

PULLET PRODUCTION BUSINESS

TRAINING COURSE FOR YOUTH AGRI-ENTREPRENEURS

Ethiopian Agricultural Transformation Institute



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ANNEX



OVERVIEW OF THE MODULE

Pullets are the future layer and breeder in the chicken industry. Thus, managing pullets is a crucial step in the production process. This pullet production training module is designed to familiarize young enterprises with the skills and knowledge needed to carry out pullet production tasks on their own. The module contains seven sections which provides a brief overview of the pullet industry, its significance, and where to find day-old chicks/pullets and other necessary supplies.

The sources of feed, agricultural machinery, and medical supplies, as well as their significance, will be covered in the module sections, and the technical skill will cover site selection, temperature, feed and other requirements, breed selection strategies, feed management, and the needs for water, air, light, and space at various stages of pullet growth. Set up of the equipment's, getting quality chicks, debeaking techniques, health management, monitoring and record keeping will be discussed. At last potential pullet production risk and mitigation strategies is given and assessment questions is delivered. We strongly believe in that this training module, if strictly followed and applied, would greatly transform the lives of youths organized into enterprises as broiler producers.

The Agriculture-focused Dignified Employment for Youth (ADEY) program is implemented by the Ethiopian Agricultural Transformation Institute in partnership with the Mastercard Foundation to enable 611,343 inclusive and dignified work opportunities for young women and men and support youth entrepreneurship, employability, and sustainable livelihoods in the agribusiness sector.



INTRODUCTION

Brooding of layer day-old chicks (DOC) are critical stages in poultry production that require careful management to ensure the health, welfare, and productivity of the birds. During the brooding phase, which typically lasts for the first few weeks of life, chicks are provided with a warm, secure environment where they can adjust to their new surroundings, develop immunity, and establish feeding and drinking behaviours.

Training methods

- Learning approaches (Presentation, Group discussion, practical attachment, etc.)
- Training materials (Laptop, projector, flip charts, markers, etc.)
- Total time required = 5 days (two-day theory and three day practical)

Target participants

- This training module targets unemployed youths and women interested to engage in pullet production business.

SECTION 1. SITE OF BROODER HOUSE AND BREED SELECTION

Overview of the section

Under this section accessibility to resources of the brooder and grower house will be discussed, constructed well house and inside the house the heat source, bedding material, and other facilities should be organized. The breed should be good layer and good in feed conversion.



Learning outcome

At the end of this section participants of this training should know:-

1. Proper site selection and good house construction
2. Requirements of pullet in the house
3. Which breed and where to get best breed for future egg production

Duration: 6 hours



Learning question

1. How should the brooder house be prepared before the arrival of day-old chicks?
2. Where can we get pullets for egg production in Ethiopia?

1.1 SITE SELECTION

- Well-drained land, this is especially important where litter systems are used.
- Within sight of owner/supervising personnel.
- Away from other chicken houses to reduce the spread of diseases.
- Noisy areas should be avoided (garage, railway, and road)

- The housing of the house should take advantage of natural air movement.
- No direct sunshine entering the house, placing the house in an east-west direction.
- Accessible to transport and communication

1.2 REQUIREMENTS OF BROODER HOUSE

- The house should be well-constructed with durable materials to ensure stability and protection from weather conditions (Bricks or mud wall, corrugated iron roofing, well protected doors). It should be well-ventilated yet draft-free.
- Use brooders such as infrared lamps, gas brooders, or electric brooders to provide a consistent heat source.
- Maintain the temperature at 32-35°C (90-95°F) for the first week, gradually reducing it by about 2.8°C (5°F) per week until it reaches 21°C (70°F).
- Use dry, absorbent bedding such as wood shavings, rice hulls, or straw.
- Avoid materials that can cause respiratory issues, such as sawdust or moldy straw.
- 1.3. Suitable Breed Selection (Layer-Day Old Chicks)
- Choose breeds or hybrids that are known for their high egg production
- Consider the size and quality of the eggs produced.
- Choose breeds that are known for their feed efficiency.
- Consider the breed's ability to adapt to different environments and climates
- **Examples:** Bovans Brown, Lohmann Brown, etc

Source of Layer Day-Old Chicks and Their Characteristics

- Layer Day-Old Chicks (DOC) are newly hatched female chicks that are specifically bred for egg production. These chicks are typically one day old when they are sold or transferred to poultry farms for rearing.
- Commercial hatcheries: hatcheries focus on producing day-old chicks specifically for the egg-laying industry. They ensure high-quality breeding stock and optimal incubation conditions.
- Regional multiplication centre: Cooperatives sometimes organize bulk purchases of day-old chicks from reputable hatcheries to distribute among their members at a lower cost.



Post assessment question

1. What is brooder house & how do we use it?
2. At what stage do we start pullet production?



Key message

Selecting best pullets for egg production is a base for increasing egg production



Duration: 10 hour



Learning question

1. What is the optimal temperature range for brooding layer day-old chicks, and how can it be maintained consistently?
2. What types of bedding material are recommended for brooding, and how often should it be changed?
3. What type of feed should be provided to day-old chicks, and how often should it be given?

SECTION 2. REQUIREMENTS OF BROODING AND SETUP OF EQUIPMENT'S

Overview of the section

This section deals with the requirements of pullets starting from day old up to pullet stage. Temperature, feed composition and feed forms, water requirements, light requirements, space and ventilation requirements will be discussed. The set up of each equipment's should properly be installed.



Learning outcome

At the end of this section participants of this training should know:-

1. Basic principles of brooding, including temperature management, lighting, feeding, and watering, to provide a comfortable and healthy environment for chicks.
2. Nutritional requirements of layer chicks and how to provide a balanced diet to support growth and development.
3. How to manage the brooding environment, including ventilation, bedding, and space requirements, to ensure optimal chick health and welfare.

2.1 HEAT (TEMPERATURE) REQUIREMENT AND MANAGEMENT

Temperature requirements

- For the first week, maintain a temperature of 32-35°C (90-95°F) at chick level directly under the heat source.
- Gradually reduce the temperature by approximately 2.8°C (5°F) each week until it reaches around 21°C (70°F) by the fourth or fifth week.



Figure 2. Temperature, feed, water and brooder guard arrangement during brooding time

Heat management practices

- Use appropriate heat sources such as infrared heat lamps, gas brooders, or electric brooders to provide consistent warmth.
- Ensure the heat source is reliable and can maintain the required temperatures throughout the brooding period.
- Place thermometers at chick level in different areas of the brooding area to monitor temperatures accurately.
- Regularly check temperatures multiple times a day to ensure consistency and adjust the heat source as needed.
- Use brooder guards or chick guards to keep the chicks close to the heat source during the first week.
- This helps prevent drafts and ensures that chicks do not wander too far from the warmth.
- Observe chick behaviour as an indicator of temperature comfort:
- **Too Cold:** Chicks will huddle together directly under the heat source, chirping loudly.
- **Too Hot:** Chicks will spread out away from the heat source, panting, and may appear lethargic.
- **Comfortable:** Chicks will be evenly distributed throughout the brooding area, actively moving, eating, and drinking.

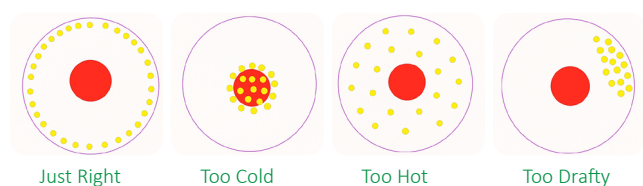


Figure 3. Heat management practices

2.2 FEED REQUIREMENT AND MANAGEMENT

- Feeding pullets during the growing period can have major effects on subsequent egg production performance—any mistakes made during this period can lead to poor egg production, and it can be difficult to correct these problems once the flock has started laying. The size of the pullets at start of lay will affect egg size. It is important to have flexibility in the pullet diet formulation and timing of diet changes to ensure that the target weights are reached at the right age
- Feed Requirements (Starter/Grower: 0-8/8-18 weeks)

- Nutritional requirements used for commercial poultry production were developed based on the recommendations of the National Research Council (NRC, 1994). Which provide a high-quality chick starter feed formulated specifically for layer chicks.
- Table 1. Nutrient requirements of starter and growing replacement pullets (brown egg layers)

NUTRIENT	STARTER1	STARTER2	GROWER	DEVELOPER	PRE-LAY
ME, kcal/kg	2810-2920	2810-2920	2790-2900	2710-2820	2735-2930
ME, kcal/lb	1275-1325	1275-1325	1265-1315	1230-1280	1240-1330
Crude protein, %	20.00	18.25	17.50	16.00	16.50
Methionine, %	0.48	0.45	0.40	0.33	0.37
Total sulfur amino acids, %	0.85	0.79	0.73	0.65	0.71
Lysine, %	0.99	0.90	0.80	0.65	0.70
Calcium	1.00	1.00	1.00	1.40	2.50
Available Phosphorus, %	0.4%	0.44	0.43	0.45	0.48
Linoleic acid, %	1.00	1.00	1.00	1.00	1.00

- Provide a high-quality chick starter feed formulated specifically for layer chicks.
- Vitamins and Minerals: Ensure the feed is fortified with necessary vitamins (A, D, E, K, B-complex) and minerals (calcium, phosphorus, sodium, magnesium, and trace minerals).

Feed Sources:

- **Commercial Feed**
- Purchase commercial feed from reputable feed manufacturers
- Ensures a balanced diet with consistent quality.
- **Home-mixed Feed**
- Requires expertise in formulating balanced rations to avoid deficiencies or excesses.
- **Supplemental Feed**

- Includes greens, grains, and kitchen scraps.
- Provides variety and additional nutrients.
- Should be used to complement, not replace, balanced commercial or home-mixed feed
- Feed forms
- Use crumbles or mash feed to ensure chicks can easily consume and digest it.
- Avoid pellets during the initial brooding period, as they may be too large for young chicks to eat comfortably.

Feed Management Practices

- Feeder Setup- Provide enough feeder space to allow all chicks to eat simultaneously without crowding. This reduces competition and ensures uniform growth.
- Feeder Space- At least 2.5 cm (1 inch) of feeder space per chick during the first week, increasing as they grow.
- Use shallow, easily accessible feeders, such as tray feeders or chick feeders, to encourage feeding.
- The best feeder space for pullets generally ranges from 2 to 4 inches per bird depending on their age, with younger pullets needing slightly less space and older, growing pullets requiring more as they eat larger quantities of feed; always adjust based on the specific breed and your rearing conditions.

AGE GROUP	AV. FEED CONSUMPTION (PER DAY)	FEEDER SPACE PER BIRD	WATER SPACE PER BIRD	STOCKING DENSITY/ BIRD
Pullets (8-12 weeks)	45-55 grams	5 cm	1.25 cm	0.07-0.1 sq m
Pullets (12-16 weeks)	60-75 grams	6 cm	1.5 cm	0.1-0.12 sq m
Pullets (16-20 weeks)	80-100 grams	7.5 cm	2 cm	0.12-0.15 sq m

Feed Quality

- Ensure the feed is fresh, free from mold, and stored in a cool, dry place to maintain its nutritional quality.
- Avoid feed contamination by keeping the storage area clean and preventing access by pests and rodents.

2.3 WATER REQUIREMENT AND MANAGEMENT

- Provide clean, fresh water in clean containers at all times. Change water regularly to prevent contamination.
- Ensure water is easily accessible to all chicks. Use shallow waterers or add marbles to waterers to prevent drowning, especially during the first few days.
- Place waterers evenly throughout the brooding area, away from the heat source but easily accessible to chicks
- Provide enough waterers and space for all chicks to drink simultaneously, especially during peak drinking times.
- Monitor water consumption regularly. Adequate water consumption indicates good health and proper hydration.
- Provide water at room temperature. Avoid providing cold water, as it can chill chicks, especially in cold weather.
- Consider adding electrolytes to the water, especially during hot weather or times of stress, to help maintain hydration and electrolyte balance.

2.4 LIGHT REQUIREMENT AND MANAGEMENT

Light requirement

- Lighting should be for 23 hours for the first 3 days
- Adequate light is essential for chicks to find feed and water, promoting early feeding and hydration.
- Light helps establish natural behavioural patterns, such as resting, feeding, and social interactions.
- Proper lighting promotes healthy growth, bone development, and feathering.
- Light influences hormone production, including melatonin and serotonin, which can affect chick behaviour and health.
- Light management practices
- Provide low-intensity light (around 20-40 lux) during the first week to reduce stress and encourage normal chick behaviour.
- Provide continuous light for the first 48-72 hours to help chicks locate feed and water. Gradually reduce the light duration.
- Use full-spectrum or cool-white fluorescent bulbs for brooding, as they provide uniform light distribution and reduce the risk of feather pecking.
- Hang lights at a height that provides uniform light intensity throughout the brooding area. Avoid

placing lights directly over feeders or waterers to prevent overheating and stress.

- If possible, provide access to natural daylight, as it helps establish natural circadian rhythms and provides a more stimulating environment for chicks.
- Gradually reduce light intensity and duration as chicks grow older to promote natural sleeping patterns and reduce stress.
- Regularly monitor chick behaviour and growth in response to lighting conditions. Adjust light intensity and duration as needed to ensure optimal chick health and development.

2.5 SPACE REQUIREMENT AND MANAGEMENT

- Provide at least 0.01 square meters per chick during the first week.
- Increase space gradually to 0.02-0.04 square meters per chick by 8 weeks of age.
- Ensure enough floor space for chicks to move around comfortably and access feed and water.
- Provide enough feeder and waterer space to allow all chicks to eat and drink simultaneously without competition.
- Position feeders and waterers evenly throughout the brooding area.
- Provide perches or platforms for chicks to roost and rest, starting around 3-4 weeks of age.
- Ensure perches are low enough for easy access and made of non-slippery material.

2.6 VENTILATION REQUIREMENT AND MANAGEMENT

- Provide sufficient air exchange to remove moisture, gases, and odors from the brooding area.
- Ensure that ventilation is balanced with heating to prevent drafts and maintain uniform temperatures.
- Aim for a relative humidity of 50-70% in the brooding area, adjusting as needed based on environmental conditions.
- Ensure that ventilation is adequate to prevent the buildup of these gases, which can lead to respiratory issues and other health problems.
- Utilize natural ventilation management techniques such as windows, vents, and doors to allow fresh air into the brooding area.
- Position openings to create cross ventilation and ensure even air distribution.

2.7 CLEANING BROODER HOUSE AND EQUIPMENT

- Clear out all old litter, feed, and debris from the brooder house.
- Take apart feeders, waterers, and any movable equipment to facilitate thorough cleaning.
- Sweep the floors, walls, and ceilings to remove dust, feathers, and loose dirt.
- Scrape off any caked-on material from surfaces and equipment.
- Use warm water mixed with detergent to wash all surfaces, equipment, and tools. Ensure all organic matter is removed.
- Scrub with brushes to clean hard-to-reach areas and stubborn stains.
- Rinse thoroughly with clean water to remove all soap residues. Ensure no cleaning agents are left behind that could harm the chicks.
- Apply a suitable disinfectant (e.g., bleach solution, quaternary ammonium compounds) to all cleaned surfaces and equipment.
- Allow the disinfectant to sit for the recommended contact time to effectively kill pathogens.
- After disinfection, rinse with clean water if required by the disinfectant used.
- Allow the brooder house and equipment to air dry completely. Proper drying prevents mold and mildew growth.
- If possible, expose equipment to sunlight, which acts as a natural disinfectant.
- Once everything is dry, reassemble feeders, waterers, and other equipment.
- Arrange the equipment back in the brooder house, ensuring proper spacing and accessibility for the chicks.
- Generally, Clean feeders and waterers daily to prevent the buildup of feed residues and contaminants.
- Remove wet or soiled litter promptly to maintain a dry and sanitary environment.
- Perform a more thorough cleaning and disinfection of the brooder house and equipment at least once a week.

2.8 SPREAD LITTER MATERIAL

- Importance of litter materials (Moisture control, insulation, creates a soft, comfortable surface for chicks to walk on, reducing stress and the risk of footpad dermatitis. Additional used as helps absorb ammonia and other odors.

- Types of litter materials (Wood Shavings, wheat straw, teff straw, Rice Hulls, etc.
- Selection Criteria of litter materials: Availability, cost, absorbency, ease of handling, and pathogen control protocols.
- Select a litter material that is clean, dry, and free from contaminants like mold or chemicals.
- Ensure the brooder house is thoroughly cleaned and disinfected before adding new litter.
- Make sure the floor is completely dry to prevent mold growth under the litter.
- Spread the litter evenly across the entire floor of the brooder house. Aim for a uniform depth to ensure consistent moisture absorption and insulation
- Maintain a depth of 5-10 cm. Adjust the depth based on the litter type and conditions. For example, wood shavings may need a thicker layer compared to straw.
- Spread an initial thin layer, then add more to reach the desired depth. This helps in achieving a uniform spread.
- **Regular Stirring:** Stir the litter regularly to keep it dry and fluffy. This prevents caking and allows for better moisture absorption.
- Inspect litter daily for wet spots, caking, or ammonia odor and replace it with fresh material to maintain hygiene and comfort.

2.9 HEAT SOURCE SETUP

- Choose a suitable heat source such as infrared heat lamps, gas brooders, electric brooders, or radiant heaters.
- Place heat sources evenly to ensure uniform heat distribution. Position them at an appropriate height to prevent direct contact with chicks.
- Preheat the brooder house 24 hours before chick arrival to achieve the desired temperature (32-35°C or 90-95°F at chick level).

2.10 FEEDER AND DRINKER SETUP

- Use chick-friendly feeders that are easy for chicks to access.
- Use appropriate waterers such as nipple drinkers or bell drinkers
- Place feeders evenly throughout the brooder area to ensure all chicks have easy access to feed. Avoid overcrowding around feeders.
- Adjust the height of feeders as chicks grow to

ensure they can reach the feed comfortably without spilling.

- Elevate drinkers slightly above the litter to reduce contamination.
- Place feeders and drinkers evenly throughout the broiler house to ensure easy access for all birds.
- Do not place feeders or drinkers directly under or near brooders

2.11 BROODER GUARDS SET UP

- It helps to keep chicks close to the heat source and prevent drafts.
- Arrange brooder guards in a circular or semi-circular pattern around the heat source, leaving enough space for chicks to move away if they get too warm.
- Ensure the brooder guard is high enough to prevent chicks from jumping over and positioned at a suitable distance to allow chicks to find feed and water easily.
- Constructing a ring for the reception of chicks in which heat, water, feed, light can be Provided
- At arrival 5 m² is enough for 500 chicks
- Circumference 7.9 m, diameter 2.5 m
- After a week 10 m² is required for the 500 chicks.
- Circumference 11.2 m, diameter 3.6 m
- Plywood or hardboard sheets of approx. 45 cm are suitable
- Avoid making of brooding 90 0c at corner

Required equipment's

- Drinker, feeder, litter, heater, bulb, brooding ring, cleaning equipment, doc crate, weighing scale, vaccine equipment



Post assessment question

1. How many chicks should be placed per brooder to ensure proper space and growth?
2. What kind of heat source can be used for brooding sage of pullet management?
3. What type of litter material can be used as bedding?



Key message

Feed, water, light, space and ventilation adjustment based on pullet's requirement have pivotal role in poultry productivity

SECTION 3. QUALITY CHICKS MANAGEMENT AND BIOSECURITY MEASURES

Overview of the section

In this section characteristics of quality chicks, debeaking techniques, health managements, monitoring of pullet growth, diagnosis and treatment of diseases, and biosecurity measures will be discussed.



Learning outcome

At the end of this section participants of this training should know:-

1. Good characteristics to select chicks for pullet production
2. Management techniques to conduct debeaking, monitoring of birds,



Duration: 12 hour



Learning Question

1. What is the importance of debeaking
2. Why prevention is better than curative means?

3.1 CHARACTERISTICS OF QUALITY CHICKS

- Eyes should be clear and bright, indicating good health.
- Feathers should be clean, dry, and fluffy, not wet or matted.
- Chicks should be active, responsive, and show curiosity and energy.
- Chicks should be of uniform size and weight, indicating consistent growth and development.
- Navels should be fully healed and free from any signs of infection or swelling.
- The vent area should be clean and free from faecal matter or pasty buildup.
- Legs and feet should be straight and strong, without any deformities or signs of lameness.

3.2 DEBEAKING/BEAK TRIMMING

- Debeaking is primarily done to reduce feather pecking and cannibalism in poultry flocks. It helps prevent aggressive pecking behaviour that can lead to injury and even death in birds.

Methods

- Debeaking is typically done using a hot blade or infrared technology to trim the tip of the beak. This process is usually done when the chicks are young, often within the first few days of life.
- Beak trimming is typically undertaken when birds are very young, often within the first few days of life. The exact age at which debeaking is done can vary depending on local regulations and practices, but it is generally done before the chicks are moved to the rearing or grow-out facility.
- Debeaking at a young age is believed to reduce the stress and pain associated with the procedure, as well as minimize the risk of cannibalism and feather pecking later in life.

Procedure

- Chicks are typically placed in a restraining device to keep them still during the procedure.
- The beak is trimmed to remove the sharp tip, usually about one-third to one-half of the beak length.
- The trimmed area may be treated with a sealer or antiseptic to prevent infection.
- Debeaking should be done by trained personnel

using proper equipment to minimize stress and ensure the procedure is done correctly.

- Proper management practices, such as providing adequate space, enrichment, and nutrition, can help reduce the need for debeaking.



Figure 4. Electric debeaker

3.3 HEALTH MANAGEMENT

- Where do diseases come from?
- Hatcheries from contaminated egg and hatchery equipment's.
- Environment: bedding material, water and feed, air quality,
- Equipment and facilities: Feeder, drinker, etc. cracks, crevices, and damp areas in house
- Other Animals and Pests.
- **Humans:** Farm worker, visitors

3.4 MONITORING CHICK HEALTH, BEHAVIOUR AND SIGN OF DISEASE

Vaccines and drugs

- **Vaccines:** Marek's, Infectious bronchitis (IB), Newcastle (ND) vaccine, and Gumboro disease vaccine. All vaccine can be obtained from national veterinary institute based at Bishoftu.
- **Drugs:** Antibiotics, anticoccidial, antifungal, and antiparasitic drugs are available at veterinary pharmacy for purchasing in small quantity and Addis Ababa at Gojjam branda if purchasing in bulk quantities.

Detergent and disinfectant

- Detergents are cleaning agents designed to remove organic matter such as dirt, manure, and grease from surfaces. They work by breaking down these substances, making it easier to wash them away.

Examples. Soaps, omo, laundry detergent, ajaks,

- Disinfectants are chemical agents used to kill or inactivate pathogenic microorganisms such as bacteria, viruses, and fungi on surfaces, equipment, and in the environment. Examples: sodium hypochlorite, quaternary ammonium compounds, formaldehyde, and iodine solutions.

Personal protective clothing's

- It is essential in poultry production to protect workers from exposure to harmful substances, prevent the spread of diseases, and ensure biosecurity
- **Example:** Coveralls, boots, gloves, mask
- Observe chicks daily for signs of illness, discomfort, or abnormal behaviour.
- Look for lethargy, reduced feed intake, coughing, sneezing, or nasal discharge., pasty vents, and abnormal droppings.

Prevention

- Follow a vaccination schedule to protect against common diseases like Marek's disease, Newcastle disease, and infectious bronchitis.
- Hygiene and sanitation Practices
- Provide balanced diets with adequate vitamins and minerals.
- Implement strict biosecurity measures to prevent the introduction and spread of pathogens.
- **Common poultry disease:** Infectious Bronchitis, Newcastle, Coccidiosis, Rickets, Infectious Bursal Disease (IBD), Salmonellosis, Marek's Disease



3.5 TREATMENT IN POULTRY HEALTH CARE

- Use coccidiostats in feed to prevent coccidiosis, a common intestinal disease in poultry caused by coccidia parasites.
- Use antibiotics judiciously and under veterinary guidance to treat bacterial infections. Antibiotics should be used only when necessary and according to prescribed dosages.
- Use probiotics and prebiotics to promote gut health and enhance the immune system, especially during times of stress or disease challenge.
- Provide additional vitamins and minerals as needed to support growth and development, especially in cases of poor nutrition or deficiency.
- Implement parasite control measures to prevent and treat infestations of external and internal parasites such as mites, lice, and worms.

3.6 STRENGTHEN FARM BIOSECURITY

- Install secure fencing around the farm to keep out wild animals, unauthorized persons, and vehicles.
- Limit entry points to the farm and maintain a visitor log. Only essential personnel should have access to the poultry houses.
- Post clear biosecurity signs at all entry points to inform visitors and staff of biosecurity measures.
- Place footbaths with disinfectant at the entrance of each poultry house. Ensure they are maintained and regularly replenished.
- Require all personnel and visitors to wear clean, farm-specific clothing and footwear. Provide disposable or washable coveralls, boots, and hairnets.
- Install handwashing stations or provide hand sanitizers at entry points and ensure their use before and after handling birds.
- Disinfect all vehicles entering the farm, particularly those transporting feed, birds, or waste.
- Use dedicated equipment for different areas of the farm to prevent cross-contamination. Clean and disinfect equipment regularly.
- Implement an all-in, all-out system for flock management to allow thorough cleaning and disinfection between flocks.
- Ensure that water is clean and free from pathogens. Regularly clean and disinfect water lines and drinkers.
- Source feed from reputable suppliers. Store feed in a clean, dry place to prevent contamination by

pests or mold.

- Remove dead birds promptly and dispose of them in a biosecure manner, such as incineration or composting.



Post assessment question

1. How do we apply litter material in brooding stage?
2. What is all-in-all-out system and how it is important in pullet production?



Key message

Prevention of disease is better than curing the disease.

SECTION 4. RECORD KEEPING

Recording activities during the brooding phase of Layer Day-Old Chicks (DOC) is crucial for monitoring their health, growth, and performance. Major record-keeping activities include

- Date of hatch
- Number of chicks received.
- Hatchery source and breed information.
- Any hatchery vaccination or treatment records.
- Type of starter feed used.
- Quantities of feed consumed
- Water consumption.
- Any additives or supplements added to feed or water.
- Daily health checks for signs of disease or distress.
- Record of any treatments administered (medication, vitamins, electrolytes).
- Mortality records, including date, number, and cause if known.
- Weighing of chicks to monitor growth.
- Record of vaccinations administered and dates.

Time required 2 hours

SECTION 5. FINANCIAL FEASIBILITY

Overview of financial feasibility

Financial feasibility describes whether agri-business is financially viable. It involves determining initial investment (resource) requirement to start the business, estimating production cost, operation expenses, and sales revenue.

These are used to determine the initial investment requirement, profitability of the business, break-even point (minimum level of production) to attain the profit zone, and pay-back period (number of years required to recover initial investment). These series procedures are used to make wise decisions to accept or reject the agribusiness investment alternative.



Learning outcome

At the end of this section participants of this training should know:

- How to determine initial investment requirement to start the business
- How to estimate periodical production costs, operating expenses, and sales revenue of the business
- How to determine profitability and cash flow of the business
- How to calculate break-even point (minimum level of production) to recover total cost and generate profit.
- To calculate payback period (time requirement to recover initial investment
- How to make decision to accept or reject the investment alternative



Duration: 6 hours



Learning Question

Do you know how to determine financial feasibility of the given specific agri-business to make wise investment decision?

5.1 INITIAL INVESTMENT

Initial investment is the minimum capital requirement to start the business.



Fig 7. Day old layer pullet's chick

- Example of initial investment requirement to start pullet production business includes brooder/ grower house, day-old chicks, feeders and drinkers, feed and feed storage, working capital, etc.

DESCRIPTION	TOTAL COST	REMARK
Feeders and waterers		
Heat source/Infrared bulb		
Feed storage		
Feed and Medicine		
Pullet grower house		
Working capital		
Etc.		
Total		

Table 1: Template to estimate initial investment requirement for agri-business

5.1.1 LONG-TERM INVESTMENT

Long-term investment in agri-business involves all asset requirement for the business which can serve for more than one year.

TYPES OF INVESTMENT	UNIT OF MEASUREMENT	QUANTITY	UNIT COST	TOTAL COST
Pullet house				
Feed store				
Waterer				
Feeder				
Heat source				
Electric installations				
Water tankers				
creates				

Example Feeders and waterers, house, storage, land, etc.

Table2: Template to calculate total cost for acquisition of long-term investment

5.1.2 WORKING CAPITAL

Working capital for the planned agri-business includes all payments requirement for day-to-day operating activities such as production costs and operating expenses.



Example

1. Production costs include cost of feed, medicine, chemical, labor cost etc.
2. Operating expenses includes administrative salary, sales commission, promotion, etc.

- Working capital excludes long term investments such as stores, broiler house, feeders and waterers, etc.

A. Production cost

- Production costs are a key component in agri-business.
- It includes all costs associated with production including value addition to make the product ready for sale.

TYPES OF COST	UNIT OF MEASUREMENT	QUANTITY	UNIT COST	TOTAL COST
Day old chick	No			
Feed	Kg			
Medicine	sachet			
Vaccine	dose			
Bedding material	Kg			
Feeder	No			
Waterer	No			
Labor cost	Person			
House rent	Month			
Transporting	create			
Storage if rental/month	Number			
TOTAL				

Table 5: Template for estimating production cost per one batch of broiler production

B. Operating expenses

- Operating expenses are all costs not directly associated with production.
- They are common costs incurred for administrative and selling activities.
- Example administrative salary, promotion cost, sales commission, transport cost to sale, etc.

ADMINISTRATIVE SALARY	TOTAL COSTS
Administrative salary	
Utility (electric, water, tele.)	
Interest	
Promotion	
Sales commotion	
Tax	
Etc.	

Table 6: Template to estimate operating expenses for agri-business

5.2 ESTIMATED PRODUCTION AND SALE REVENUE



- Production volume is the main source of revenue for the agri-business to generate profit.
- Producers should determine the estimated average production volume from the planned production season.

FORMULA 1

Total production volume = Average production per hectare X Land size (ha)

- After determining the estimated volume of production, it is possible to determine the expected sales revenue for the planned production.

FORMULA 1

Total sales revenue = Total production volume X unit selling price



5.3. PROFIT AND LOSS STATEMENT

- The primary objective of any business is to generate profit.
- Profit and loss statement is the main tool to calculate profitability of the business.
- It is used to accept or reject the investment based on estimated profit.

FORMULA 1

Gross profit = Total sales revenue – Cost of goods sold

DESCRIPTION		
Sales Revenue		
Sale of broilers		
Sale of poultry litter		
Total Sales revenue		
Cost of good sold		
broiler production cost		
Ending inventory		
Cost of goods sold		
Gross profit		
Operating Expenses		
Salary if any		
Utility (electric, water, tele.)		
Interest		
Promotion		
Depreciation		
Tax if any		
TOTAL OPERATING EXPENSE		
NET PROFIT		

Table 8: Template for profit and loss statement preparation

5.4 BALANCE SHEET

Balance sheet used to know the total resource owned, amount of claim by creditors and amount of owners' equity

- Balance sheet contains asset, liability, and own capital
- Assets are all resources available for use or for sale
- Example cash, inventory, warehouse, land, equipment etc
- Liabilities are all debts obtained from bank, microfinances, individuals or others
- Own equity/capital involves own/member contribution, grant/donation, etc

FORMULA 4

Total Asset = Total liability + Total own capital

DESCRIPTION		
Asset		
Current asset		
Cash		
Inventory		
Total current asset		
Fixed asset		
Tools and equipment		
Warehouse		
Land		
Total fixed asset		
Total asset		
Liability and Capital		
Liability		
Bank loan		
Debt from relative		
Total liability		
Owners capital		
Own capital contribution		
Grant/donation		
Total owners' capital		
Total liability and capital		

Table 9: Template for balance sheet preparation

5.5 CASH FLOW STATEMENT.

Cash flow is all cash inflow and outflow for any purpose in the business operation

Example:

- Cash inflows include sale of seed/seedling, debt obtained from banks, members capital contribution, etc.
- Cash out flow includes purchase of input, payment for construction, repayment of debt, payment for salary, etc.

FORMULA 5

Beginning cash balance + total cash inflow
= ending cash balance + total cash out flow

DESCRIPTION		
Owners' investment		
Debt		
Grant		
Sale of broiler		
Wate house construction cost		
Purchase of equipment		
Purchase of input		
Land rent		
Feed cost		
Labor cost		
Cash Operating costs		
Ending cash balance		
Total		

Table 10: Template for cash flow statement preparation

5.6 BREAK EVEN ANALYSIS

- Break even analysis is used to determine the minimum level of production to cover total cost
- At break-even point no profit no loss
- To make profit, level of production and sale should exceed/greater than breakeven point.
- Fixed costs are fixed in total amount regardless of increase/decrease in volume of production.

Example depreciation, warehouse rent, administrative salary, promotion cost, etc

- Variable costs varied in total in response to increase/decrease in level of production

Example production costs, packaging cost, loading and unloading, etc.

FORMULA 6

Break-even point = Fixed cost/(Unit selling price – unit Variable cost)

5.7 PAYBACK PERIOD

Payback period is used to determine number of years/ periods it takes to recover initial investment.



Payback Period

The amount of time it takes to recover the cost of an investment.

FORMULA 7

a. When the annual profit of the business is uniform/equal

Payback period = Initial investment/annual profit

b. When the annual profit fluctuate/vary from year to year

Potential Risk and Mitigation Strategy

NO.	POTENTIAL RISK	MITIGATION STRATEGY
1	Inconsistent availability of day-old chicks	
2	Interruption of electricity	• Arrange solar power source • Generator back up
3	Inconsistence availability of inputs	• Arrange store facility • Being economical in the use of inputs
4	Disease outbreak	• Follow proper vaccination schedule • Follow proper biosecurity measures



Post assessment questions

- Which of the following is part of working capital
a. Purchase of fertilizer, **b.** Purchase of tractor, **c.** Transportation cost, **d.** Purchase of chemical
- Which of the following should include in profit/loss statement
a. Purchase of tools and equipment, **b.** Sales revenue, **c.** Debt, **d.** Owner investment
- Which of the following is variable cost
a. Purchase of seed, **b.** administrative salary, **c.** Depreciation, **d.** Rent of storage



Key message

Analyzing financial feasibility of agribusiness enables to pre-determine the applicability of the business in terms of initial investment requirement, profitability, and sustainability

ANNEX

Table:1. Feed consumption and mortality records sheet.

Breed: _____

Age in weeks: _____

Date of hatch: _____

DATE	FEMALE	MALE	TOTAL NO OF BIRDS	FEED GIVEN	FEED REFUSAL	NUMBER CHICKEN DIED	NUMBER OF CHICKENS CULLED

