms</li> <li>• Schedule movements in such a way that when it is required for people or vehicles to go between farms on the same day without a thorough disinfection, the youngest flocks are visited first and the oldest last.</li> <li>• undertake prevention measures for minimizing infections through wild birds like netting the sheds so they are wild bird proof, not allowing other workers to keep birds of any type including budgies or parrots as pets, cleaning up spilled feed promptly to discourage visiting birds, sanitizing</li> <li>• chicken's drinking water to prevent confirmation by wild birds</li> <li>• ensure that the farmers have documented pest control programs to reduce the risk of diseases being carried on to the farm by rodents</li> </ul>		15	5	10
			<b>100</b>	<b>30</b>	<b>70</b>
<b>7.AGR/Q4333</b> Build entrepreneurship and marketing skills	Pc1. farm planning and budgeting with reference to various components of poultry farm.	<b>100</b>	10	3	7
	Pc2. keep books of accounts and various transactions of the farm.		10	3	7
	Pc3. Arrange for financial assistance from various quarters in the light of various schemes available for poultry development.		10	3	7
	Pc4. ascertain the prices of various inputs and egg and meat products from the market.		10	3	7
	Pc5. assess the influence of various quality parameters of egg/meat on the egg/meat pricing.		10	3	7

	Pc6. establish cordial relations with various clients for the benefit of poultry farm development.		10	3	7
	Pc7. assess the needs and requirement of the clients and assess one's own unique selling proposition.		10	3	7
	Pc8. extract critical market information that is otherwise not in the public domain		10	3	7
	Pc9. choose appropriate buyer in a given situation of market parameters.		5	1	4
	Pc10. identify best ways of attracting market price for one's produce		5	2	3
	Pc11. ensure quality before and during the Sale activity to ensure good returns.		10	3	7
			<b>100</b>	<b>30</b>	<b>70</b>
<b>8.AGR/Q4334</b> Complete documentation and record keeping related to poultry farming	Pc1. document and maintain records of feed consumption, water consumption and egg production of layers.	<b>100</b>	15	8	7
	Pc2. document and maintain records of feed consumption, water consumption, weight, average daily gain, days on feed and processing date for broilers.		15	8	7
	Pc3. document and maintain records of mortality rate of birds.		15	10	5
	Pc4. document and maintain records of quantity of feed fed to the birds.		15	10	5
	Pc5. Document maintain financial records of any items bought, e.g. feed, equipment, etc.		15	10	5
	Pc6. document and maintain record of other costs incurred.		15	8	7
	Pc7. document and maintain records of revenue and profit earned.		10	6	4
			<b>100</b>	<b>60</b>	<b>40</b>

<b>9.AGR/Q4316</b> Ensure safety, hygiene and sanitation of poultry farm	Pc1. comply with food safety and hygiene procedures followed in the organization.	<b>100</b>	5	1	4
	PC2. ensure personal hygiene by using of gloves, masks, goggles, boots, etc. whenever required.		10	3	7
	Pc3. wear appropriate protective clothing or use protective equipment as and when required.		10	3	7
	Pc4. perform all procedures and follow work instructions for controlling operational risks.		5	1	4
	Pc5. understand the hazards of use and contamination mentioned on labels of vaccine / medication / pesticides / fumigants bottles.		10	3	7
	Pc6. take safety measures when handling chemicals used for disinfection.		5	1	4
	Pc7. use safety equipment such as fire extinguisher, first aid kit and eye- wash station when required.		5	2	3
	Pc8. check all tools and equipments before operating them.		5	2	3
	Pc9. perform duties in a manner which minimizes environmental damage.		5	1	4
	Pc10. report any accidents, incidents or problems without delay to farm supervisor and take necessary immediate action to reduce further danger.		5	2	3
	Pc11. clean, maintain and monitor poultry shelters and equipments periodically.		5	2	3
	Pc12. ensure proper disposal of waste and other potentially hazardous materials.		5	1	4
	Pc13. identify, document and report problems such as rodents and pests to management.		5	2	3
	Pc14. conduct workplace checklist audits before and after work to ensure safety and hygiene.		5	1	4
	Pc15. ensure the procedures for dealing with accidents, fires and emergencies are followed at all times.		5	2	3

	Pc16. ensure that first aid treatment is provided to any injured in case of an accident.		5	2	3
	Pc17. ensure that emergency equipments are in place and in a proper working condition.		5	2	3
			<b>100</b>	<b>30</b>	<b>70</b>







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**CIN No.:** U93000HR2013NPL048073

**Price: ₹**



978-1-11-22222-45-7