BROILER MANUAL

LESOTHO

FEBRUARY 2025

Disclaimer

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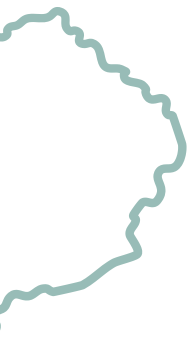


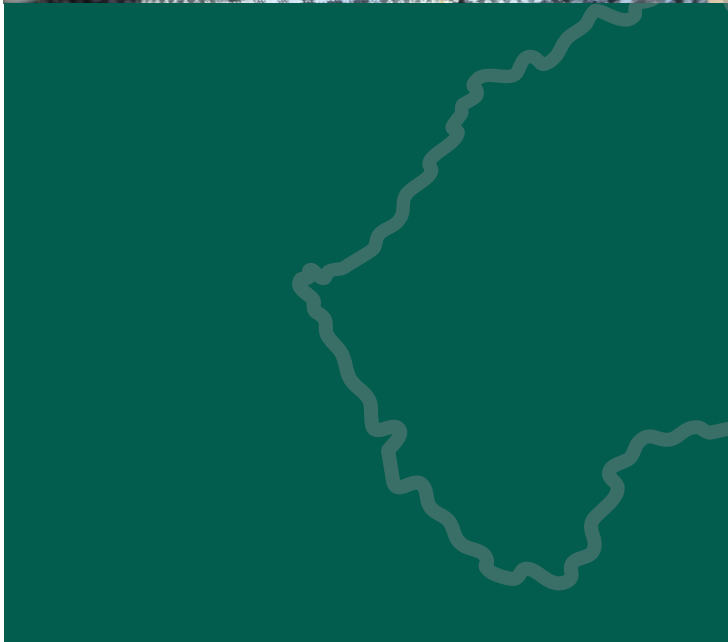
Introduction

‘STEPS’ Project Overview

Venture37 is implementing the United States Department of Agriculture (USDA) Food for Progress-funded Sustainable Transformation of Enterprises in the Poultry Sector (STEPS) in 7 districts in Lesotho (Maseru, Berea, Leribe, Butha-Buthe, Mafeteng, Mohale’s Hoek, and Quthing). STEPS aims to improve productivity and the business enabling environment in the poultry sector of Lesotho by segmenting the complex poultry market, supporting actors regardless of their current capacity, organizing producers in Buyer Hubs to unlock economies of scale, and spurring innovation across the poultry sector to provide inputs and markets to poultry producers.

Venture 37

Land O'Lakes Venture37 (hereafter “Venture37”) is a nonprofit organization committed to helping communities around the world build economies by strengthening local agriculture, helping agribusinesses create jobs, and linking farmers to markets. Since 1981, it has implemented over 315 integrated dairy, livestock, and crop development programs in nearly 80 countries—creating lasting impact by linking farmers, businesses, and the public and private sectors in local and global contexts.



Rural Self-Help Development Association

Rural Self-Help Development Association (RSDA) was established in 1991 as a Lesotho-registered non-governmental organization. Its aim is the eradicate hunger and improve livelihoods of rural Basotho. Their vision is to assist farmers and community organizations to run their own affairs and improve their livelihoods through sustainable agricultural practices. They do so by activating and supporting self-help to then ensure sustainable livelihoods. RSDA is an important partner in the STEPS project, overseeing the growth and development of the dual-purpose value chain in Lesotho, as well as leading farmer training in the field.

World Poultry Foundation

The World Poultry Foundation (WPF) is made up of a team of experts in poultry and sustainable development dedicated to building access to poultry and empowering farmers worldwide. Simply put, we're poultry people helping poultry people—focused on creating long-term impact in rural communities through innovative and sustainable poultry programs.

At the World Poultry Foundation, we envision a world with efficient, self-sustaining poultry value chains, where farmers have access to the resources, knowledge, and support needed for their poultry enterprises to thrive, ultimately leading to improved livelihoods and a brighter future for farming communities.

International Livestock Research Institute (ILRI)

The International Livestock Research Institute (ILRI) was established in 1994 as an international not-for-profit livestock research organization. ILRI works to improve food security and nutrition and reduce poverty in developing countries through research for efficient, safe, and sustainable use of livestock. ILRI is a CGIAR research centre, a global research partnership for a food-secure future. CGIAR science is dedicated to reducing poverty, enhancing food and nutrition security, and improving natural resources and ecosystem services.

KZNPI

The KwaZulu-Natal Poultry Institute (a registered, privately-run, non-profit organisation) is a poultry training facility in Pietermaritzburg, South Africa. It was established in 1991 and is dedicated to training and mentoring people across Africa involved in all aspects of poultry farming. They train subsistence farmers, small-scale producers and the staff of large integrated companies as well as technical advisors to the poultry sector.

Curriculum Development Background

As part of the STEPS project, the World Poultry Foundation (WPF) led activities to improve access to relevant, quality poultry information, increase poultry production, and strengthen the capacity of poultry producers to scale up egg and poultry meat production. The WPF facilitated the development of a curriculum tailored to the Lesotho context to improve poultry rearing and production practices across several breed types: layers, broilers, and dual-purpose birds.

To support the curriculum development process, the WPF formed a Working Group (WG) comprised of relevant organizations and government ministries in Lesotho. While the broader WG was comprised of a wide range of relevant parties, there was also a core group to provide detailed feedback on the approach and tailoring of curriculum content. Those core member organizations included:

- Lesotho Agricultural College
- Department of Livestock Services
- National University of Lesotho
- National Curriculum Development Centre
- Department of Marketing

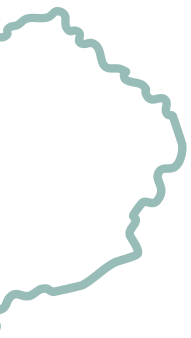
The primary objective of the WPF + STEPS Poultry Curriculum Development Working Group was to collaboratively develop context-specific curricula for poultry farmers in Lesotho. This helped to ensure the curricula aligned with the unique needs and realities of the local poultry sector in Lesotho, supporting farmers in improving their production practices and business outcomes. The WPF is grateful for the time, energy, and input the Working Group provided throughout the development process.

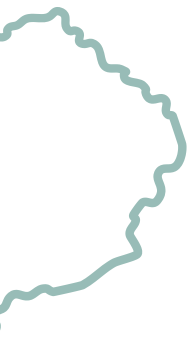
The content of this manual was also reviewed by several external experts for validity and consistency. Content was inspired by and fact-checked through interviews with Basotho farmers. Content is also grounded in the WPF team's knowledge and experience developing Dual-Purpose Poultry value chains across Africa. Finally, this content will be refined and further tailored based on the training pilot with farmers planned for 2025.

Manual Overview

The manual is intended to address the whole process of broiler production, from farm to fork, as part of a food system; the network required to ensure food is produced to reach the consumer in an effort to reach zero hunger. The main topic areas covered in this manual include:

- Introduction to Single-Purpose Broilers
- Housing Design and Management of the Environment
- Management of a Broiler Cycle
- Bird Health and Biosecurity
- Business Skills for Broiler Farmers





1. Introduction to Single-Purpose Broilers

Broilers have been developed over many years with the specific purpose of meat production. They are specialized hybrids that are slaughtered well before reaching sexual maturity and, therefore, do not produce eggs. This contrasts with dual-purpose birds, which can be used for both meat and egg production. As a result, farmers must purchase day-old chicks for every production cycle, but broilers have far superior meat production traits compared to dual-purpose birds.

Definition

Broilers are fast growing hybrids intended for meat production.

Broilers are typically chosen for more commercialized production systems, where input costs and risks are higher, but the birds grow faster and yield more meat. This system also relies on the availability of day-old chicks from parent stock producers.

Over the years, genetic progress has been significant. Provided with the right environmental conditions and management, a broiler can reach approximately 2.2 kg (4.85 lbs) live weight in 34 days (Photos 1.1 and 1.2). This applies to environmentally controlled houses; in naturally ventilated, open-sided houses, 42 days is a reasonable target age to reach 2.2 kg.

PHOTO 1.1
Day-old Broiler Chick

PHOTO 1.2
2.2kg Broiler

Breeding and Selection of Single-Purpose Broilers

Breeding a broiler that will grow quickly and efficiently is a complex process of selection for these traits through multiple generations. Genetic selection occurs at the pedigree and grandparent levels to produce parent stock who supply the fertile eggs that will hatch into broilers, intended for slaughter and consumption. The numbers multiply at each level, forming what is known as the breeding pyramid (Figure 1.1). This structure means that broiler farmers cannot keep broilers to lay eggs and produce more broilers; instead, they must purchase each batch of day-old chicks.

At the end of the cycle, broilers are slaughtered, sent to an abattoir for processing, or sold in an open live market. Some markets require birds to be slaughtered at a registered facility with meat safety standards in place. The meat can be sold fresh or frozen and can also be further processed—such as deboned, breaded, or seasoned. Birds may also be sold live but are intended for slaughter.

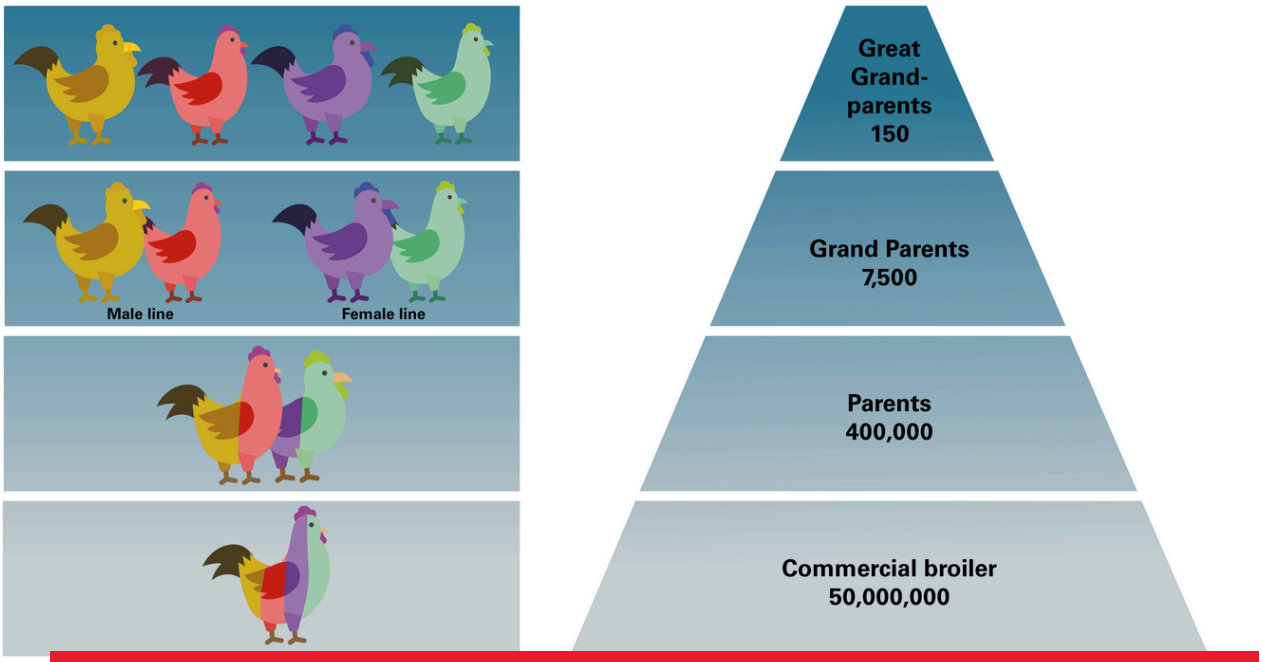


FIGURE 1.1
Broiler Breeding Example

Some large poultry companies in South Africa are fully integrated, meaning they control all aspects of production, including grandparent and parent farms, hatcheries, abattoirs, and feed mills (Figure 1.2). Because they do not rely on outside suppliers, they can better control costs and maintain lower production expenses.

However, in Lesotho, there are no fully integrated poultry companies. Broiler farmers operate independently, purchasing chicks and feed from suppliers. This increases input costs and can lead to issues with quality control. Farmers in Lesotho are heavily reliant on South African suppliers, especially for obtaining day-old chicks. Developing local integration or establishing parent stock farms in Lesotho would improve chick access, reduce transportation-related stress, and enhance overall chick quality. It could also create opportunities for contract growers.

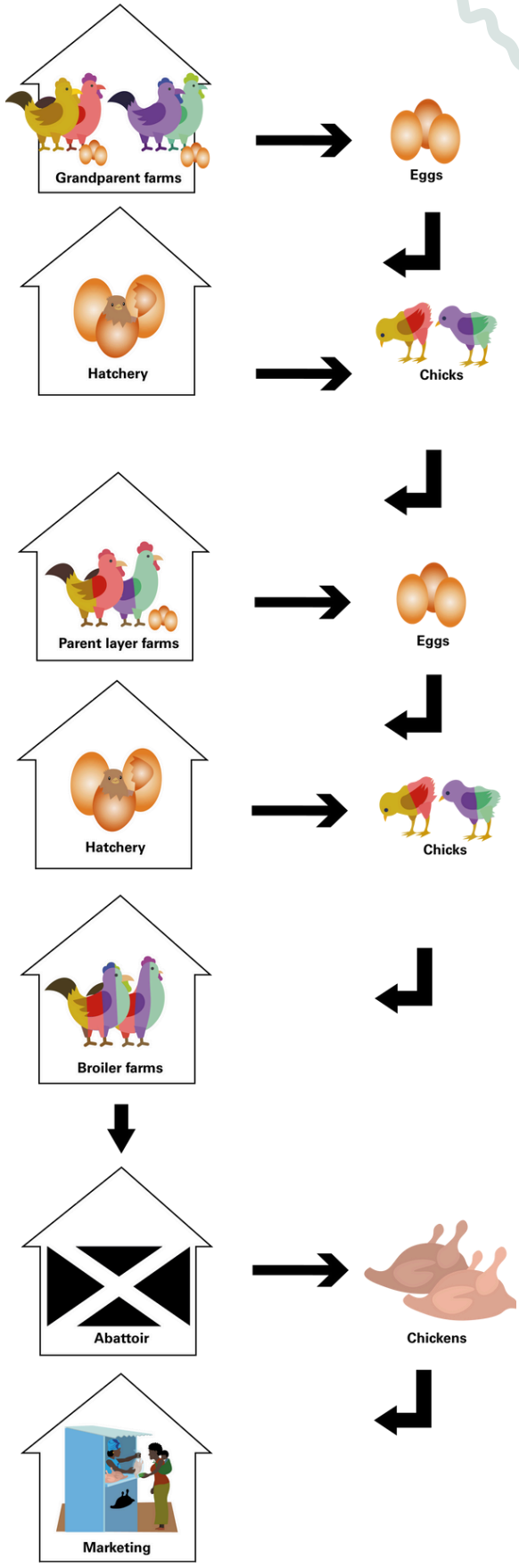


FIGURE 1.2
Integrated Broiler Value Chain

PHOTO 1.3
Ross 308
Photo Credit: Aviagen

PHOTO 1.4
Indian River
Photo Credit: Aviagen

PHOTO 1.5
Arbor Acres
Photo Credit: Aviagen

PHOTO 1.6
Cobb 500
Photo Credit: Cobb

The four most common broiler breeds in South Africa, where Lesotho sources most of its day-old chicks, are Ross, Cobb, Arbor Acres, and Indian River (Photos 1.3 - 1.6). These breeds all have white feathers, which make processing easier since the carcass appears cleaner after plucking due to the absence of dark pinfeathers. Compared to layers, broilers have strong legs, large breast muscles, and a stockier build.

Benefits of producing broilers

PHOTO 1.7
Broilers can provide income and food security for Lesotho farmers.

1 Food security

Broilers grow quickly and efficiently, improving food security by providing a reliable meat source for households or income generation. Broiler meat is high in protein and low in fat, making it a nutritious food choice. Expanding local production in Lesotho could reduce dependence on imported meat and potentially open export opportunities. The Lesotho government has identified poultry production as a priority area for growth to enhance food security.

2 Quick Growth Cycle

Broilers grow significantly faster than dual-purpose or indigenous breeds, allowing for shorter production cycles. This enables farmers to complete up to 6.5 cycles per year.

3 Income Generation

Broiler farming is a common income-generating activity. However, farmers must reinvest part of their earnings to purchase the next batch of day-old chicks and cover other input costs, such as feed. Profit margins per bird are often low, so higher production volumes generally yield better financial returns. Broiler production can also contribute to job creation.

4 Useful By-Products

Broiler manure is a valuable fertilizer for vegetable or crop production, reducing the need for chemical fertilizers. This can contribute to climate-smart agriculture, lowers farming costs, and promotes diversified farming practices.

Risk Factors in Broiler Production

Broiler performance depends on several factors, including environmental conditions, nutrition, and management—topics covered in this manual. Raising broilers typically requires more capital and higher input costs than indigenous or dual-purpose poultry farming. Limited access to financing and markets in some parts of Lesotho can also pose challenges.

Broilers are more susceptible to disease and require intensive management to thrive. Additionally, because there are few parent stock producers in Lesotho, farmers rely on external suppliers for day-old chicks, creating potential risks. Chicks transported over long distances may arrive dehydrated and stressed, but farmers have limited options since suppliers are scarce.

The broiler meat market is also a key consideration. If a planned sale falls through, keeping broilers past their intended slaughter date can be costly, as they continue consuming feed without additional profit. If slaughtered, proper refrigeration or freezing is necessary to prevent meat spoilage.

PHOTO 1.8
Broiler production demands higher capital investment and increased input costs.

Different Production Systems for Broilers

Broilers have been bred to perform optimally when provided with the correct environmental conditions and management. As a result, they typically more-suited to **semi-commercial or commercial indoor production systems**, rather than backyard systems where birds forage and scavenge. While broilers can be raised in free-range systems, they rely heavily on supplemental feeding to reach their full growth potential.

PHOTO 1.9
Broilers perform optimally under specific environmental conditions.

2. Housing Design and Environmental Management

Proper housing is essential for broilers, as they thrive in a sheltered, controlled environment with ideal temperatures and ventilation. Housing protects birds from predators, theft, and exposure to disease-causing agents.

Lesotho experiences a wide range of temperatures, with cold winters and hot summers, so housing design must accommodate these variations.

There are two types of broiler housing: open-sided housing (Photo 2.1) and closed, fully environmentally controlled houses (Photo 2.2). Most broiler houses in Lesotho are open-sided because they are more affordable to build and run. These structures have open sides for light and air movement but are enclosed at the ends. The open sides are covered with mesh to keep predators and wild birds out. Curtains can be raised or lowered depending on weather conditions (Photo 2.1).

PHOTO 2.1
Open-Sided House with Curtains

PHOTO 2.2
Environmentally Controlled House

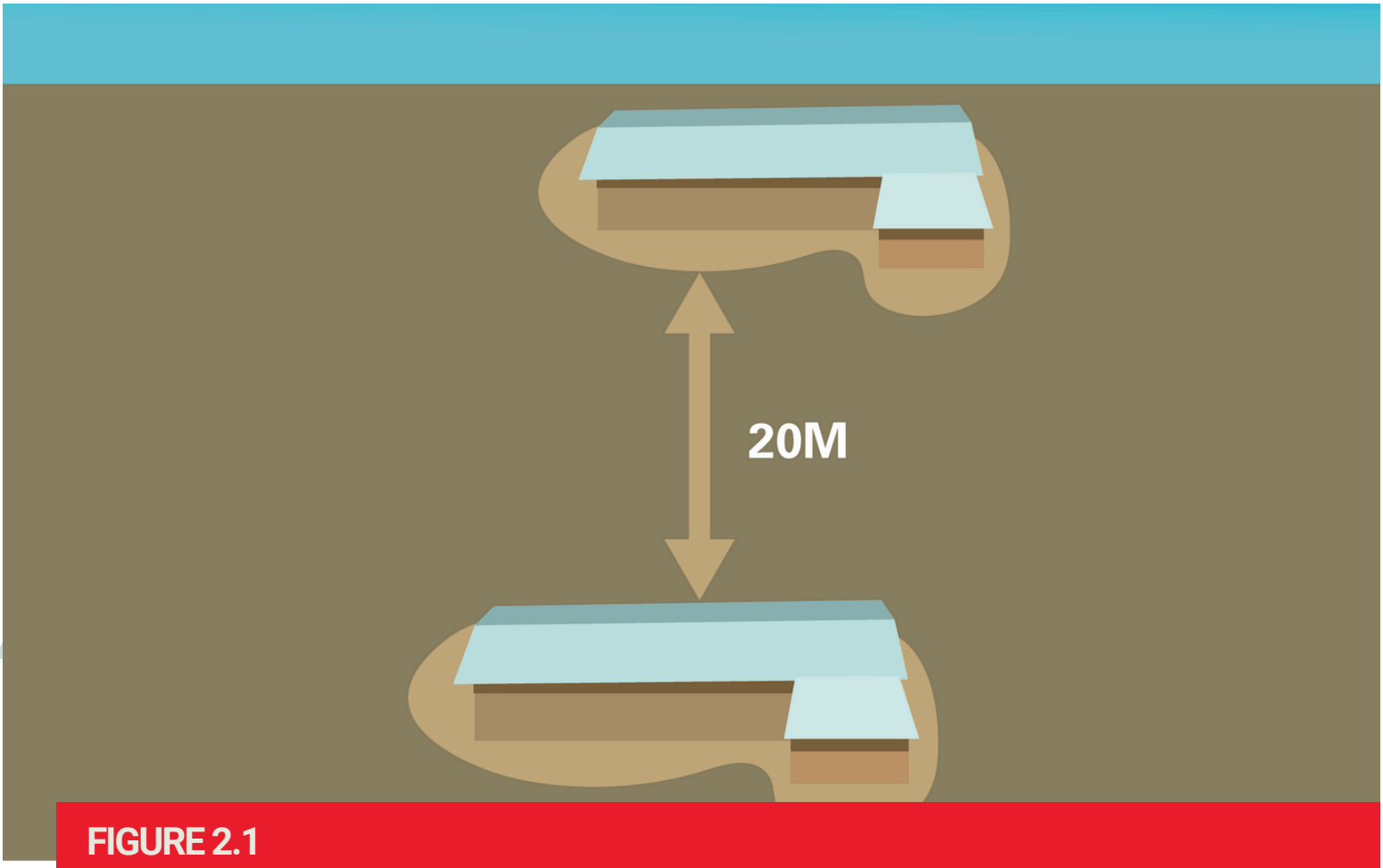


FIGURE 2.1
Selecting the site is a crucial aspect of constructing broiler poultry houses.

Selecting the Site

Before building a poultry house, it is important to select the right location. New poultry houses should be built far from other farms to minimize the risk of airborne disease transmission. Pathogens can spread through the air, on people, via wild birds, or by vehicles moving between farms.

When constructing multiple houses on the same site, they should be at least **20 meters (65 feet) apart** (Figure 2.1)**.** Choose an area with a slight slope for proper drainage, ensuring the site remains dry. Damp conditions encourage disease and create breeding grounds for flies. **Sandy soil is preferable** for better drainage, while clay-heavy soil should be reinforced with stones.

Good air circulation around the site is crucial. Higher ground typically experiences better airflow than low-lying areas. The prevailing wind should pass through the open sides of the house rather than against the end walls. However, Lesotho is known for strong winds, particularly in the highlands, so a balance is needed: sufficient ventilation for summer cooling without excessive heat loss in winter. Natural obstacles such as mountains and forests may help block harsh winds, while **good insulation** can reduce heat loss in colder months.

Ideally, poultry houses should be built on an **east-west axis,** which keeps them **cooler in summer and warmer in winter** (Figure 2.2). In summer, the sun passes directly overhead, while in winter, it shifts to shine into the **north-facing open side**. Due to strong winds in Lesotho, houses may be slightly tilted from the east-west orientation to optimize airflow while shielding birds from direct wind exposure.

If birds overheat, they reduce their feed intake and grow more slowly. Conversely, if they are too cold, they eat more, but the extra feed is used for heat production rather than growth—leading to higher costs.

Farms must be located near a **reliable water source** for both drinking water and cleaning. A safe estimate is **400ml of water per bird per day**, or **400 liters per 1000 birds per day.**

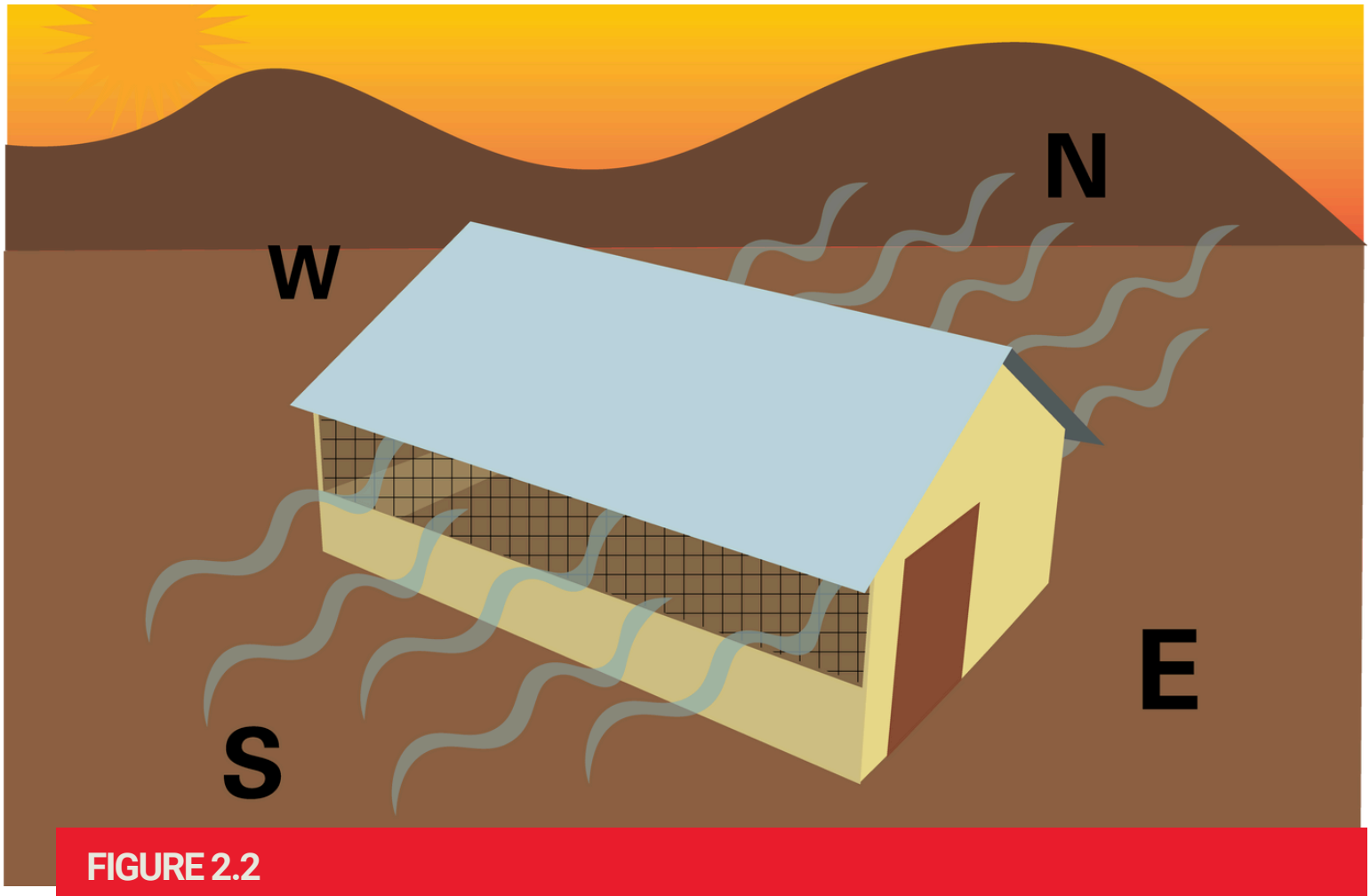


FIGURE 2.2
Graphic Showing House Axis Placement

Structure of the House

The following are key requirements for poultry house construction:

1 Size

There is no limit on the **length** of the house, but the **maximum width should not exceed 12 meters** to ensure sufficient air movement for proper ventilation. The **height** from the floor to the bottom edge of the roof should be **2.5 to 3 meters.**

2 Foundations

Solid, **above-ground foundations** are essential for stability and to prevent water entry. A **depth of 600 mm** is recommended.

3 Floors and Doors

Floors should ideally be **smooth concrete**, as this allows for more effective cleaning. **Cracked floors can harbor pests and disease**. The floor should be **slightly elevated** above ground level and **sloped toward the door** for proper drainage. Doors must **close securely**, be **lockable**, and be **wide enough to accommodate wheelbarrows and other equipment.**

4 Walls and Curtains

- **Low walls** (no higher than **½ meter**) along each length of the house allow for proper air circulation.
- **Wire mesh** is necessary to keep out wild birds and pests.
- **Heavy-duty tarpaulin curtains** should be adjustable, opening from the top and dropping down.
- **End walls** can be constructed from materials such as **corrugated iron, bricks, or concrete blocks.**

Important note:

Farmers often respond to the cold Lesotho winters by building very high walls with only small openings. This is not ideal as it results in poor ventilation.

5 Roof

The roof should be **2.5 to 3 meters high**, pitched at **25–33 degrees**, with a 1-meter (3-foot) overhang. Feeders and drinkers should be able to be suspended from the roof. Different materials can be used for the roof. Thatch is not recommended as, although it has good insulation, it is difficult to clean. Adding a lining on the inside can help with this. Corrugated iron is durable and easy to clean, but often needs to be insulated with a polyurethane spray foam, IsoBoard, or even polystyrene (Photos 2.4, 2.5, and 2.6).

PHOTO 2.4
Thatch Roof Example

PHOTO 2.5
Corrugated Iron Roof Example

PHOTO 2.6
Foam Spray Insulation Roof Example

6 Exterior

A **1-meter-wide cement apron** around the building is recommended, as it helps control long grass and keeps pests away. For **good biosecurity** (see Section 4), a **20-meter perimeter fence** should surround the farm, with a **"No Entry" sign**.

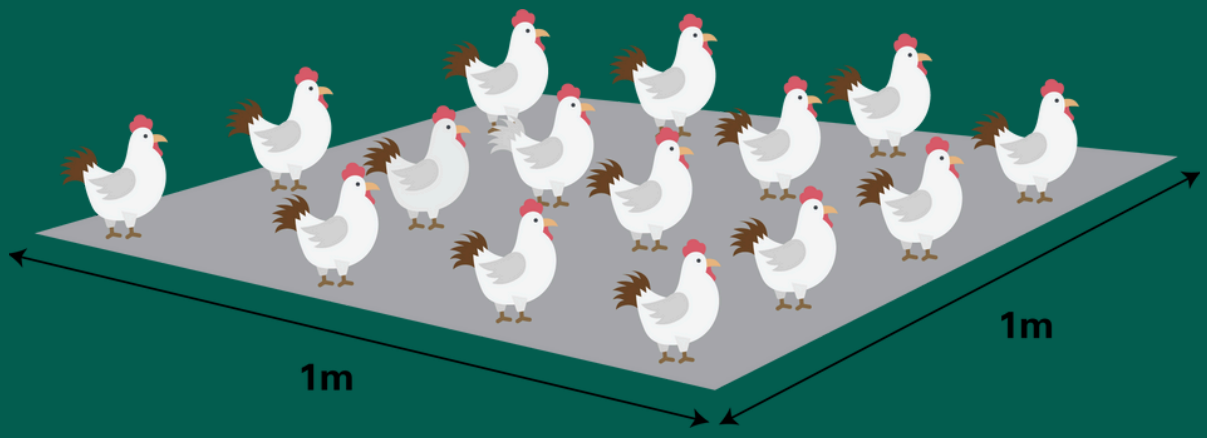
Adequate floor space for the number of birds is crucial. For broilers in an **open-sided house, 10–18 birds per square meter** (10–18 birds/m²) can be accommodated. Houses with good environmental control can house **18 birds per square meter**, but if ventilation is poor, this number should be reduced. While a higher stocking density can increase profit, overcrowding can negatively impact growth and overall profitability.

Stocking density adjustments by season:

- **Winter** – Stocking density can be increased, as birds benefit from shared body heat.
- **Summer** – Stocking density should be reduced, as overcrowding leads to heat stress and weight loss.

How to Calculate the Number of Birds that Can be Placed:

- Measure the available floor area (e.g., 10m × 15m = 150m²).
- Choose the appropriate stocking density (e.g.**, 15 birds per square meter**).
- Calculate the total number of birds the space can accommodate:
  - 150m² × 15 birds/m² = 2,250 birds.



How to Calculate the Size of the House to Build:

- Decide how many birds you want to rear (e.g., 1,000 birds).
- Choose the appropriate stocking density for your conditions (e.g., **10 birds per square meter**).
- Calculate the required floor space:
  - 1,000 birds ÷ 10 birds/m² = 100m² of space needed.
- Determine possible dimensions (length × width) that match the required area (e.g., 8m × 12.5m = 100m²).

Maintaining Clean Poultry Houses

Broilers should be reared in an **"all-in, all-out" system,** meaning:

- Chicks **arrive at the same time** and are **not mixed with birds of different ages**.
- Birds are **depleted/sold at the same time**, leaving the house empty for **cleaning and disinfection**.

The Broiler Cycle Consists of Three Phases:

1. **Production Period** – When broilers are housed.
2. **Cleanout Period** – When the house is cleaned and disinfected.
3. **Resting Period** – When the house remains empty for 10 to 14 days.

Cleaning the broiler house **between cycles** is crucial for **disease prevention**.

Steps for Cleaning a Poultry House After the Production Period:Production Period –

1. **Remove all equipment,** such as feeders and brooders.
2. **Remove bedding and manure –**
    a. Bag and **dispose of waste away from the poultry house** to prevent disease transmission.
    b. Manure can be composted or **spread on crops**.
3. **Turn off the electricity supply** and cover electrical outlets with plastic.
4. **Dry clean the house –**
    a. Sweep and dust to remove bedding, feathers, manure, old feed, dust, and insects.
    b. **Disinfectants do not work effectively if organic matter is present.**
    c. Clean from r**oof to floor**, back to front (Figure – cleaning the house).
5. **Rinse the building to remove dust.**
6. **Wash with detergent** to remove grease and dirt, then rinse again.
7. **Apply disinfectant –**
    a. Follow l**abel mixing instructions** for proper dilution (e.g., a **1:100 dilution rate** means **1 liter of disinfectant per 100 liters of water**).
    b. **Wear PPE** as specified on the label.

How to Mix Disinfectant:

- **Find the dilution rate** on the disinfectant label (e.g., **1:100**, meaning **1 liter of disinfectant per 100 liters of water**).
- Determine the size of your mixing container (e.g., 20 liters).
- Calculate the amount of disinfectant needed:
    - Divide the container size by the water amount in the ratio: **20L ÷ 100L = 0.2**
    - Multiply by the disinfectant amount in the ratio: **0.2 × 1L = 0.2L (200mL) of disinfectant**
    - **Final mixture:** Add **200mL of disinfectant to 20L of water.**

PHOTO 2.7
After completing a cycle, a 10-14 day rest period is needed, where all equipment and the house is cleaned and disinfected.

Rest Period and Biosecurity

The rest period is essential, as any remaining viruses that survive disinfection will die naturally. Using a planning calendar ensures compliance with the 10–14 day rest period and allows time for ordering new chicks.

During the rest period:

- Complete necessary repairs to maintain the house.
- Prevent contamination by avoiding carrying dirt back inside.

Before the next flock arrives, the house must be fully prepared with all cleaned and maintained equipment in place.

Equipment in the Poultry House

Essential Equipment for a Broiler House:

1 Feeding Equipment

- **Chick Pan** (Photo 2.8) –
  - Young chicks cannot reach regular feeders, so feed should be provided in scratch pans during the first week to encourage scratching and feeding habits.
  - Grills prevent feed wastage.
  - Paper bedding with sprinkled feed can further encourage feeding behavior.
  - 3 feeders per 100 birds is recommended.

Chick feeding pans should be replaced with tube or trough feeders as birds grow

- **Chick Oval Hole Feeder** (Photo 2.9) –
  - These help to prevent feed spillage
  - 4 feeders per 100 birds is recommended
- **Bulk Chick Feeder** (Photo 2.10) –
  - Bulk chick feeders should be replaced with tube feeders as birds grow.
  - 3 feeders per 100 birds is recommended.

PHOTO 2.8
Chick Pans

PHOTO 2.10
Bulk Chick Feeder

PHOTO 2.9
Chick Oval Hole Feeder

2 Drinking Equipment

There are different drinking systems available to ensure birds have continual access to clean water:

- **Manual drinking systems –** Fonts that require daily manual filling (3 per 100 birds) (Photos 2.11 and 2.12)
  - **Chick fonts** ensure easy drinking access but must be cleaned frequently to prevent contamination (Photo 2.12)
- **Bell Drinker Systems** - connected to the water supply, but require cleaning during cycle (3 per 100 birds) (Photo 2.13)
- **Nipple drinking systems –** Connected to the water supply and don't require cleaning during the cycle (e.g. 12 birds per nipple) (Photo 2.14).

PHOTO 2.11
Manual Drinker System

PHOTO 2.13
Bell Drinker

PHOTO 2.12
Chick Font

PHOTO 2.14
Nipple Drinking System

3 Other Equipment

- **Hooks and chains –** For suspending feeders and drinkers from the roof.
- **Brooders & brooder guards –**
  - Various brooders can be used to heat the environment for chicks, including: Gas brooders, paraffin heaters, charcoal heaters, infrared lamps.
  - The choice of brooder depends on availability, effectiveness and safety.
    - Gas brooders are efficient but rely on a nearby gas supply and have some safety considerations (Photo 2.15)
    - Charcoal heaters are cost effective, especially where electricity is expensive or unreliable but need constant monitoring and have safety considerations (Photo 2.16)
    - Paraffin heaters are cost effective but may not provide effective heat for larger producers and have safety considerations.
    - Infrared lamps are easy to set up and use but may not produce effective heat for larger producers and rely on electricity. (Photo 2.17)

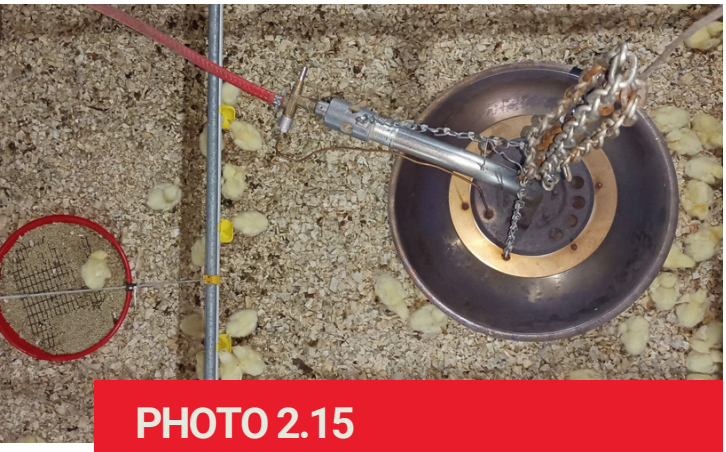


PHOTO 2.15
Gas Brooder

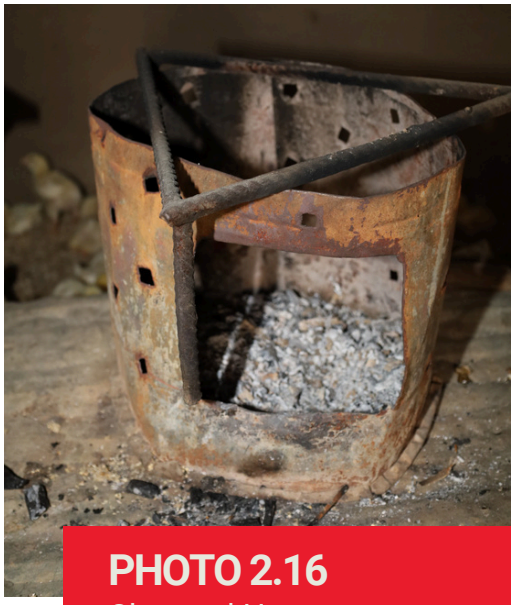


PHOTO 2.16
Charcoal Heater

PHOTO 2.17
Infrared Lamp

- Brooder Guards (Photo 2.18) is usually a piece of Masonite board about 30 cm in height that is circled and joined to confine an area for chicks close to the brooder so that chicks cannot crowd in corners and suffocate. They are also useful to prevent draughts

PHOTO 2.18
Brooder Guard

- **Lighting –**
  - Appropriate lighting helps chicks explore their surroundings and eat more.
  - Solar power can be harnessed to reduce electricity costs (Photo 2.19).

PHOTO 2.19
Using Solar Energy for Lights

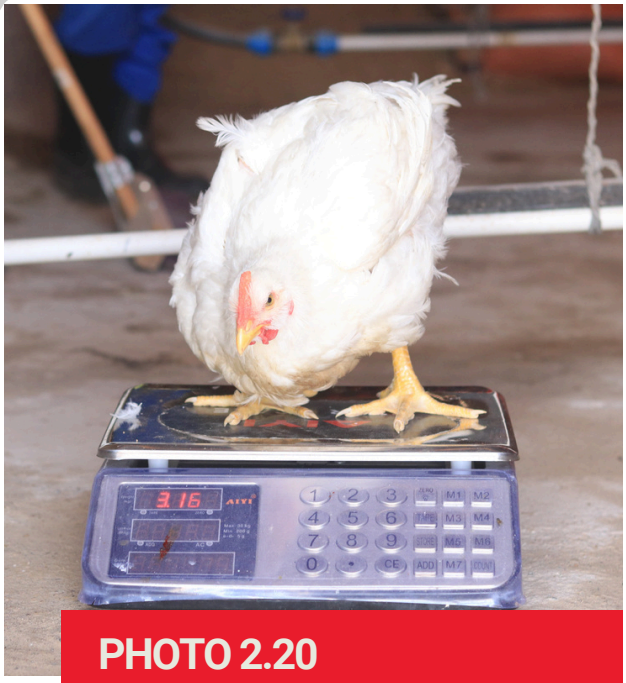


PHOTO 2.20
Scale

PHOTO 2.21
Estimate birds weight by lifting

- **Pressure Washer –** For deep cleaning.
- **Ventilation System –** in an environmentally-controlled house.
- **Scale –**
  - Used to weigh birds (Photo 2.20).
  - Helps track growth and determine the right time to market or pricing (if selling per kilogram).
- **Thermometer –**
  - A thermometer placed at chick height is useful to ensure the heating is adequate, although chick behavior will also inform this.
- **Medical Ear Thermometer –**
  - Measures chick vent temperature upon arrival.

3. Management of a Broiler Cycle

Preparing the Broiler House Before Chick Arrival

Before the chicks arrive, the following should be prepared in the broiler house:

- Order and deliver feed.
- Prepare the footbath with disinfectant.
- Place a 5–10 cm layer of bedding material on the floor. This should be clean, dry, and absorbent. Different materials can be used (Photos 3.1 and 3.2). Pine shavings are ideal but may be difficult to source in Lesotho. Alternative options include dried grass/hay, cereal straw, and recycled shredded paper (though shredded paper tends to cake). Sand is another option—it is reusable but does not retain heat well in cold conditions and must be kept dry.
- Place feeders (chick feeding pans) and drinkers (chick fonts).
- Set up brooders and position brooder guards.
- Fill the feeders.
- Turn on the brooders about 24 hours before the chicks arrive. This is crucial to warming up not only the room but also the floors.

PHOTO 3.1
Shredded Paper Bedding

PHOTO 3.2
Pine Shavings Bedding

Transportation of Chicks

Transportation plays a vital role in chick quality. The sooner chicks are placed after hatching, the better. When planning chick orders, minimizing transport time and distance is essential. If chicks are arriving from South Africa by road, consider border control wait times. Ideally, chicks should be transported in environmentally controlled vehicles where the temperature can be adjusted to maintain a chick vent temperature of 39.4–40.5°C. The relative humidity should be at least 50%, with proper ventilation or air conditioning. However, this is not always the case (Photo 3.3). Minimizing transport time and distance is essential, and the house should be fully prepared to place chicks as soon as they arrive.

PHOTO 3.3
Transportation Method Example

Chick vent temperature can be measured upon arrival using a medical ear thermometer (Photo 3.4). If chicks are sourced from distributors, measuring vent temperature on arrival provides insight into transport conditions. Overheated chicks may arrive dehydrated and stressed, and this feedback can be shared with suppliers to improve transport conditions.

PHOTO 3.4
Vent Temperature Measurement

If environmentally controlled vehicles are unavailable, transport should be planned for early mornings or late afternoons. To keep chicks hydrated, a hydrogel supplement, cucumber, or watermelon can be added to the chick boxes. Additionally, an electrolyte or stress pack can be added to the water in the chick fonts to support chicks after stressful transport.

Placing Chicks in the House

Brooding refers to the period when chicks require an external heat source and optimal care. In nature, a mother hen provides warmth to her chicks, as they cannot regulate their body temperature. In a broiler house, this is achieved using artificial heaters. The first few weeks of a chick's life are critical, and proper management during this period significantly impacts performance.

Definition:

Brooding refers to the time period immediately after hatch when the chick requires optimal care.

1 Zone of Comfort

The zone of comfort is a localized area within the poultry house that provides optimal conditions for chick growth and well-being. This means the temperature is within an ideal range, so chicks are neither too hot nor too cold. As birds grow, the temperature required for the zone of comfort gradually decreases. If this zone is not provided, birds will become less efficient. Factors such as temperature, wind speed, housing conditions, and feeding levels all affect the zone of comfort.

2 Chick Arrival and Placement

When the chicks arrive, follow these steps:

1. **Verify the delivery** – Count the number of boxes while the driver is present to confirm the correct order.
2. **Handle with care** – Carry the boxes carefully into the house and ensure air circulation around them (avoid stacking too high). Do not leave chicks in direct sunlight.
3. **Weigh the boxes** – It is good practice to weigh all chick boxes.
4. **Check vaccination records** – Ask for documentation of any vaccinations given at the hatchery. Chicks should arrive already vaccinated for Newcastle Disease and Infectious Bronchitis.
5. **Assess chick health** – Gently remove the chicks and inspect them for quality. Do not place any deformed or sick chicks. Count the number of dead chicks and report it to the hatchery/distributor.
6. **Ensure accurate chick count** – Count the chicks into another box before placing them in the brooder area. This makes recounting possible if needed.

Assessing Chick Quality

The quality of day-old chicks significantly impacts their growth. A **healthy chick** should have:

- Clear, bright eyes.
- Dry, soft, and well-covered down (yellow fluff).
- Strong, yellow, fully-fleshed legs with no deformities.
- Healthy skin on the legs with no sores.
- A firm body without signs of edema (fluid buildup).
- A **sealed, clean, and dry navel** (where the yolk sac was attached). Unhealed navels can lead to bacterial infections, resulting in "mushy chick disease."
- A chick should be alert (wide awake) and active (moving around). If a chick is panting or gasping for water and has a dry, shriveled body, instead of being plump, it is a sign of dehydration (a lack of water).A quick **righting reflex** – If placed on its back, a healthy chick should turn itself over within **two seconds.**

A newly hatched chick should weigh a minimum of 36 grams. Smaller chicks will need extra care in order to survive and thrive. The weight of the chick is a good indicator of chick quality, but can depend on the age of the parent stock. Younger parents lay smaller eggs which result in smaller chicks.

How to Weigh Chicks:

- Weigh the full box with chicks inside (e.g., 8808g).
- Remove the chicks and weigh the empty box (e.g., 1160g).
- Count the total number of chicks in the box (e.g., 200).
- Subtract the weight of the empty box from the full box (e.g., 8808g – 1160g = 7648g).
- Divide the total chick weight by the number of chicks to determine the average weight (e.g., 7648g ÷ 200 = 38.2g).

PHOTO 3.5
Chicks Eating and Drinking

3 Encouraging Feed and Water Intake

After placing the chicks, they should be encouraged to eat and drink (Photo 3.5). One effective method is to place the chicks directly on the feeders. For the first few days, spreading some feed on paper laid over the bedding can also help, as chicks naturally peck at objects on the ground. Additionally, tapping on the feeders and drinkers can attract their curiosity and encourage them to start eating and drinking.

Although day-old chicks still have some yolk in their abdomen that can sustain them for a short time, it is crucial to get them eating starter crumbles as soon as possible. This early feeding helps develop their digestive system. If chicks do not eat within the first day, their digestive systems may shut down, leading to starvation, a condition known as "starve-out."

PHOTO 3.6
Checking Crop Fill

To check if a chick has eaten, feel its crop, which is located below the neck and above the wing (Photo 3.6). The crop temporarily stores feed and mixes it with water to soften it. By 24 hours after placement, most chicks should have food and water in their crop. If a chick's crop is empty, it can be encouraged to eat by placing it near the feed.

Ensuring chicks can access water is equally important. Chicks drink by lowering their heads to take in water and then tipping them back to swallow. If any chicks appear weak or are not drinking, they can be taught by gently dipping their beaks in water.

Managing Environmental Factors

1 Lighting

- For the first **7 days**, a **23-hour lighting program** (i.e. 23 hrs of light per day) is recommended to encourage early feed intake.
- After the first week, **16 hours of light per day** is ideal.
- If a light timer is unavailable, natural daylight can be used, but birds may grow slightly slower.

2 Brooder Temperature

- **Gradually decrease brooder temperature** as chicks grow (Table 3.1).
  - Turning the brooders on and off will depend a lot on the outside temperatures. In summer the brooders may be turned off during the day if the temperature is high.
- **Gradually decrease brooder temperature** as chicks grow (Table 3.1).
- Turning the brooders on and off will depend a lot on the outside temperatures. In summer the brooders may be turned off during the day if the temperature is high.
- **Expand brooder guard space** as chicks grow.
- **Monitoring chick behavior** is the best way to determine comfort (Figure 3.1):
  - Huddling under the brooder → Too cold.
  - Moving away from the brooder → Too hot.
  - Huddling in one corner → Draught present .

TABLE 3.1
Recommended Temperatures for Broilers as They Age.

Age (d)	Temperature (celcius)
Day old	32
3	30
6	28
9	27
12	26
15	25
18	24
21	23
24	21
27	20

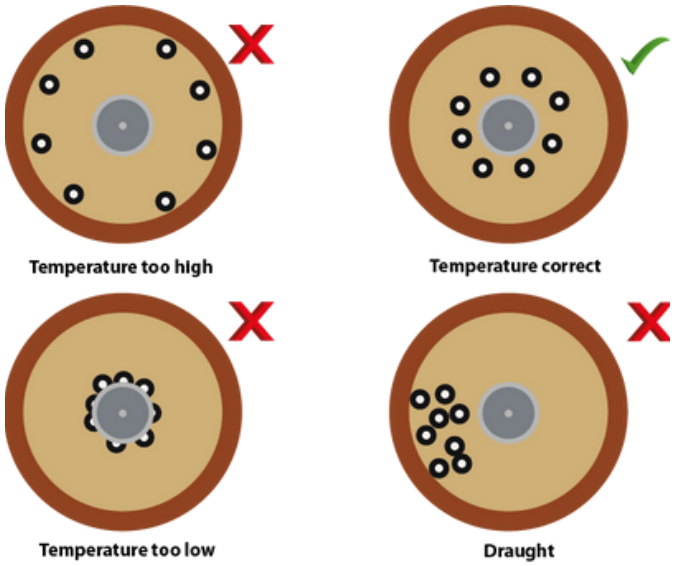


FIGURE 3.1
Monitoring Chick Behavior

PHOTO 3.7
Proper ventilation is essential during production.

3 Ventilation

During brooding, it is essential to maintain some air movement through the house. Carbon dioxide can build up and must be replaced with fresh oxygen. Proper air circulation also helps keep the litter dry. Even in very cold conditions, there should be a small opening to allow fresh air into the house. In houses with fans, only small fans should be used at low speeds or cycled on and off as needed, a practice known as minimum ventilation.

Proper ventilation is essential during brooding:

- Air circulation prevents carbon dioxide buildup and introduces fresh oxygen
- Ventilation helps dry litter, reducing moisture-related health risks
- In cold weather, minimal ventilation should be maintained to prevent gas buildup
- In high-altitude areas, like Lesotho, lower oxygen levels make ventilation even more critical

Ventilation is crucial for maintaining good air quality and ensuring bird health. In winter, when temperatures are low, many farmers tend to close the house as much as possible, but this can lead to the build-up of harmful gases. While heating costs may rise when cold air enters the house, ventilation remains necessary. Insulating the roof and walls can help retain heat while still allowing for proper airflow.

Because parts of Lesotho are at a high altitude, oxygen levels in the air are lower than in lower-altitude regions, making proper ventilation even more critical. Without sufficient oxygen, birds are at risk of developing ascites, commonly known as "water belly," a condition where fluid accumulates in the abdominal cavity.

Stockmanship

Stockmanship is an important aspect of the management of broilers. This means that the flock should be carefully observed using all senses to monitor behaviour, health and environmental conditions. Being aware of bird behaviour and conditions in the house can help indicate when there are problems to troubleshoot.

Hearing – listen to vocalisation, breathing and respiratory sounds as well as mechanical sounds in the house

Sight – observe bird behaviour and the environment

Smell – notice the air quality, such as ammonia levels

Taste – check the water and feed quality

Touch – handle birds to assess crop fill in young chicks and general condition of older birds, and sense the environmental conditions

4

Relative Humidity

Relative humidity can be measured with a hygrometer and plays a crucial role in how chicks perceive temperature. When relative humidity is high, chicks feel the air temperature as hotter than it actually is. Since they come from an incubator environment with high humidity, they can be prone to dehydration if conditions become too dry. During the first few days, relative humidity should be maintained at 60–70%. In Lesotho, where relative humidity is generally low, a portable backpack sprayer can be used to mist the walls of the house with water. Additionally, if humidity is low, the temperature settings recommended in Table 3.1 should be increased slightly. If a hygrometer is unavailable, chick behavior can provide insight into whether conditions are within their comfort zone. If humidity is too high, litter quality deteriorates because excess moisture cannot evaporate, leading to wet bedding.

Proper humidity is essential during brooding:

- Ideal relative humidity: 45–65%
- High humidity: Reduces litter quality, increases ammonia levels, and leads to respiratory infections
- Low humidity: Can cause dehydration
- If necessary, a portable backpack sprayer can be used to mist water onto house walls
- Monitor chick behavior as an indicator of humidity comfort

The ideal relative humidity for poultry is between 45% and 65%. If the air is too dry and dusty, birds become more susceptible to respiratory infections. On the other hand, if the air inside the building is too moist, manure does not dry properly, resulting in wet litter. This can lead to high levels of ammonia, breast blisters, sore feet, and coccidiosis. Proper ventilation, especially when humidity is high, is essential for maintaining good litter quality. Wet and caked litter should be removed from the house regularly, but litter should also not be excessively dry and dusty.

Ventilation plays a vital role in creating a healthy environment for poultry. In open houses, curtains should be adjusted as needed to regulate airflow. Incoming cool air must mix properly with the hot, stale air inside to prevent cold spots within the house.

Management of Feeds, Feeding, and Water

Poultry feed is a mixture of ingredients known as raw materials. Feed mills purchase these raw materials and use specific formulas for different species and ages of birds. The ingredients are blended in precise proportions to create a balanced feed that meets the birds' requirements for maintenance (staying alive) and growth. Rations are designed for a specific type of bird and age, meaning broiler rations and layer mash are formulated differently. It is essential to use the recommended feed from a reputable supplier. Do not use pullet or layer mash or breeder pellets for broilers.

1 Feed Form

Poultry feed is produced in different forms, including mash (meal), crumbles, and pellets (Photos 3.8, 3.9 and 3.10). Layers are typically fed mash because it is more affordable, and hens can consume enough in a day to meet their nutritional needs. Broilers, however, need to eat quickly and in large amounts to support rapid growth. Pellets are easier for broilers to pick up and swallow than mash, and while they may cost more, the higher growth rate justifies the expense. Day-old broilers are usually fed crumbles—small pellets—until they are large enough to transition to regular pellets at around 16 days of age.

Feed Forms & Their Uses

- **Mash**: Common for layers; economical but takes longer to consume
- **Crumbles**: Small pellets ideal for young broilers. moisture-related health risks
- **Pellets**: Best for broilers; promotes fast consumption and growth

PHOTO 3.8
Mash

PHOTO 3.9
Crumbles

PHOTO 3.10
Pellets

2 Feed Management

Feed is the most significant expense in poultry production, accounting for approximately 70% of total costs. Other expenses include the cost of day-old chicks, heating, electricity, water, bedding (shavings), vaccinations, cleaning supplies, and labor.

Since feed is expensive, minimizing waste is critical. Spilled feed or feed consumed by rats and wild birds reduces farm profitability. Do not overfill feeders, as birds tend to flick their heads and spill feed onto the floor. Feed purchases should also be planned carefully to ensure feed is used within three months and not stored for long periods.

3 Height of Feeders

Ensure that feeders in the broiler house are set at the correct height for the birds (Figure 3.2). If feeders are too high, birds may struggle to access the feed. If they are too low, birds will need to lower their heads excessively, increasing spillage. Additionally, low feeders may become contaminated with feathers and droppings.

Feeder Height Guidelines

- Adjust feeders to be at back height of the birds
- Avoid placing them too low to prevent contamination and waste
- Regularly check and adjust as birds grow

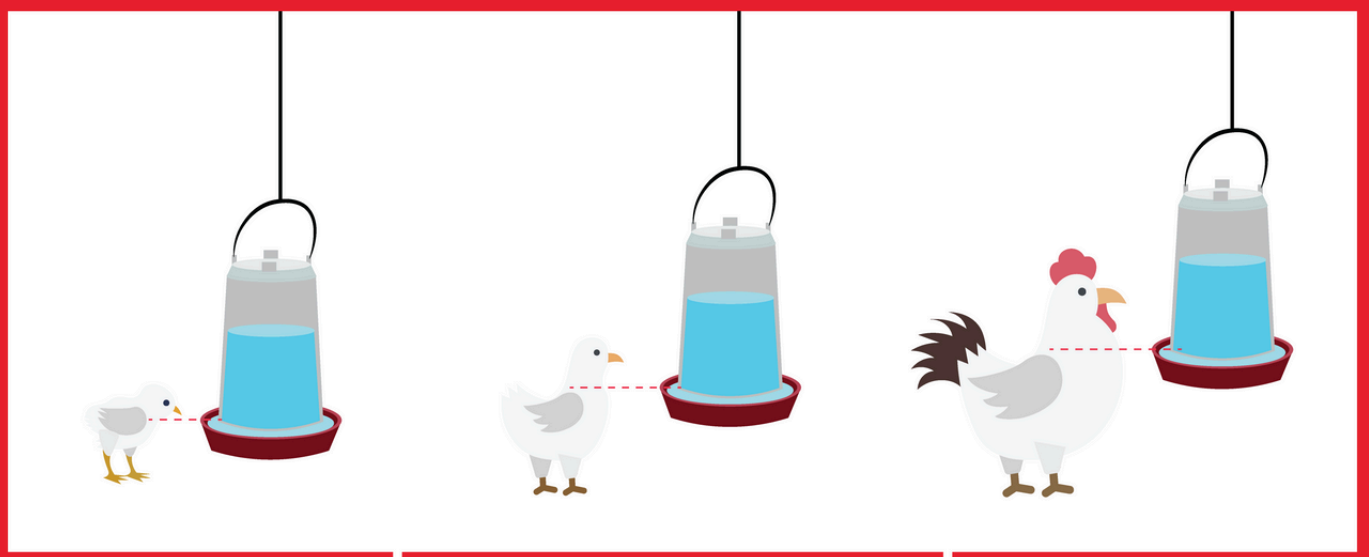


FIGURE 3.2
Appropriate Height for Drinkers and Feeders

4 Feed Availability

Feed should always be available to broilers to ensure they reach their genetic growth potential. Feed restriction is generally not recommended. However, in Lesotho, where higher altitudes increase the risk of ascites (fluid buildup in the abdomen), slowing down growth may be necessary. This can be done by limiting access to feed while still providing a pelleted broiler ration.

5 Mold Prevention

Wet feed encourages mold growth, making it unpalatable and potentially toxic. Any moldy feed must be discarded. Prevent mold by ensuring there are no leaking water pipes or nipples near feed storage areas. While some wetting of feed by the birds' saliva is unavoidable, daily checks should be conducted to remove lumps of wet feed from tube or pan feeders.

6 Feeding Out of the Bag

For optimal growth, broiler feed should be the sole dietary source. Adding vegetables, grass, or other foodstuffs creates an unbalanced diet, which slows growth. Broiler feed is specifically formulated with all necessary nutrients in the correct proportions, eliminating the need for supplemental feeding.

Tip:

There is no need to supplement a commercial broiler feed from a reputable supplier

7 Feed Storage

Feed purchased in bags should be stored in a dry shed on top of pallets. The storage room must be free of windows, cracks, or leaks to keep feed dry and protected from sunlight, as both mold and UV exposure can destroy essential vitamins. Stacking sacks on wooden pallets, away from cold floors and walls, prevents condensation and sweating. If feed is purchased in bulk, it should be stored in a sealed, rainproof bulk tank.

Proper Feed Storage :

- Store feed in a dry, well-ventilated area
- Use wooden pallets to keep sacks off the ground
- Keep feed away from direct sunlight to prevent vitamin degradation
- Check for leaks or condensation that could lead to mold growth

8 Rodent and Wild Bird Control

Rats and wild birds should not have access to feed storage areas, as they carry diseases that can contaminate the feed and infect poultry. Rat bait stations should be strategically placed around the farm to control rodent populations. Any spilled feed should be cleaned up immediately to prevent attracting wild birds, which can also carry diseases (see section on Biosecurity).

9 Broiler Rations

The basic feeds are broiler starter, broiler grower, broiler finisher and broiler post-finisher. Feed suppliers may have slightly different ranges depending on the expected slaughter age (Example below - Table 3.2). The days are estimates and it is better not to leave open bags of feed and vary the times slightly to fit with this. If feed contains medication, a post-finisher ration may be required to ensure the meat is safe for human consumption. If birds need to be kept longer than expected, a broiler maintenance ration—which contains fewer nutrients—can be used to reduce costs, though this is not ideal for continued growth. Keeping birds longer than planned can be expensive, as older birds consume more feed.

Mash diets are not recommended for broilers as they are dusty. If you are worried about ascites, rather keep to a pelleted feed but restrict the feed intake to slow down the growth.

TABLE 3.2
Example Feed Types and Ranges for Broilers

Feed Type	Days	Feed Intake (kg/bird)	Kg Feed for 1000 Birds	No. of 50 kg Bags
Starter Crumble (20% CP)	Up to 21	1	1000	20
Grower Pellet (18% CP)	22-35	1.5	1500	30
Finisher Pellet (16% CP)	36-42	1	1000	20

Water Management

Chicks cannot survive without water. Water helps regulate their body temperature, aids in digestion, and keeps the mucous membranes (the lining of the mouth and lungs) moist, preventing pathogens (disease-causing organisms) from entering the body. If chicks do not drink water, their droppings become dry, and within a few hours, they stop eating, leading to a complete halt in droppings. Water is essential for daily survival, as it makes up 80% of a chick's body and 65% of an adult bird's body.

If birds are deprived of water, serious physiological changes begin within hours, leading to reduced weight gain. A bird that loses 20% of its water content will die. Poultry can survive much longer without feed than without water.

Water from natural sources like rivers, dams, and boreholes is often contaminated with pathogens such as E. coli, particularly if exposed to manure. These sources may also contain microscopic plant and insect life, as well as sand. Municipal water is generally safe for both human and poultry consumption.

Before using water for drinking, it should be:

- Filtered to remove sediment
- Treated with chlorine to kill pathogens. This can be done by:
  - Placing chlorine tablets in the header tank
  - Adding one teaspoon of bleach per 20 liters of water

Water may also contain harmful levels of dissolved minerals such as calcium, salt, fluorine, and iron. These can clog water pipes and nipples in poultry houses or cause rust. If using a nipple drinker system, regularly flush the pipes with descaler when cleaning out the poultry house. Fine filters or water softeners can help prevent mineral buildup on a daily basis.

Water quality should be tested regularly. Collect clean containers from the local water authority, fill them with water samples, and return them for analysis. Samples should be taken at the point of consumption —ffrom the nipple drinkers or bell drinkers, not an outside tap. (Example of a standard poultry water test is shown in Appendix i)

Key Water Quality Management Steps:

- Filter to remove sediment
- Disinfect with chlorine (tablets or bleach solution)
- Test water regularly at the point of consumption
- Flush pipes with descaler if using nipple drinkers

1 Managing the Water System

The height of the water line or bell drinkers must be adjusted as the birds grow (Photos 3.11 and 3.12). Water nipples or drinkers that are too high may be out of reach, while those that are too low may cause spillage and contamination. This aspect of water management also impacts flock uniformity, ensuring all birds have equal access to clean water.

Bell drinkers should be cleaned twice a week using a clean cloth to wipe inside the lip and remove dirty water, and fount drinkers should be cleaned daily when refilling. This prevents harmful microorganisms from building up

PHOTO 3.11
Chick Font at Appropriate Height

PHOTO 3.12
Bell Font at Appropriate Height

2 Cleaning the Water Lines

During production cycles, lime, scale deposits, rust, dirt, and algae accumulate in water lines, reducing water flow and fostering bacterial growth. Broilers drinking from contaminated lines ingest these pathogens, which can lead to health issues.

Between production cycles, the water lines should be "shocked" (thoroughly cleaned) by:

1. **Flushing** lines with high-pressure water to remove debris.
2. **Filling** lines with a cleaning solution and letting it sit for **3–6 hours**.
3. **Flushing again** with clean water before reuse.

3 Feed and Water Intake

A broiler's daily water intake (ml/bird/day) is approximately double its feed intake (g/bird/day).

For example, at 28°C (82°F), a 5-week-old broiler will:

- Consume 150g of feed.
- Drink 280ml of water.

At 30°C (86°F), the same bird will:

- Eat 128g of feed (lower intake due to heat stress).
- Drink 300ml of water (higher intake to stay cool).

Installing water meters in poultry houses helps monitor intake and detect problems early. Meters also provide useful data on water usage as readings can deduct water usage from flushing lines and allow accurate measurements of bird water intake

Water availability must be checked daily, even in nipple drinker systems. If birds experience water deprivation, they will stop eating. Cool, clean, and fresh water should always be accessible. The ideal water temperature for poultry is 10–13°C (50–55°F).

Feed & Water Consumption Trends

- Birds drink twice as much as they eat
- In hot weather, feed intake decreases while water intake rises
- Daily water checks prevent dehydration and growth issues
- Water meters help track abnormal consumption patterns

PHOTO 3.13
Water availability is one of the most important aspects of rearing poultry.

Catching and Management Before Slaughter

At the end of the broiler cycle, birds may be sold live or transported to an abattoir. Slaughtering birds on the farm is not recommended, as waste can introduce pathogens that may infect future flocks.

After weeks of growth and careful management, it is crucial to handle birds properly to avoid injuries such as:

- Bruising
- Scratches
- Wing damage

PHOTO 3.14
Holding Bird Correctly

Birds should be transported in crates, and the number of crates needed should be determined before catching begins. The number of birds per crate depends on:

- **Bird size** – Larger birds require fewer per crate.
- **Transport conditions** – Reduce numbers in hot weather or for long journeys.
- **Stability** – Too few birds may result in instability during transport, increasing injury risks.

Keeping birds calm during catching is critical. Strategies include:

- **Turning off lights** to reduce stress.
- **Catching birds early in the morning or late in the evening.**

When handling birds, they should be held correctly (Photo 3.13):

- **By the shanks** or **around the body with both hands**.
- Keep wings **close to the body** to prevent flapping.
- Never carry birds by the neck or wings.

CHECKLIST 3.1
Preparing the House for Broiler Chicks

	Task	Done	Date	Person
1	Fill the foot bath with disinfectant			
2	Spread shavings on the floor, 5-10 cm deep			
3	Put the feeders and drinkers in the house at the correct height for day-old chicks			
4	Put the brooders in place and at the correct height			
5	Hang thermometers at the edge of the brooders, at the level of the chicks			
6	Place the brooder guards around the brooders			
7	Fill the drinkers with clean water			
8	Fill the feeders with broiler starter crumbles			
9	Turn heating on 24 hours before the chicks arrive			
10	Read the temperature of the air near the brooders			
11	Make sure the lights are working, and set timer if you have for 23 hours light			

CHECKLIST 3.2
Placing and Brooding Broiler Chicks

	Task	Done	Date	Person
1	Carefully carry the boxes to the poultry house			
2	Count the number of boxes			
3	Take the chicks out of the boxes and place them inside the brooder guards			
4	Handle the chicks carefully to avoid breaking wing and leg bones			
5	Count the dead chicks			
6	Remove the sick or deformed birds			
7	Put paper with feed on it on top of the shavings			
8	Watch the chicks to see if they are eating. Put any chicks that do not eat close to the feeders			
9	Feel the crops for feed content			
10	Watch the chicks to see if they are drinking. Dip the beaks of any chicks that do not drink in the water			
11	Watch the behavior of the chicks to see if they are comfortable with the temperature			
12	Change the brooder temperature if it is too hot or too cold			

CHECKLIST 3.3
Managing the Broilers and Their Environment

	Task	Done	Date	Person
1	Turn the litter to dry it underneath. Remove wet patches of shavings			
2	Notice whether there is a smell of ammonia in the house			
3	See which direction the wind is blowing from			
4	Raise or lower the curtains to ventilate the house, according to the weather			
5	Look at the birds to see if they are heat stressed or huddling because of the cold			
6	Clean out the drinkers and fill with fresh water			
7	Set drinkers at the correct height for the birds			
8	Set feeders at the correct height for the birds			
9	Fill the feeders with the correct broiler ration			
10	Check the light time switch			
11	Weigh a sample of the broilers (weekly). Record the average weight			
12	Remove dead birds (daily). Record the number of mortalities. Put them in the mortality pit			

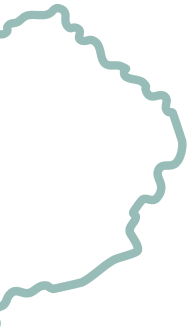


PHOTO 4.1
Strong biosecurity and farm management practices are essential for keeping birds healthy.

4. Bird Health and Biosecurity

Prevention of disease is critical, and good biosecurity and farm management practices play a key role in reducing the risk of disease exposure. If birds are exposed to disease, it is important to quickly identify that they are sick and take appropriate action.

1 Biosecurity

Biosecurity refers to keeping poultry safe by preventing the spread of disease-causing agents (viruses, bacteria, fungi, and protozoa). These microorganisms are everywhere, and it is impossible to eliminate them all. However, with good biosecurity, birds have the least exposure to pathogens and the best chance to remain healthy. Many pathogens are killed by sunlight, as well as through proper cleaning and disinfection of the house (as described earlier). Vaccinations give birds immunity, and reducing stress by maintaining proper environmental conditions further strengthens their resistance to disease.

2 Vaccination

Most hatcheries in South Africa, where chicks are often sourced, vaccinate for Newcastle Disease and Infectious Bronchitis. However, this should always be confirmed, as vaccination is sometimes offered as an additional service. It is essential that chicks arrive vaccinated. Additionally, it is recommended to vaccinate for Newcastle disease at 8-10 days and Infectious Bursal Disease (Gumboro) at 18-20 days. Consult your vet at the local resource centre for more information regarding vaccination.

3 Carriers of Disease

There are many potential routes for disease exposure (Figure 4.1), but proper management can significantly limit the risk.

FIGURE 4.1
Potential Routes of Disease Exposure

Ways to reduce carriers of disease from affecting broilers:

- Clean and disinfect the house between flocks (as described earlier).
- Restrict access to casual visitors by fencing the property, locking the broiler house, and posting "No Entry" signs.
- Minimize contact between buyers and birds.
- Require personal protective equipment (PPE) for all visitors—clean overalls and boots. Disposable options or plastic sandals that can be easily washed are also effective.
- Place footbaths and hand sanitizers outside each shed.
- Use disinfectant wipes on cell phones if taken into the poultry house.
- When moving between houses, visit the youngest flocks first, then older flocks.
- Keep grass around the house short and remove any rubbish to deter pests.
- Prevent wild birds and rodents from entering the house by installing wire mesh over gaps.
- Implement fly control measures.
- Use rat bait stations regularly (Photo 4.2).
- Remove dead birds promptly and dispose of them in a mortality pit with lime or by burning.
- Remove litter after each cycle and compost it far from the poultry house.
- Restrict vehicle access to essential traffic only.
- Disinfect tools used in and around the house.
- Discard old or moldy feed and clean up feed spills promptly.
- Test water regularly.

4 Farm Management Aspects

A clean and healthy environment is also crucial for disease prevention. Attention to the following details inside the poultry house can help maintain flock health:

- Adjust feeders and drinkers to the correct height as birds grow.
- Ensure there are enough feeders and drinkers for the number of birds. Overcrowding can lead to pecking injuries.
- Check that feed is fresh (smell and taste to confirm) and that water is clean (it should be drinkable by human standards).
- Provide adequate ventilation to remove dust, hot air, and ammonia. High ammonia levels can cause respiratory issues.
- Turn litter regularly and remove wet patches to prevent ammonia buildup.
- Maintain appropriate stocking density. Overcrowded birds may peck at each other.
- Monitor flock uniformity—uneven growth can signal disease or poor conditions.
- Control the fly population within the house (Photo 4.3).
- Avoid sudden loud noises that could stress the birds.

Key Daily House Management Checks:

- Feed and water availability and quality
- Feeder and drinker height adjustments
- Ventilation and ammonia levels
- Litter condition
- Bird behavior and uniformity

PHOTO 4.2
Rat Bait Station

PHOTO 4.3
Fly Trap

1 Identification of Sick Birds

Spending time in the broiler house daily is essential to become familiar with what healthy birds look like and how they behave. This helps detect problems early and it makes it easier to identify a bird that is sick and not showing normal behavior. Observation skills and attention to detail are crucial for identifying issues before they escalate. When walking through the flock use the points in Figure 4.2 to check for healthy birds to check the birds are healthy.

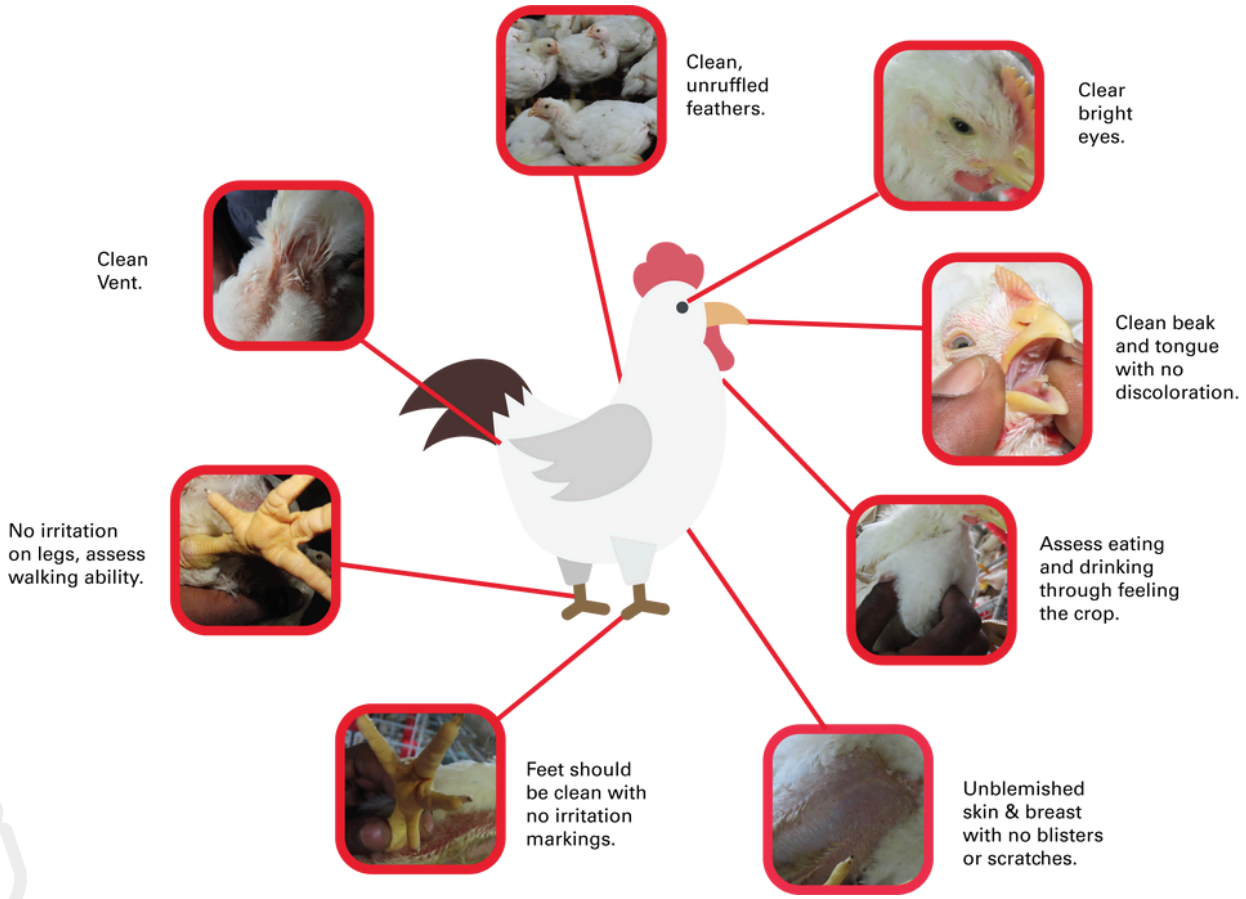


FIGURE 4.2
Signs of a Healthy Bird
Adapted from Ross 308 Management Guide

Skin and feathers serve as the bird's first defense against disease-causing organisms. Rough handling, causing tears or scratches to the skin, can create entry points for bacteria.

When chicks are young, check that the lighting system is working properly, as they need time to adjust to their environment.

The first sign of illness is often a decrease in feed or water intake. If birds are not eating, check the feed for issues such as high salt content, mold, or spoilage. If they are not drinking, check for blocked pipes, excessively hot water, or contamination. Birds generally consume twice as much water as feed. If water intake decreases, droppings become dry, or disappear altogether. Birds will die within 2 to 3 days without water.

Water Quality Concerns

Water quality can directly impact bird health and can interfere with the effectiveness of soaps, disinfectants, and medications. Water with incorrect pH or high iron levels can corrode water systems and promote biofilm formation, clogging pipes. Wet droppings may indicate dissolved solids, bacterial contamination, or improper salt levels. High nitrate or bacterial coliform levels suggest fecal contamination and must be addressed.

Litter Quality and Air Quality

Litter can harbor pathogens, toxins, and contaminants. Wet litter leads to ammonia buildup, which can damage the lungs and increase disease susceptibility. Poor ventilation can exacerbate the issue, as dust particles can carry pathogens. Respiratory issues may be indicated by a "snicking" sound (similar to sneezing or gasping).

Common Signs of Disease

- Diarrhea
- Blood in droppings
- Blue combs
- Snicking (respiratory distress)
- Lameness (sore legs or difficulty walking)

If any of these signs are observed, it is important to act quickly to prevent the spread of disease. Sick or dead birds should be taken to the nearest veterinary laboratory for post-mortem examination and disease identification. It is difficult for farmers to diagnose disease accurately, and professional testing can ensure the appropriate treatment is administered.

2 Common Diseases

It is always important to consult a veterinarian for an accurate disease diagnosis and appropriate treatment recommendations. However, the signs of the most common diseases affecting poultry are described below:

PHOTO 4.4
Ascites (Water Belly)
Image: Dr Billy Hargis from MSD Vet Manual

Ascites (Water Belly) (Photo 4.4)

- Not an infectious disease.
- Associated with rapid growth and high feed intake, especially at high altitudes and in cold temperatures with reduced ventilation.
- Results in poor development of the heart and lungs.
- Common in broilers at 5 weeks old.
- Abdomen fills with clear fluid.
- No vaccination or treatment available.
- Managed by slowing down the growth of susceptible broilers through reduced feed intake.

Newcastle Disease (Photo 4.5)

- Caused by a virus.
- Can result in 100% mortality in unvaccinated flocks.
- Prevention through vaccination:
  - Hitchner B1 and La Sota vaccines: administered via aerosol spray, drinking water, or eye drop.
  - Oil-based vaccine: administered as an intramuscular injection.
- Nervous symptoms: drooping wings, lack of coordination, falling over, twisted necks.
- Respiratory symptoms: birds struggle to breathe.
- Birds stop eating and drinking.
- No treatment available.

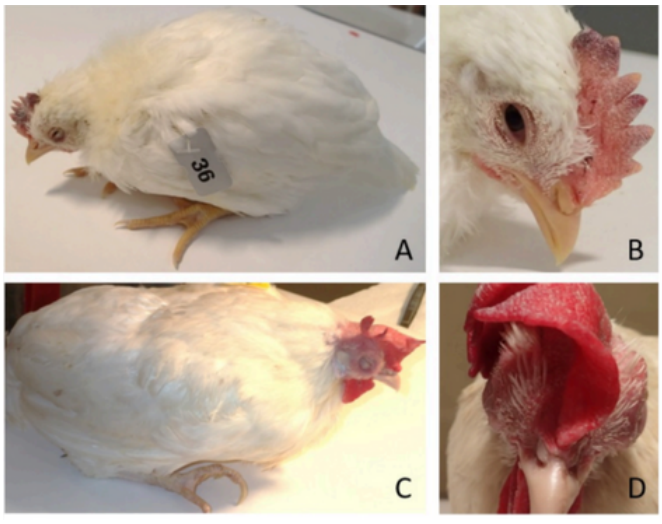


PHOTO 4.5
Newcastle Disease
A) Lethargy in young chicken
B) Necrotic/hemorrhagic areas of comb in young chicken
C) Lethargy with periorbital edema in adult hen
D) Head swelling in adult hen
Image: Kiril Dimitrov, MSD Veterinary Manual

Infectious Bronchitis (Photo 4.6)

- Caused by a rapidly spreading virus.
- Respiratory symptoms: snicking, sneezing, gasping, watery eyes, head shaking, nasal discharge.
- Increased mortality.
- Birds may recover within 1-2 weeks if no other pathogens are present.
- Secondary bacterial infections, commonly E. coli, often occur.
- Live vaccines are commonly used for prevention.

PHOTO 4.6
A) Swollen eyelids and B) Watery Eyes in birds with Infectious Bronchitis
Image: Elbasuni et al., 2023.

Gumboro (Infectious Bursal Disease; IBD) (Photo 4.7)

- Caused by a persistent virus that is difficult to kill with disinfectants.
- Often affects young broilers.
- Sudden (acute) onset.
- Damages the immune system by attacking the bursa of Fabricius.
- Symptoms: sudden increase in mortality, loss of appetite, stunted growth, depression, huddling, ruffled feathers, vent pecking, diarrhea, trembling, lack of coordination.
- Prevention through vaccination via drinking water.
- Secondary bacterial infections can be treated with antibiotics.

PHOTO 4.7
A chicken demonstrating extreme listlessness, ruffled feathers, and crouched stance 4 days after infection with IBVD.
Image: Dr. Julia R. Blakey from MSD Vet Manual

Colisepticaemia

- The most common disease in broilers.
- Caused by E. coli bacteria.
- E. coli is naturally present in the intestines, but healthy birds can withstand infections.
- Stress from poor management or another pathogen can trigger bacterial multiplication.
- Treated with antibiotics.

Coccidiosis

- Caused by protozoa that live in the intestines.
- Broilers kept on the floor and in contact with their droppings are more susceptible than layers in cages.
- Symptoms: blood in droppings, anemia, ruffled feathers, poor growth (due to nutrient malabsorption), weight loss, high mortality.
- Controlled with coccidiostats added to feed (except finisher feed; a withdrawal period is required before slaughter).

Salmonella

- Caused by bacteria.
- Leads to food poisoning in humans.
- Symptoms: mortality, huddling, loss of appetite, constant cheeping, swollen abdomen, white diarrhea.
- Infected birds must be culled.
- Proper cooking of raw chicken is essential to prevent human infection.

Aspergillosis

- Caused by a fungus that thrives in moldy, damp conditions.
- Infected hatching eggs may explode in the incubator.
- Chicks acquire the infection in the hatchery or from damp bedding.
- Symptoms: pneumonia-like signs (gasping, struggling to breathe), high mortality.
- Can originate from contaminated shavings.
- Ensure shavings are purchased from a reputable source.
- Hatchery hygiene is critical.
- No treatment for chicks; fungus is eliminated through fumigation.

Mushy Chick Disease (Photo 4.8)

- Caused by bacteria.
- Infection of the yolk sac in newly hatched chicks.
- Occurs if the navel is not properly sealed after hatching.
- High mortality rate, with deaths beginning on the second day.
- Dead chicks feel soft (mushy) and emit a bad smell.
- Yolk sac contains green liquid or appears red and inflamed.
- No treatment for infected chicks.
- Antibiotics in drinking water may help prevent further spread.

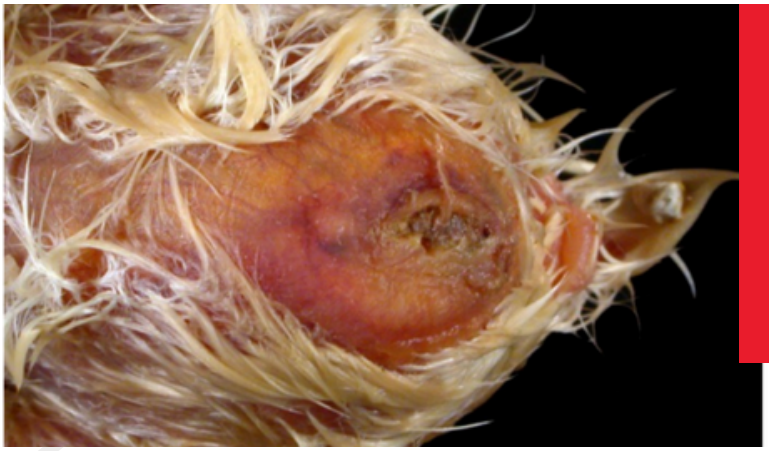


PHOTO 4.8

Mushy Chick: Unhealed navel, 1-day old chick. The unhealted navel is in the center of the feathered area of the abdomen. The cloaca is posterier to the navel.

Image: Dr. H. John Barnes MSD Vet Manual

Parasites

- Mites and lice can cause anemia and irritation in poultry.
- Red mites hide in cracks during the day and feed on birds at night.
- Northern fowl mites live on birds, particularly around the vent.
- Symptoms: birds peck at their feathers, skin damage, blood loss, anemia.

Parasite Management Tips:

- Check under feathers, wings, and around the vent.
- Treat with powder (e.g., Karbadust) on birds and bedding.
- Provide a dust bath area.
- Clean and disinfect the house thoroughly before introducing a new batch of birds.

Notifiable Diseases

A notifiable disease is one that MUST be reported to government authorities by law. These diseases can spread rapidly, leading to mass chicken deaths, human health risks, and disruption to the poultry industry. Reporting helps authorities control and prevent outbreaks.

The notifiable diseases in chickens in Lesotho are:

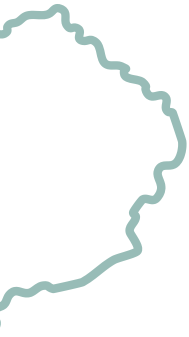
1. Newcastle Disease
2. Avian Influenza (Bird Flu)
3. Salmonellosis

Steps to Report a Notifiable Disease

1. **Recognize Signs:**
    - Recognize signs of disease.
2. **Separate Sick Birds:**
    - Isolate symptomatic birds from the healthy flock.
3. **Contact the local District Veterinary Officer (DVO):**
    - Report the situation to the District Veterinary Officer at your nearest Resource Centre.
    - They will conduct a preliminary investigation.
4. **Follow Instructions from Authorities:**
    - They will mobilize resources for further investigation and control.
5. **Cooperate with Disease Control Efforts:**
    - Quarantine may be imposed.
    - Infected or exposed birds may need to be culled.
    - The farm may require disinfection.
6. **Report New Cases:**
    - Continue notifying authorities of any new illnesses or deaths during the investigation.

CHECKLIST 4.1
Bird Health

	Task	Done	Date	Person
1	Observe the birds eating			
2	Check the height of the feeders			
3	Observe the birds drinking			
4	Check the height of the drinkers			
5	Make sure the water is clean			
6	Check the lights are working			
7	Remove wet patches of litter			
8	Check the birds are comfortable with the temperature			
9	Open and close the curtains for good ventilation			
10	Make sure there is no smell of ammonia or too much dust in the air			
11	Observe the behavior of the birds, check for signs of disease			
12	Look for parasites on the birds			



5. Business Skills for Broiler Farmers

Before starting a broiler business, it is important to determine the feasibility of the project. To do this, you can forecast the income expected from broiler sales. This might involve checking the price of meat in the shop or asking in your neighborhood about the current cost of a live broiler. Most breeding companies publish performance objectives on their websites, allowing you to predict the weight, feed intake, and feed conversion ratio (FCR) at various ages of broilers grown under optimum conditions. Performance in Lesotho can be expected to be slightly below these targets, especially in open-sided, naturally ventilated houses. A good target would be to produce a 2.2 kg bird in 42 days. With a two-week cleanout, this means 6.5 cycles per year.

Define Your Business:

- Have a clear idea of what your business entails, e.g., producing 100 broilers per week to sell live to the local community.

Understand Your Product:

- Know that your product is a live bird or processed meat requiring inputs and care. Ensure you have the knowledge and ability to produce it successfully.

Choose the Right Location:

- If you already have a farm/poultry house, consider the location of sales. If you are still planning, think about the distance from other poultry houses, access to water and electricity, and proximity to markets and roads.

Research Your Market:

- Starting a business without a market is risky. Ask potential customers about the prices they are willing to pay. Gather information from suppliers of chicks, feed, equipment, and other inputs.

Study Your Competitors:

- How many birds does your neighbor produce? What price and weight does he sell at? Does demand fluctuate throughout the year?

Identify Your Competitive Edge:

- Find out if customers want something different, such as further processed birds, that could set you apart from competitors.

Starting a broiler business requires capital for building and equipment. Table 5.1 shows examples of projected expenses for each cycle of an existing farm. Each farmer's expenses will vary depending on how the broiler is marketed. For example, if sold live, there will be no processing expenses. If processed, processing may be done in exchange for offal, eliminating certain costs.

Record Keeping

Keeping accurate records is vital for determining profit or loss and making informed management decisions. Good record-keeping helps identify problems early, allowing corrective action. Comparing records to breed standards also allows farmers to benchmark their performance.

1 Financial Records:

Budget

One of the essential financial records is the budget. A budget is a financial tool used to plan for future expenses and help make decisions about affordability. It involves listing all costs incurred over a specific period. For an established farmer, it would include fixed and variable costs such as those shown in Table 5.1. When used effectively, a budget can help farmers make informed decisions about their birds before placing them on the farm, minimizing the risk of losses.

TABLE 5.1
Projected Expenses and Income of a Broiler Cycle

Expense	Price per unit	Number of units	Total Price
Bedding			
Day-old Chicks			
Feed			
Heating Costs			
Medication/Vaccination			
Electricity and Water			
Cleaning Materials and Disinfectants			
Rat Bait			
Transport Costs			
Phone Costs			
Office Supplies and Stationary			
Salaries			
Protective Clothing			
Bank Charges			
Loan Repayment			
Repairs and Maintenance			
Meat Processing Cost/Fees			

Basic Definitions

Fixed Costs - Costs that do not change with the number of birds.
Examples: Housing, equipment, licenses, salaries.

Variable Costs - Costs that change per bird.
Examples: Feed, vaccines, transport per bird.

Break-even price - The minimum price you must charge per bird so that your total income covers all costs.

The break-even is the point where income matches expenses, meaning there is neither a profit nor a loss. A farmer should aim for sales that exceed this point to generate profit. Knowing the break-even point helps broiler units to set a minimum price for their birds. It also shows how changes in costs or production scale can affect pricing. It is essential for profit planning and sustainability of the poultry business.

Generating the break-even point requires calculating both fixed and variable costs. Fixed costs include expenses that remain constant, such as salaries, while variable costs fluctuate based on the number of birds and include feed and chicks. The formula that can be used to calculate the break-even point is as follows:

How to Calculate Break-Even Point:

Break-even price per bird = (Fixed Costs ÷ Number of Birds Sold) + Variable Cost per Bird

This formula helps determine the minimum price you need to sell each bird for in order to cover both your fixed and variable costs.

Example:
Let's say you're raising 500 Broilers.
Fixed Costs (housing, lighting, equipment depreciation, etc.) = 2,600
Variable Cost per Saleable Bird (feed, medicine, transport) = 33
However, only 485 birds are expected to be sold (accounting for some loss).
Now, let's plug in the numbers:
Break-even price per bird = 2,600 ÷ 485 + 33
= 5.36 + 33
= 38.36 per bird

What This Means:
You must sell each bird for at least 38.36 just to break even.

- If you sell a bird for 45, you earn a profit of 6.64 per bird.
- If you sell for 35, you lose 3.36 per bird.

Common Financial Mistakes that Cause Losses in a Broiler Businesses

a. Keeping some income back for house maintenance and replacing equipment is necessary
It is important to bear in mind that housing requires maintenance and equipment will become worn out and need replacing, so this will require funds held back from the profit.

b. Keeping birds for too long reduces profitability.
The success of a broiler unit depends on completing multiple production cycles each year.. However, when birds are kept beyond the recommended 35 days, the number of cycles in a year is reduced, and keeping birds longer increases feed consumption, and since feed is usually the largest cost in poultry production, this significantly cuts into profits.

c. Income from one cycle is required to pay for costs for the next cycle
When a farmer is receiving income from a flock it may appear that he has made a huge profit, but some of this money needs to be kept to pay for inputs for the next cycle.

d. Poor management practices increase production costs.
Issues such as poor ventilation, extreme temperatures, overcrowding, inadequate nutrition, and disease can negatively affect bird health and growth. When birds fail to reach their target market weight on time, farmers are forced to keep them longer than planned. This not only increases feed costs but also disrupts the production schedule, reducing the number of possible cycles per year and leading to lower overall profitability.

e. Poor record keeping leads to uninformed decision-making
Keeping accurate records is essential for monitoring both the financial and production aspects of a poultry business. When farmers do not track inputs, sales, growth rates, and expenses, they cannot properly evaluate performance or identify areas of loss. Good record keeping enables timely and informed decisions that help reduce losses, improve efficiency, and support the long-term sustainability of the business.

PHOTO 5.1
Farmer with final poultry product ready for sale in market.

2 Production Records

Production records are crucial for assessing performance. Broiler genotypes provide performance objectives, which can be compared to your own records to identify areas for improvement. Accurate records also help diagnose issues; for example, poor weight gain could result from low feed intake or poor feed quality.

Recording things such as feed intake helps to be able to plan and budget for the future. It also helps to pick up theft issues or missing feed.

Examples of Production Records (see Appendix iii)

- Number of chicks placed
- Vaccination history and any medications used
- Breed and hatch date
- Daily mortalities and culls
- Feed stocks
- Live weight
- Water intake
- Daily house temperature

Keeping accurate production records allow calculations of key performance indicators. Some of the equations used to calculate performance are shown in Table 5.2.

TABLE 5.2
Useful Calculations for Measures of Performance in Broilers

Calculation	Unit	Formula	Example	Answer
Average Weight	kg	Total weight of broilers / no. birds	250 birds weighed; total weight 394.25 kg	394.25 / 250 = 1.577 kg
Live Weight Gain/Day	grams	(new weight – previous weight) / no.days	Weight on day 7: 179g; day 12: 371g	(371 – 179) / 5 = 38.4g
Total Live Weight Gain	grams	End weight – day-old chick weight	DOC weight 39g; end weight 1997g	1997 – 39 = 1958g
Feed Intake	g/d	(kg feed x 1000) / (no. birds x no. days)	2990 kg eaten by 7000 birds in a week	(2990 x 1000) / (7000 x 7) = 61.0
Feed Conversion Ratio (FCR)	kg/kg	kg feed / kg live weight gain	400 broilers gained 109 kg and ate 145 kg	145 / 109 = 1.33
Weekly Mortality Rate	%	(No. dead birds / opening stock) x 100	14 died in first week; 400 chicks housed	(14 / 400) x 100 = 3.5%
Livability	%	(No. live birds sold / No. chicks housed) *100	550 day-old chicks housed, 503 birds sold	(503 / 550 * 100 = 91.5%

3 Key Performance Indicators

Feed Intake

Calculations of feed intake can be made for the entire production cycle, each feeding phase (starter, grower, and finisher), or on a weekly basis. Regardless of the time frame, it is important to track opening stock, any purchases, closing stock, and the number of birds. If there are any open bags, they can be weighed. If a scale is not available, estimates can be used (e.g., half-full or ¼ full).

How to Calculate Average Daily Feed Intake per Bird in a Week:

1. **Record the feed stock at the start of the week.**
   - *Example: 2 ½ bags (2.5 x 50kg = 125kg)*
2. **Add any feed purchases made during the week.**
   - *Example: 5 bags (5 x 50kg = 250kg)*
3. **Record the closing stock at the end of the week.**
   - *Example: 3 ¼ bags (3.25 x 50kg = 162.5kg)*
4. **Calculate the feed consumed:**
   - Feed consumed = Opening stock + Purchases − Closing stock
   - *Example: 125kg + 250kg − 162.5kg = 212.5kg*
5. **Divide by the number of birds and the number of days in the week:**
   - Average daily feed intake per bird = Feed consumed / Number of birds×7
   - *Example: 212.5 / (180 x 7) = 0.168kg per bird per day (168g/bird/day)*

Body Weight

Calculations of body weight are needed alongside feed intake to accurately calculate feed conversion ratios.

How to Calculate Body Weight:

1. **Weigh birds using crates:**
   - Weigh a group of birds (e.g., 30 broilers), 10 at a time, in a crate.
   - *Record the weights of the full crates. - Example: 19.5kg, 20.05kg, and 20.1kg*
2. **Weigh the empty crate:**
   - *Example: 1.5kg*
3. **Multiply the empty crate weight by the number of times used:**
   - *Example: 1.5kg x 3 crates = 4.5kg*
4. **Add the weights of the full crates and subtract the total empty crate weight:**
   - Net weight = (Full crate weights) - (Empty crate weight)
   - *Example: (19.5 + 20.05 + 20.1) - 4.5kg = 55.15kg*
5. **Divide by the number of birds weighed:**
   - Average body weight per bird = Net weight / Number of birds
   - *Example: 55.15kg / 30 birds = 1.83kg per bird*

Feed Conversion Ratio (FCR)

Feed conversion ratio is calculated as: FCR = kg of feed consumed / kg of weight gained

How to Calculate Feed Conversion Ratio (FCR):

1. **Add up the total feed consumed during the cycle:**
   - Starter: ½ bag (25kg)
   - Grower: 1 ½ bags (75kg)
   - Finisher: 2 bags (100kg)
   - *Example: Total Feed Consumed: 25kg + 75kg + 100kg = 200kg*
2. **Divide by the number of birds to get feed intake per bird:**
   - Feed intake per bird = Total feed consumed / Number of birds
   - Divide by the number of birds to get total feed intake per bird .
   - *Example: 200kg / 50 birds = 4kg per bird*
3. **Divide feed intake per bird by the average body weight::**
   - **FCR = Feed intake per bird / Average body weight**
   - If the average weight is 2.1kg, divide by the average body weight.
   - *Example: 4kg / 2.1kg = 1.9*

In any poultry operation, forward planning is essential. One of the most critical tools is a housing and depopulation program (placement and culling schedule). Orders for day-old chicks must be placed months in advance, so you need to know exactly when your houses will be ready to receive birds. At the end of the production cycle, and before the next batch of birds arrives, the broilers must be sold to allow sufficient time for cleaning and disinfection. Depopulating and re-housing a poultry shed in the same week is highly discouraged from a biosecurity standpoint.

Checklist Before Starting a Broiler Business

- ✔ Do you know your market?
- ✔ Have you researched input costs?
- ✔ Is your location suitable?
- ✔ Do you understand broiler production and care?

Marketing

If broilers are being reared as a business for profit, excellent husbandry and a high-quality product alone are not enough. Without a market, you will not make a profit. Marketing is a vital part of running a successful poultry business. Failure to sell live birds promptly results in additional feeding costs, which quickly becomes unprofitable. It also delays housing the next flock, reducing your potential to achieve 6.5 production cycles per year. If you opt to slaughter and process the birds, additional factors, such as refrigeration, need to be considered. The time-sensitive nature of poultry, whether live or processed, makes marketing even more critical.

SWOT Analysis (Strengths, Weaknesses, Opportunities, Threats)
Conducting a SWOT analysis is a useful tool to evaluate factors affecting your business. It helps you anticipate potential problems, develop solutions, and identify opportunities for growth.

Example SWOT Analysis:

- **Strengths**: High chicken consumption; consistent market demand.
- **Weaknesses**: Limited infrastructure; distribution challenges; lack of storage facilities in rural areas.
- **Opportunities**: Nearby restaurant seeking a regular chicken supplier.
- **Threats**: Disease outbreaks; fluctuating input costs.

Questions to Reflect on During SWOT Analysis:

- What strengths can I build upon?
- What weaknesses need to be addressed?
- What opportunities can I leverage?
- What threats should I prepare for?

1 Marketing Fundamentals

Marketing encompasses advertising, selling, and distributing products to customers. It is essential to continuously evaluate your marketing approach by asking:

- **What am I marketing? –** Know your product and consider ways to improve or add value.
- **Who am I marketing to? –** Understand your customers and their preferences.
- **Why am I marketing? –** For profit and sustainability!
- **When am I marketing? –** Always! Building and maintaining a good reputation is ongoing.
- **How should I market? –** Tailor your approach to your customer base.

PHOTO 5.2
The 4P's help develop an effective marketing strategy.

There are four tools used in developing an effective marketing strategy, known as the 4P's—Product, Place, Price, and Promotion (or communication).

Product:
The product refers to the broiler chicken itself, which must meet consumer needs in terms of size and appearance, or if processed, in terms of quality, freshness, packaging, and portion size. This may include offering different types of broiler meat (e.g., whole chicken, chicken breasts, thighs, wings) and considering production factors such as free-range or organic options.

Price:
Price is determined based on factors such as production costs, competition, and consumer demand. In broiler marketing, pricing strategies may include competitive pricing (setting prices similar to competitors), penetration pricing (setting lower prices to attract customers), or premium pricing (for high-quality or value-added products). Price must strike a balance between profitability for producers and affordability for consumers.

Place:
Place refers to the distribution channels through which broiler products reach consumers. These channels can include supermarkets, local butcher shops, farmers' markets, or direct-to-consumer sales. Efficient logistics, proper refrigeration, and timely delivery are crucial to maintain product freshness and minimize wastage. Transporting live broilers over long distances can also pose challenges.

Promotion:
Promotion involves communicating the benefits of the broiler product to the target audience. This can be achieved through advertising (e.g., TV, social media, print), in-store promotions, special discounts, or direct customer engagement. Promotional strategies may also emphasize aspects such as quality assurance, sustainability, and animal welfare, which are increasingly valued by consumers.

2 Marketing Channels in Lesotho

The market in Lesotho is broadly divided into formal and informal markets. There are varying levels of food safety regulations within these sectors, particularly concerning processed broilers. There is also the possibility of selling live birds in the formal market—for example, as a growing contractor for a larger business. A formal arrangement typically involves signing a contract that outlines the expected product standards and pricing. Breaking into the larger retail market can be challenging; however, many larger retailers may have mandates to source locally produced meat and integrate smaller-scale producers. While the selling price in formal markets might not be as high, the income is generally more reliable.

Definition:

Contract growers are independent farmers that grow broilers under contract for a poultry company, which often includes the benefits of producing within an integration, such as technical advice and cheaper feed. Although the company may not offer the price that could be achieved in the informal market, it removes the need for the farmer to market birds. The contract will specify the number of birds and target weight.

Formal Market:

- Includes large retailers, wholesalers, and supermarkets
- Typically requires contracts specifying product expectations and pricing
- May offer consistent income but often lower prices due to rebates and bulk sales
- Larger retailers may prioritize sourcing from local producers, creating opportunities for small-scale farmers

PHOTO 5.3
A broiler farmer brings her bird to an informal market.

The informal market consists of small wholesalers, trading stores, spaza shops, and street vendors. Contracts are uncommon in this sector, meaning there is often little loyalty or consistency in orders. Building strong relationships and maintaining a good reputation are essential for ensuring repeat business. Keeping a list of customers and creating a WhatsApp group to update them on bird availability and pricing can help improve sales and communication.

Informal Market:

- Comprises small wholesalers, trading stores, spaza shops, and street vendors
- No formal contracts, resulting in less reliability but potentially higher profit margins
- Customer relationships and reputation are critical for success
- Communication tools like WhatsApp groups can help keep customers informed about availability and pricing

One advantage of informal markets is that the selling price per bird is usually higher than in the formal market. Additionally, there is the benefit of not having to pay rebates. Targeting gathering points, such as transport hubs, can serve as a strategic location to sell live broilers. Alternatively, you may encourage buyers to come directly to your farm. However, from a biosecurity perspective, it is not ideal to have large numbers of people visiting your farm. Likewise, bringing unsold birds back from the market can pose a biosecurity risk.

The Department of Marketing in Lesotho also organizes various events to connect buyers and sellers, including roundtable discussions and trade fairs. In addition, the RSDA marketing website is currently being developed to serve as a platform for sharing market information and connecting stakeholders.

The most important thing to remember is this—if you don't have customers, you don't have a business!

PHOTO 5.4
Informal markets typically bring in a higher price than formal markets.

Acknowledgment

We would like to express our sincere gratitude to all those who contributed to the creation of this manual.

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Our heartfelt thanks go to the farmers who graciously consented to be featured in the photos, allowing us to showcase best practices throughout this manual.

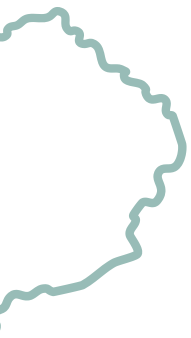
Lastly, we extend our appreciation to everyone involved in the creation of this resource. Your efforts have been invaluable.

Appendices

i Water Test Example

ii Broiler Budget

iii Broiler Record Card



Appendix i

Water Test Example

Methods	Determinands	Units	0105053/24 Water Sample from Poultry drinker Line 09.05.2024
Chemicals			
93	Dissolved Calcium	mg Ca/ℓ	8.24
93	Dissolved Magnesium	mg Mg/ℓ	2.60
93	Sodium	mg Na/ℓ	4.63
94	Dissolved Copper	µg Cu/ℓ	13.9
94	Dissolved Iron	µg Fe/ℓ	43
94	Dissolved Lead	µg Pb/ℓ	<10
94	Dissolved Zinc	µg Zn/ℓ	<10
16G	Dissolved Chloride	mg Cl/ℓ	7.91
65Gc	Dissolved Nitrate	mg N/ℓ	3.32
65Gb	Dissolved Nitrite	mg N/ℓ	.06
1B	pH at 25°C	pH units	7.7
67G	Sulphate	mg SO_4/ℓ	<2.5
Calc.	Total Hardness	mg $CaCO_3$/ℓ	31
Microbiological			
32	Total Coliforms	MPN/100mℓ	5
31	Standard Plate Count	colonies/mℓ	>1000

Acceptable Limits

Reported Determinands	Limits	Reported Determinands	Limits
Dissolved Calcium	≤60 mg/ℓ (≤60000µg/ℓ)	Nitrate	≤10 mg/ℓ (≤10000µg/ℓ)
Chloride	≤14 mg/ℓ	Dissolved Lead	≤0 mg/ℓ (≤0µg/ℓ)
Total Chlorine	≤0 mg/ℓ	pH at 25°C	≥6.8 to ≤7.5
Dissolved Copper	≤0.002 mg/ℓ (≤2µg/ℓ)	Sulphate	≤125 mg/ℓ (≤125000µg/ℓ)
Dissolved Iron	≤0.2 mg/ℓ (≤200µg/ℓ)	Standard Plate Count	≤0 Count/1mℓ
Total Hardness	≥60 to ≤180	Total Coliforms	≤0 Count/100mℓ (≤0 MPN/100mℓ
Dissolved Magnesium	≤14 mg/ℓ (≤14000µg/ℓ)	Dissolved Zinc	≤1500µg/ℓ (≤1.5 mg/ℓ)
Sodium	≤32 mg/ℓ (≤32000µg/ℓ)		

Nitrate toxicity depresses growth rate and can cause poor coordination.
High sulphates can combine with other salts to have a laxative effect on birds and cause wet litter.
High levels of sodium or chloride will cause an increase in water consumption and lead to wet litter.
High iron can be conducive to bacterial growth leading to diarrhoea.
High pH can cause an unpleasant taste resulting in low water intake.
Bacterial contamination can cause disease and affect bird health.

Appendix ii

Example Profit and Loss

	Item	Detail	Quantity	Cost/Price	Total	Fill in your total here
Revenue	Birds	Live sales/viscera/frozen chicken	485	100	48,500	
Revenue	Other sales	Manures	-	-	-	
Total Sales					**48,500**	
Variable	Bedding	Wood shavings	60	35	2,100	
Variable	Broiler	Day-old chick	15	500	7,500	
Variable	Feed	Starter meal (50 kg)	390	8	2,925	
Variable		Grower meal (50kg)	385	16	6,160	
Variable		Finisher meal (50kg)	384	28	10,560	
Variable	Heating	Cost for 14d of heating	1,176	1	1,176	
Variable	Water	All purpose	60	3	180	
Variable	Processing (if applicable)	Slaughter & packaging	475	7	3,325	
Variable	Medication	Antibiotic- Fosbac (25g packet)	60	2	120	
Variable		Multivitamin (100g packet)	47	2	94	
Variable		Cocciostat (ESB3) 100g	50	2	100	
Variable	Transport of sales	Van	150	4	600	
Variable	Sales Taxes	If Applicable				
Total Variable Costs					**34,840**	
Gross Margin (Sales - Variable Costs)					**13,660**	
Semi Variable	Lighting	Electricity 50units@105	105	6	630	
Semi Variable	Cleaning material	Detergent 2kg	70	1	70	
Semi Variable		Disinfectants 200ml madubula	18	2	36	
Semi Variable	Rat bait	Superkill 100g	130	1	130	
Fixed	Protective clothing	Overall/gumboots	950	2	1,900	
Fixed	Labour	Permanent labour	500	2	1,000	
Fixed	Repairs and Maintenance	Lines, equipment etc	1,000	1	1,000	
Total Overheads Costs (fixed and semi variable costs)					**4,766**	
Earnings before Interest, taxes or depreciation* (Gross Margin - Fixed costs)					**8,894**	
	Depreciation	Equipment and housing				
	Depreciation	Birds				
	Interest	E.G 15% on loan				
	Non-sales related taxes					
Total						
Net Profit					**8,894**	

Please note that this is just an example and figures will change based on different situations.

Cost per sales unit

A		Total Sales	48,500
B		Sales Volume	485
C		Sales Price	100
D		Variable Costs	34,840
E		Fixed Costs	4,766
F		Interest, taxes and depreciation	-
G	A-D	Gross Margin	48.015
H	G-E	EBITDA	43,249
I	H-F	Net Profits	43,249
Break Even Price (Fixed volume)			
L	B/D	Variable Cost	72
M	((E+F)/B)+L	Break Even Sales price	82
Break Even Volume (fixed Price)			
N	C-L	Contribution	28
O	(E+F)/N	Break Even Price	169

Gross margin is the difference between a company's revenue and its cost of goods sold (COGS) or total variable costs. It represents the income a company retains after incurring the direct costs associated with producing the goods and services it sells.

EBITDA (Earnings Before Interest, Taxes, Depreciation, and Amortization) is a financial metric that shows a company's profitability before deducting interest expenses, taxes, depreciation,

Net profit (also called net income or bottom line) is the total profit of a company after all expenses have been deducted from total revenue. This includes operating expenses, interest, taxes, depreciation, and amortization.

Interest is the cost incurred by a business for borrowed funds. It is the expense paid on any loans or credit facilities the company uses.

Depreciation is the systematic allocation of the cost of a tangible fixed asset (like machinery, buildings, vehicles) over its useful life. It represents the reduction in the value of assets due to usage, wear and tear, or obsolescence.

Appendix iii

Broiler Record Card

House no. _____ Hatch Date: _____ Hatchery: _____ No. Chicks Arrived: _____ Vaccinations: _____

Dead on Arrival _____ No. Placed _____ Breed: _____ Day-old Weight: _____

		Birds				Feed		Body Weight			Water		Remarks
Day	Date	No. Dead	% Dead	End Stock	% Surv.	Cons. (kg)	Intake (g/d)	Avg. Weight	Weight Gain	FCR	Cons (l)	Intake ml/bird	
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													

<

		Birds				Feed		Body Weight			Water		Remarks
Day	Date	No. Dead	% Dead	End Stock	% Surv.	Cons. (kg)	Intake (g/d)	Avg. Weight	Weight Gain	FCR	Cons (l)	Intake ml/bird	
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													

		Birds				Feed		Body Weight			Water		Remarks
Day	Date	No. Dead	% Dead	End Stock	% Surv.	Cons. (kg)	Intake (g/d)	Avg. Weight	Weight Gain	FCR	Cons (l)	Intake ml/bird	
28													
29													
30													
31													
32													
33													
34													
35													
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