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POULTRY FARMING

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INTRODUCTION TO CHICKEN FARMING

Chicken farming is an essential part of agriculture in Tanzania. It provides a source of income, eggs, and meat for many households. Small-scale farming is common, and chickens are raised both for home consumption and for sale.







KEY TAKE AWAY FOR A FARMER TO INVEST IN POULTRY FARMING.

Most people talk about the basics of poultry as housing, feeding, and vaccination, but there are **FOUR** powerful, less discussed factors that can make or break your poultry business from the start. Before you start investing in poultry whether in small or large-scale farming you must think on the following factors:

1. Market Access

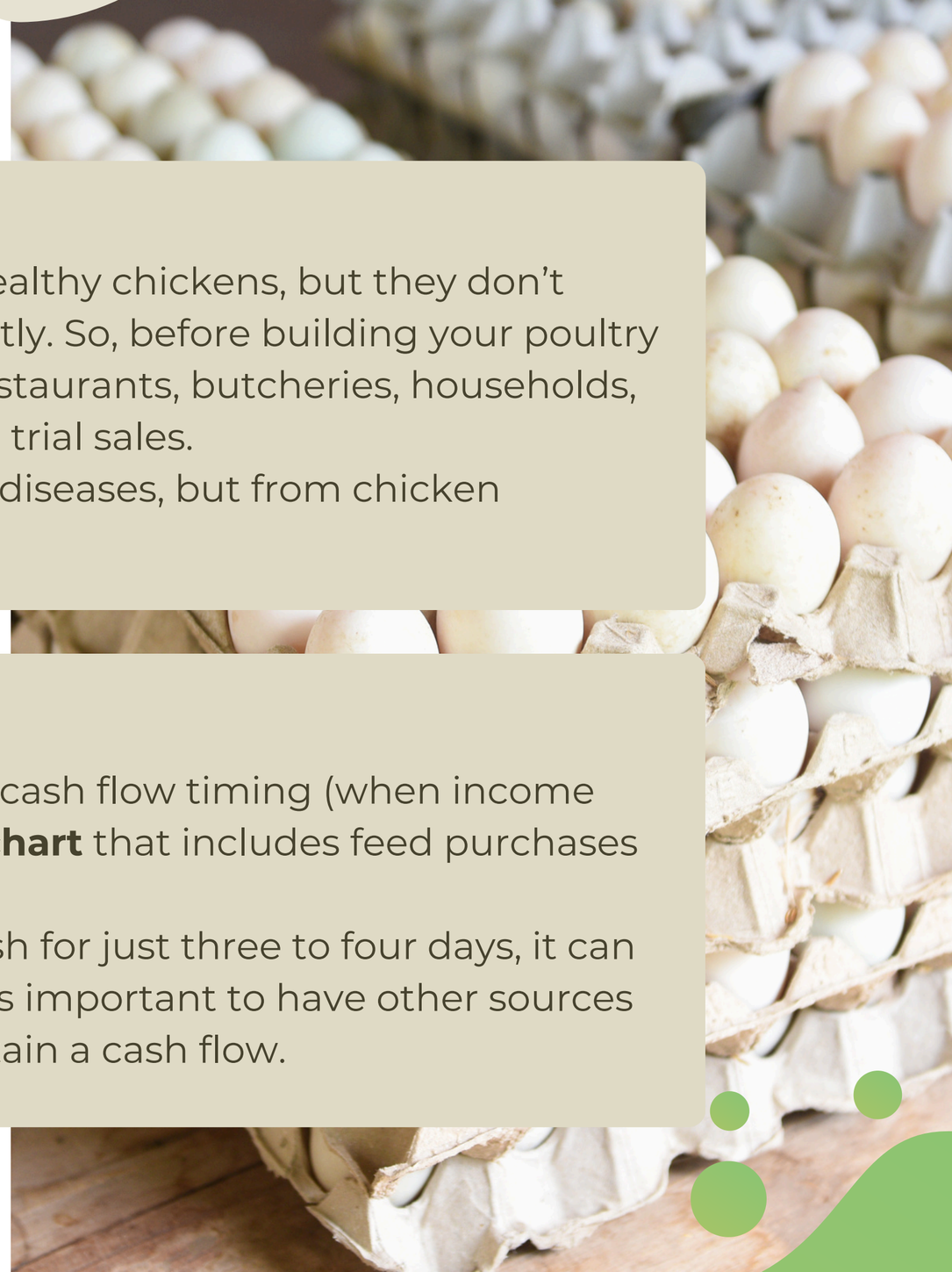
Many new poultry keepers focus on production and raising healthy chickens, but they don't think carefully enough about who will buy and how consistently. So, before building your poultry house, **know your target customers.** Will you be selling to restaurants, butcheries, households, or brokers? Create informal agreements or sample them with trial sales.

- **Hidden truth:** Sometimes the biggest losses are not from diseases, but from chicken growing fat with no one to buy them.

2. Cash flow planning (not just budgeting)

People often make one-time budgets, but they don't plan on cash flow timing (when income comes in versus when expenses are due). **Make a cash flow chart** that includes feed purchases (weekly), vaccinations, and when your first sales happen.

- **Hidden truth:** Feed is a daily pressure. If you run out of cash for just three to four days, it can slow down your chickens' growth or even cause deaths. It's important to have other sources of income rather than depending only on poultry to maintain a cash flow.





3. Mental toughness and a backup plan

Most people overlook how much stress and pressure comes from small setbacks like diseases outbreaks, theft, or delays in sales. **Key tip:** Ask yourself, if something goes wrong, do you have a safety net? Whether it's an extra income stream, mentor, or side hustle.

- **Hidden truth:** Many new poultry farmers give up not because they fail completely, but because they have no emotional or financial buffer to absorb small shocks. So, before starting poultry business make sure you have a backup plan and good problem-solving skills.

4. Breed and feed compatibility

Sometimes farmers buy popular breeds, but they don't match their goals or feed availability. Questions to ask before deciding to invest in poultry:

- Do I want fast profits (broilers) or steady income (layers or Kienyeji)?
- Can I afford the feed type required (starter, or other food supplements)? Can I source these things consistently?

Key tip: Some breeds such as broilers are sensitive and require specific care. Make sure you are set up for the breed you choose.





POULTRY STATISTICS IN TANZANIA

Recent data from the Ministry of Livestock and Fisheries show the number of chickens to be approximately **103.1 million, including both indigenous with the total of 47.4 million (the Kienyeji) and commercial breeds with the total of 55.7 million**.

Approximately **3.7 million households in Tanzania keep poultry**, highlighting the sector's importance in both rural and urban settings:

Sources: www.bongo5.com, (May 14, 2024 News) www.kilimokwanza.org (October 16, 2024 Update.)

Leading regions:

Mbeya and Tabora regions have **largest number of indigenous chickens** with more than 2.5 million and 2.49 million respectively. **Dar es Salaam leads in commercial poultry** producing approximately 434,000 chickens per week, of which 314,000 are broilers and 120,000 pullets. Other regions that mostly practice chicken farming are Morogoro, Dodoma, Mwanza, Arusha, Kilimanjaro, and Tanga.

- In terms of slaughter facilities, Dar es Salaam hosts several notable operations including Interchick Limited, which has a capacity of slaughtering 300 chickens per day; Kings Chicken, capable of processing 400 birds per day; and Elieza poultry farm found in Goba. Other poultry farms in Tanzania include Silverlands Tanzania in Iringa and Kuku Farm in Mkulanga.

Chicken meat and eggs consumption rate:

The average chicken meat consumption in Tanzania is 2.07 kg per capita annually. This figure is below the Food and Agriculture Organization's (FAO) recommended level of 50 kg per capita. Egg consumption average per person is 106 eggs per year, while the recommended is 300 eggs annually.



- Both chicken meat and eggs consumption are below the recommended levels as per FAO, indicating there is the room for improvement in the poultry sector. The low consumption rate signals a potential market for chickens, offering opportunities for farmers and businesses in meat and eggs industry to expand production, improve distribution, and encourage consumer demand.

Sources: www.africafarming.info; www.helgilibrary; www.tanzaniainvest

CULTURAL PRACTICES IN CHICKEN FARMING

- **Chickens in the family:** In many Tanzanian households, chickens are part of the family's daily life. They may be raised alongside other livestock like goats and cattle.
- **Traditional knowledge:** Elderly farmers often pass down traditional methods of chicken care, such as choosing the right place for the chicken house and using certain plants for medicinal purposes (e.g. neem leaves).
- **Community support:** Farmers often share resources, knowledge, and labor within communities. Chicken farming cooperatives and local poultry groups are popular for sharing expertise.

CHICKEN BREEDS

- **Local breeds:** The traditional "Kienyeji" chickens are hardy, resistant to disease, and can survive in harsh environments. They are popular for their meat and eggs. Examples include the Kuchi, Kuku Kishingo, Njachama (Nungunungu), Kuku Kibutu, Singamagazi, Kuku wa Mbeya, etc.
- **Improved breeds:** These chickens include such hybrids as the "Cobb" and the "Ross," which are commonly used in commercial farming for better egg and meat production.





TYPES OF CHICKEN FARMING

Free-Range Farming

Chickens roam freely during the day, eating grass, insects, and other natural food. This method is often seen in rural areas.

Semi-Intensive Farming

Chickens have a designated space but are allowed to roam within a certain area. They are given supplemental feed and water.

Automatic Systems

Chickens are kept in cages or pens, with controlled feeding and care. This method is less common in rural areas but is being adopted in urban regions for commercial purposes.



KEY CONSIDERATIONS IN CHICKEN FARMING

HOUSING

Traditional chicken houses (called "kibanda" in Swahili) can be simple wooden structures with a roof to protect chickens from rain and predators. In semi-intensive systems, a raised wooden house with well ventilation is very common. Commercially, chicken houses are constructed respective to two types of structures:

- **Open chicken house**
- **Closed chicken house**



THE OPEN CHICKEN HOUSE

The most common type of chicken house, the “open house” is built with enough space to allow for good ventilation and easy natural light penetration (with no human control). The structure has a simple design and uses low-cost, common materials. In villages, most poultry houses are made using pile trees, roam soil or unburnt bricks walls, and grass roofing. In towns, most poultry houses are built using wood, burnt bricks, or blocks; walls plastered with cement; and roofs made with iron sheets.

Things to consider while building an “open” chicken house:

i. Selection of the site.

Choose an area with sufficient air circulation, dry ground without stagnant water, moderate wind conditions and positioned in a way that aligns with the sunrise direction (with the longer side facing the where the sun rises).

ii. Construction

A good house should have enough space inside, a roof that does not allow rainwater or harsh sunlight penetration, and proper ventilation for air and light circulation. The house also must be sturdy to prevent theft and protect against predators like wild animals, cats, rats, snakes, and dogs. The inside area of the house must be respective to the number of chickens to be kept.

To ensure proper air flow (ventilation), windows must be located on both the north and south ends of the chicken house. The height of wall should be from 0.5m, while the open space to the roof should be 2.5m.



The side wall (apex of the roof) must locate East-west (width of the house) to control the penetration of the sun's rays, which is most important in intensive chicken farming. Also, it is recommended to install the door on one side of the apex walls.

iii. Size of the poultry house

The size of the poultry house will depend on the number of chickens and type of poultry farming. For free and semi-intensive chicken farming, you will need $1m^2$= 7 to 10 chickens. For intensive chicken farming, farmers are likely to keep Broilers for meat and Layers for eggs. They will need $1m^2$= 10 to 15 Broiler chickens and $1m^2$= 5 to 7 Layer chickens. In the case of the Layers, the space ratio enables the chickens to maintain their weights which stimulates egg productivity.

NB:
Chickens require adequate space based on their age and type of rearing system being used.





FLOOR

- The chicken house floor must be smooth, either made using room soil or cement for easy cleanliness. If you are using soil, you can place floor sheets on the ground to help keep the chickens from getting cold.
- Floor sheets for chickens are materials used to cover the floor of poultry houses to maintain hygiene, improve comfort, and manage waste. They help to prevent the direct contact between chicken and the ground, reducing diseases risks and making cleaning easier.

Types of floor Sheets for poultry farming: www.suaire.sua.ac.tz

i. Deep litter floor (earthen or concrete with bedding):

A concrete or compacted earthen floor covered with absorbent bedding materials such as sawdust, rice husks, straw, or wood shavings.



Rice husks floor sheet.



Wood shaving floor sheet.





Sawdust floor sheet.

ii. Plastic and wire mesh poultry flooring:

This the type of floor is designed to allow droppings to fall through the gaps, which helps in dung plate managements. This flooring is suitable for commercial poultry since it very cost full.

The **advantages** of the plastic and wire mesh flooring:

- It is safe for chicken and their feet.
- It is easy to install and makes cleaning easy.





Plastic floor sheet.



Wire mesh floor sheet.

THE CLOSED CHICKEN HOUSE

This type of chicken house requires a highly complex installation, where ventilation and light are tightly control. Closed houses are mostly only used by big poultry companies as they are expensive to install and operate.

Important Equipment Inside the Chicken House

i. Feeding Equipment ii. Watering Equipment iii. Nesting Boxes iv. Perches v. Bedding

Feeding Equipment

- Good quality feeding equipment enables chickens to eat without crowding. It prevents feed loss and does not allow chickens to step into them and scatter the food. Also, feed loss can be prevented by raising the equipment slightly off the ground using stones, logs, or suspension.
- Feeding equipment can be made by farmers using locally available materials, or it can by purchase from factories. Items used to make feeding tools include old tires, carved logs, pieces of gourds, bamboo, buckets, and used cans.

Illustration: Examples of good equipment for feeding chickens.









Benefits of Using Good Feeding Equipment:

- Prevents scattering of food and feed loss.
- Reduces the chances of chickens being infected by diseases such as coccidiosis (bloody diarrhea), worms, etc.

Watering Equipment

Watering equipment must be easy to clean. Water containers should be slightly raised using stones, bricks, or logs to prevent contamination and spillage. Watering equipment can also be made by the farmer using locally available materials or purchased from factories. Some items used include old tires, gourds, bamboo, buckets, or used cans.





Local vs modern watering equipment

Perches for resting and sleeping

Naturally, chickens prefer to sleep and rest in elevated places, as it makes them feel safer compared to being on the ground. Therefore, to make your chickens feel comfortable, provide them with perches both outside where they roam and inside the coop to help them sleep well. Normally, perches should be made with a height of one meter from the ground.



Nesting boxes

It is important to have nesting boxes for laying eggs inside the chicken coop. These nests should be calm, private, and have dim lighting. The absence of nesting boxes in the coop causes chickens to lay eggs randomly, which leads to loss, damage to the eggs, poor hatching rates, and the breaking of many eggs, thus reducing and delaying productivity.

A nesting box should have enough space to allow the hen to spread and turn around. On average, a nesting box should have a length of 35 cm, a width of 35 cm, and a depth of 35cm. If the nesting box has legs or is a crate made from wood or trees, it should be placed about 50 cm above the floor. Inside each box, there must be bedding material to increase warmth and ensure the safety of the eggs. The number of nesting boxes should be three-quarters of the number of hens that have reached laying age. Also, one opening or hole in the nesting box can accommodate five (5) laying hens.







CHICK REARING

Preparations Before Receiving Chicks

The things to consider:

- Prepare a small, enclosed area (brooder) to keep the chicks in your house.
- The brooder (chick rearing house) should be clean and sprayed with disinfectant or pesticides to kill any germs and pests. It should remain empty for at least one to two weeks before the arrival of chicks (use only veterinary approved products).
- The room should not be too windy and should not have holes that could allow entry of rats, snakes, or other dangerous animals.
- Place bedding material such as rice husks (to a thickness of 5–10 cm). Then sprinkle a little lime to control bad odor and insects that cause diseases such as coccidiosis.



Preparations Before Receiving Chicks . . .

- Prepare a heat source like a charcoal stove, kerosene lamp, or electric heater, depending on your environment and availability of such equipment.

- After receiving the chicks, make sure you turn on the heat source to warm the brooder to a specific temperature suitable for chicks (35C). If using charcoal stove as a heat source, ensure it is well lit and not emitting smoke before placing it in brooder.

- Make sure equipment for water, feeding, and starter feed are prepared before receiving chicks.



Chick Rearing Area (Brooder)





- A brooder is a special device used to raise chicks from one day old up to one month old. This device helps to maintain a warm environment to protect the chicks, as this is a sensitive stage where many chicks die due to cold or being eaten by predators. The brooder is made using materials that do not easily conduct heat, such as hard paper, plywood, timber, cloth, etc.

- Chicks from one to seven days old can be kept 50 per square meter. As they grow, the farmer is advised to increase the size of the brooder based on their growth. The brooder height is recommended to be at least 45 centimeters above the ground to facilitate heating

Brooder with chicks, food, water, and heat sources.







Bedding Placement:

- The bedding used in the chicken house should be capable of retaining heat and absorbing moisture. Bedding materials may include wood shavings, rice husks, peanut shells, coffee husks, etc. Proper bedding placement is crucial because it keeps the chicks warm, dry, and safe reducing disease risk and promoting healthy growth

Receiving and Rearing Chicks on the First Day

- When a farmer receives chicks, confirm that the chicks have been vaccinated against Marek's disease. This vaccine is usually administered at the hatchery. The chicks should be of good quality, strong, and not appear sick or weak in any way.

Rearing Chicks Within the First Two Hours of Receiving Them

i. Remove chicks from the box and place them in a prepared brooder room.
ii. Prepare warm water and clean pebbles in water containers to prevent chicks from drowning.
iii. Mix glucose into the warm water (one tablespoon of glucose per two liters of water or ten teaspoons per ten liters). If glucose is unavailable, use one tablespoon of sugar per five liters of warm water.
iv. Give the chicks the glucose or sugar water only within the first two hours before providing anything else.
v. Ensure all chicks have drunk the warm water, and help any that haven't by gently guiding them.
vi. Do not feed the chicks until they have taken enough warm water.

Rearing Chicks After Two Hours

- After the first two hours, pour out the sugar/glucose water and replace it with clean water mixed with vitamins (refer to manufacturer's instructions for the right dosage). Then, refill drinkers. Also, fill feeders with starter feed (chick starter) and start feeding the chicks. Chick feed starter is sold in either Agrovet shops, Animal feed meals, large poultry farms to mention few.

Important Considerations When Rearing Chicks:

- Closely monitor chicks for those not drinking water. Make sure there are no water spills on the litter. Provide vitamin water daily for the first 5 days. Ensure you observe them even at night to check behaviors such as feeding, huddling, temperature response, and light preference.
- Maintain the correct brooder temperatures as follows:
  i. Week 1 – 35°C ii. Week 2 – 32°C iii. Week 3 – 29°C iv. Week 4 – 26°C
- For the first three weeks, chicks should have heat in the brooder day and night. Heat sources should be placed over bricks to prevent direct contact with chicks. If you don't have a thermometer, observe chick behavior in the brooder.
- If they gather close to the heat source, the temperature is too low. Add more heat. If they stay away from the heat source, the temperature is too high. Reduce the heat. When chicks spread evenly in the brooder, the temperature is just right. Chick mortality can increase by 5% or more if the temperature is incorrect.

Note:

i. If the heat is too high chicks will pant, feathers may ruffle, feed intake reduces, and mortality may occur.

ii. If it's too cold, chicks will huddle together, and they can get pneumonia and possibly die.

Vaccination and important medications for chicks until adulthood:

Chicks should be vaccinated according to instructions from livestock experts. Vaccinations against major diseases like Marek's (if applicable) should be given.

DAY/ AGE	VACCINE/ MEDICENE	DISEASE	METHOD OF VACCINATION
2 to 6	Pullorum Trisulmycine	Pullorum	Water
7	I2	Newcastle disease	Eye drop
	Lasota		water
14	Gumboro vaccine	Gumboro	water
21	I2	Newcastle disease	Eye drop
	Lasota		Water
28	Gumboro vaccine	Gumboro	Water
35	Fowl pox vaccine	Fowl pox	Wing jab
3 months	Pipperazine citrate	Warms	Water



NB:

a) Deworming should be repeated every three months, and Newcastle (Kideri) vaccine should be repeated every two months.
b) After every vaccination, give the chickens vitamins
c) Water used for vaccine should be free from chlorine. It's recommended to boil water before vaccination to remove minerals and chlorine.
d) Water for vaccine should not be used for, more than two hours.

Common diseases in Chicks:

i. White diarrhea
ii. Red diarrhea
iii. Cold/ flue



DISEASE PREVENTION AND MANAGEMENT

- Chickens in Tanzania are often afflicted and killed by diseases. Disease can be caused by viruses, bacteria, or fungi. The most-deadly diseases for chickens are those caused by such viruses as Newcastle, fowl-pox, avian-flue, and infectious bronchitis. These virus-induced illnesses are incurable.

Signs & Symptoms of common chicken diseases:

- **Newcastle (kideri):** Newcastle often leads to the death of 100% of non-vaccinated chickens. Infected chickens will experience difficulties breathing, loss of appetite, loss of body control and falling down, wings falling, mucus spitting, and neck weakening, before their eventual death. Newcastle can be prevented by vaccination.
- **Fowl pox (ndui):** This is the viral disease that affects chickens and even other poultry. Symptoms include wound spots on the featherless parts of the chicken, especially on the cobs and mouth white layer. It mostly causes deaths to chicks.

Fowl pox comes into two main forms.

1. Dry form

This form causes wart-like lesions on comb, wattles, eyelids, and leg. Lesions eventually dry and fall off. Chickens recover though it affects growth and eggs production.

2. Wet form (diphtheritic)

This affect mouth, throat, and upper respiratory track. It causes difficulty in breathing or eating. This form is more serious and can be fatal. Fowl pox can be prevented by vaccination

- **Avian influenza (Mafua ya ndege):** Symptoms include difficulty breathing, coughing, cobs turning a violet color, eye tearing, neck bending, swelling of the head, passing grean to white waterlily diarrhea, before death. It can be prevented by vaccination.

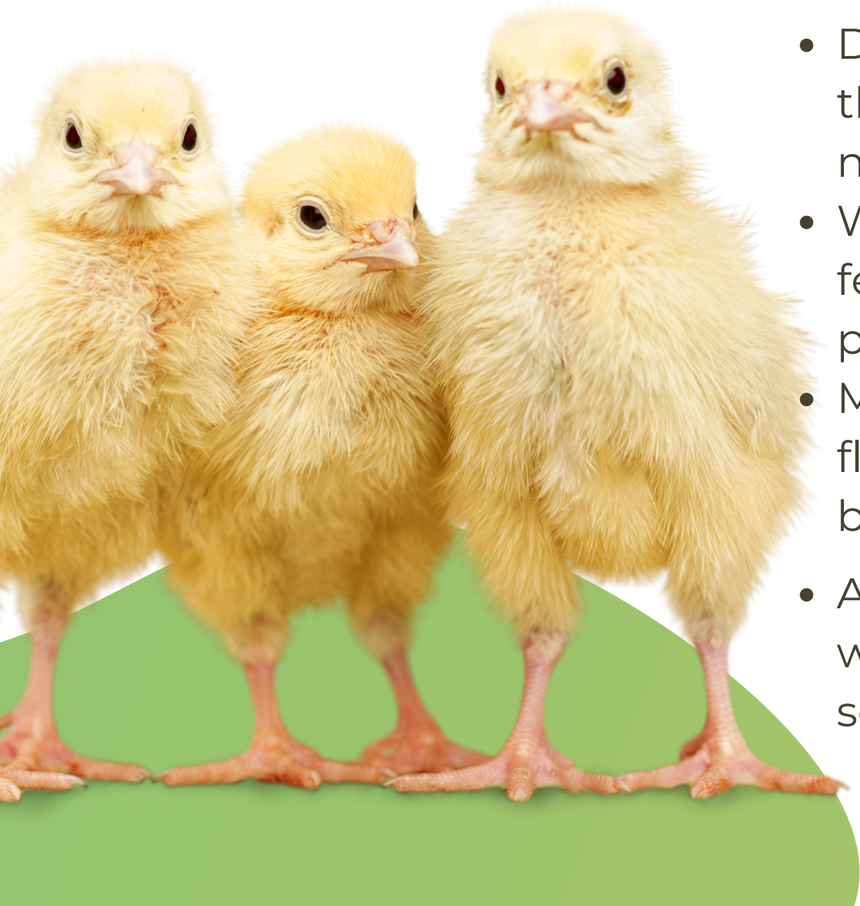
- **Infectious coryza (mafua makali):** Symptoms include face swelling, coughing, mucus, loss of appetite, decrease in egg production by 10% to 40% in Layers. This virus illness can only be prevented by vaccination through eye teasing (Giving vaccine drops directly into the eyes of the chickens)

- **Fowl cholera (kipindupindu):** Symptoms include yellowish diarrhea, slumbering, and hiding head in the wings. Fowl cholera kills 50% infected chickens. It is caused by a bacterium and can be cured by all medicine containing Sulphur.

- **Coccidiosis:** Symptoms include red blood diarrhea, brown diarrhea, loss of appetite, and feather stretching. It is caused by a fungus and can be treated by medication. In small scale or backyard, farmers use Coccidiostats, preventive drugs mixed with water or feed. Such drugs are Amprolium, Sulfa-quinoxaline, or Coxistac. Also, Coccidiocides medicines are used to treat the disease when symptom shows. The best way to prevent Coccidiosis is to keep poultry dry and clean (Biosecurity).

STEPS TO TAKE TO HELP KEEP YOUR CHICKENS HEALTHY:

- **Vaccinate:** Vaccinate your chickens against common diseases to prevent outbreaks. Vaccines can be bought from local veterinary shops.
- **Maintain good hygiene:** Regularly clean the chicken house to reduce the spread of disease. Ensure proper waste disposal. You can use Soap detergent and warm water for general cleaning and disinfectants weekly or monthly.



How to clean?

- Daily remove any wet or soiled bedding (especially those under water), then refill clean water and food containers. Clean droppings around the nests or perches.
- Weekly sweep or rake the coop to remove wastes. Wash and disinfect feeders and drinkers. Make sure you inspect for signs of mates, flies, or pests.
- Monthly, make sure you conduct a deep clean, remove all beddings, scrub floors, walls, and equipment, then disinfect. Let the coop dry completely before returning the chickens.
- After all clearness you conduct, all wastes must be deposed in a proper waste disposal. Chickens' wastes are highly used in crop farming as a source of manure.

What does proper waste disposal look like?

Compost chicken manure and bedding is rich in nutrients and safe for crops after 3 to 6 months. In this way it's advised bins or compost pit for odor control. Bins or pits must be placed away from the coop to avoid attracting flies and rodents. Also, do not dump near water source or community area.

- **Monitor your chickens' health:** Keep an eye on the chickens for any sign of illness, such as lethargy or changes in egg production.
- **Practice biosecurity:** Help prevent the spread of disease by isolating the poultry farm from other poultry farmers. Maintain strict rules about feet bathing before entering the farm and/or chicken house. Avoid welcome visitors to a poultry farm and/or chicken house.

It's recommended to take bath before entering the farm or not allowing visitors to inter the coop because Human is a carrier of infectants such as Bacteria, virus and even fungi.



Adult Chickens (Layers)

These are chickens aged 18 weeks and above that are about to start or have started laying eggs. When chickens reach 16 weeks, preparations should be made to build nests and bring them into the coop. The following should be considered:

- Provide them with clean food and water at all times.
- Give them feed suitable for laying hens (Complete Layer Mash) in quantities as shown in the table below:

DAY/ AGE	Number of chickens	Amount of feed per day in Kg
From week 18 onward	100	12
	50	6
	25	3
	12	1.5
	6	3/4

NESTS

It is important to have a designated area inside the chicken house for laying eggs. This area should be quiet, peaceful, and with dim light (as we discussed earlier)

- Lack of nests causes chickens to lay eggs randomly and lose many eggs without knowing, leading to poor hygiene, reduced productivity, and setbacks in laying activities.
- A nest should be well-sized to allow the hen to sit and turn easily. The standard size should be 35 cm in height, 35 cm in width, and 35 cm in depth. Also, the nest should be placed 50 cm above the ground to help the hen feel safer.

Guide: Nests should be placed in the coop starting from week 16 so that the hens get used to them.

- Nests should be prepared early based on the number of hens. Inside each nest, put soft bedding (e.g., dry grass) to increase egg safety. The number of nests should be about one for every four hens that are of laying age.
- In each nest with bedding, spray insecticide to prevent bugs (e.g., mites, lice). Use natural or industrial-made insecticides like Sevin powder.



Egg Collection

- It is advised to collect eggs from the nests frequently right after the hens lay.
- Eggs laid at the beginning often have poor hatchability, so it is advised to use them as food (Eat them)
- Mark eggs with date or number using a pen or pencil. When collecting eggs for incubation, choose those laid within two weeks.
- Collect eggs carefully each time to avoid cracking, breaking, or contaminating them, which can make chickens eat them.
- If you notice chickens eating eggs, reduce the light in the coop, block window openings, and provide enough greens and protein-rich food.
- If the problem of egg eating persists, consult a livestock expert for guidance or to trim the chickens' beaks.

Storing Eggs

Collected eggs should be stored in a dry, ventilated container such as a tray, box with dry sawdust, sand, or cotton to prevent breakage.

- When placing eggs in storage, the pointed end should be facing down.
- The storage container should allow sufficient air circulation without being too open.

Characteristics of Eggs for Hatching

It is advised to select eggs for hatching and to use those not suitable for hatching as food at home or for sale.

The best qualities of hatching eggs are as follows:

- They should be clean, and if dirty, cleaned using a cloth with water or spirit.
- They should not have cracks or soft shells so as to avoid the risk of infection as bacteria and other pathogens may enter the eggs easily for soft shells which can kill the developed embryo or cause deformities.
- They should come from hens fertilized by a rooster.
- They should be of average size relative to the shape and breed of the chicken. This increases the chance of healthy, uniform, and successful hatching.
- They should be oval-shaped like a ball, not too deformed. This shape ensure proper embryo positioning, allows efficient air and heat circulation, supports healthy development and increase the chance for hatching.
- They should have been stored for less than two weeks from the day they were laid.
- They should be stored in a cool, well-ventilated place so as to preserve their freshness, prevent embryo damage, and reduce the risk of bacterial growth before incubation.
- They should not be handled with bare hands but rather with ash-rubbed hands to eliminate smells that may cause hens to reject them for incubation.

Methods of Hatching Eggs

There are two main methods used for hatching eggs:

a. Artificial incubator b. Natural incubation (by hen)

a: Artificial Incubator Method

- This is the method of hatching chicks using human-made incubators of various types. It is advised to use incubators that follow veterinary guidelines for proper egg incubation and chick development according to Tanzania Animal Diseases Act No. 17 of 2003.
- This process involves controlling temperature, humidity, and ventilation to simulate the conditions a hen would provide while incubation eggs. The goal is to hatch eggs in a controlled environment allowing for the successful embryo development.
- Artificial incubation is widely used in poultry farming, especially for hatching large number of eggs in a more controlled, efficient manner than natural incubation.





b: Natural Incubation (By Hen)

This is the traditional method with a long duration that involves hatching eggs using a brooding hen.

To achieve good results, follow these steps:

- Prepare a special nest for the hen to hatch the eggs as instructed above.
- It is recommended to choose hens with a wide body and good hatching behavior.
- Each hen can hatch between 10 to 20 eggs.
- Place food and water near the hen while incubating to reduce the need for movement. If the hen moves a lot in search of food, it may abandon the eggs, which can result in poor hatching rates.





Identifying Fertile and Infertile Eggs:

A hen can lay eggs even without mating with a rooster, so it's important to ensure that the eggs are fertile before incubation. A farmer can identify fertile and infertile eggs starting from the 10th day after incubation.

How to identify if the egg is fertilized using a light source such as a torch and a box:

i. Prepare a box or container with a light source like a torch, candle, or electric bulb.

ii. Take a piece of the box and inside it places the light source.

iii. Cut a thick piece of paper or cardboard and make a hole slightly smaller than the egg.

iv. Place the egg above the hole on the paper/cardboard.

v. Use a flashlight or torch to shine through the egg from below in a dark room.

vi. For each egg inspected, if the egg contains dark lines (blood vessels), it means it is fertile. If the egg is clear and yellow, it means it is infertile.

vii. Eggs identified as infertile can be used for food at home or sold because they are still safe and have no negative effects.



Picha: Hatua ya kwanza, tumia jagi kama hili au kasha la boksi na ndani yake weka balbu kama hii au tochi, lakini epuka balbu za kawaida zinazotoa joto kali



Picha: hatua ya pili, kata kipande cha boksi kishatengeneza tundu kiasi cha kutosha kufanya yai likae juu yake na lisipitilize



Picha: hatua ya tatu, weka yai juu ya tundu likiwa limeziba tundu



Picha: hatua ya nne washa tochi au balbu na anza kuangalia kwa makini muonekano wa ndani wa yai

Top Left: Step one - use a jug or container like this and place a bulb inside, preferably one that doesn't produce high heat.

Top Right: Step two - cut a piece of cardboard with a hole just big enough to hold the egg without it falling through.

Bottom Left & Right: Demonstration of how the egg sits above the hole and is illuminated to check fertility.

CHICKEN FEED

Chickens require food with all the necessary nutrients that the body needs to grow, stay healthy, and produce eggs and meat in large quantities. Proper feed is a mixture of various nutrients with different roles in the body. Every feed formula must have a balanced proportion suitable to the specific nutritional needs of the chicken at a given age. Chicken feed accounts for about 70% of production costs, so it's important that the farmer considers the quality of ingredients during mixing, correct usage of feeding tools (to avoid wastage), and proper storage. Poor quality feed causes chickens to grow poorly and reduces egg production, leading to diseases and even death.

Effect of nutrients deficiency in chicken feed:

i. Stunted growth and weight loss
ii. Weak limbs, leg deformities, and fragile bones
iii. Laying eggs with soft shells
iv. Laying fewer eggs
v. Poor feathering and feather loss
vi. Swollen abdomen
vii. Frequent illnesses
viii. Poor egg fertilization and low hatching rate

Categories of Feed:

Chicken feed is categorized into five main groups:

i. Energy-giving feed
ii. Body-building feed
iii. Bone-strengthening feed
iv. Body-protecting feed
v. Water

I.ENERGY-GIVING FEED:

The following are included in this category:

a) Cereal bran such as maize bran, soft rice bran, and wheat bran

b) Grains such as millet, maize, rice, sorghum, and sesame

c) Root crops like cassava, sweet potatoes, and yams

d) Oils from plants like sunflower, cotton, sesame, palm, coconut, groundnut, and also oils from fish and animals like cows which help boost energy and body heat

- For root crops, especially cassava, make sure the feed is soaked for 24 hours or cooked and dried before feeding to chickens to remove cyanide, a natural poison found in some of these foods. In this category, energy-giving feed makes up 60–70% of the total feed mixture.
- **Note:** Use more white millet than red millet because red millet contains certain chemicals that may interfere with the absorption of other nutrients in the body.

II.BODY-BUILDING FOODS:

Foods in this group are categorized into two main sources:

a) Plant-based sources

b) Animal-based sources

(a).Plant-Based Sources

- Oilcakes (Mashudu): These are residues after oil is extracted from seeds of plants such as legumes and other oil-rich plants like sunflower, palm, groundnuts, soybeans, cashew nuts, and sesame.

- Leaves from the legume family (e.g., Lucerne) and fodder trees (e.g., Leucaena, Moringa, Sesbania, etc.)

(b).Animal-Based Sources

- Animal blood: Boiled and dried from healthy animals (slaughtered in a hygienic manner). This helps prevent the risk of poultry contracting diseases.

  Note: Blood should not be boiled for too long to prevent the loss of nutrients.

- Fish, sardine, and meat residues.

- Natural feeds like worms, insects, and their eggs (e.g., termites).

  Such foods contribute about 20% to 30% of the total feed mixture.



Note: When soya is used in chicken feed mixtures, it must first be roasted and then crushed. Cottonseed cake should be used in small amounts due to its high fiber content and the presence of gossypol, a chemical that can affect the absorption of other nutrients in the body.

III.FOODS THAT STRENGTHEN BONES (MINERALS):

- These are mineral-rich foods needed to build and maintain bones in the body, including strengthening eggshells, bird skeletons (chickens), and promoting overall good health. Important minerals are calcium and phosphorus, found in limestone (special poultry-grade lime).

- For hens to lay eggs with hard shells, they must get minerals like lime, which can be sourced from various materials like crushed shells or properly ground bones.

Mineral nutrients required include:

- Properly burnt shell materials, such as crushed shells from the ocean, snails from dry land, and eggshells that have been burned. Before using snail shells or eggshells from the house, it is advised that they be burned or boiled to kill disease-causing germs.

- Table salt

- Industrially produced minerals such as Di-calcium phosphate (DCP)

Warning: The need for minerals in chicken feed should not exceed 2.5% for all types of chickens.

IV.BODY-PROTECTING FOODS (VITAMINS):

- Vitamins are necessary for the growth of chickens. They increase the chicken’s appetite, help digestion, and assist in egg-laying and formation. Vitamins can be found in green leafy vegetables like lucerne (alfalfa), moringa, and legumes like beans and other shrubs commonly eaten by chickens. There are also vitamins produced industrially.

This group includes vegetables such as:

- Amaranth, wild amaranth, spinach, cabbage, etc.
- A mix of vitamins made in industries as vitamin premix (found in all veterinary shops)
- Chicken feed for those kept indoors must be supplemented with factory-made vitamins
- Sunlight is important to ensure vitamins A and D are produced well in the body. Therefore, the chicken coop must be built in a way that allows sunlight to enter during the morning and evening.

Warning: When using vegetation to feed chickens, choose areas that are not dangerous or contaminated (e.g., avoid roadsides, ponds, gardens sprayed with pesticides or herbicides).





V.WATER

- Water makes up a large percentage of a chicken’s weight. It helps in digestion and transporting food in the body, removing waste, and regulating body temperature. Blood also contains water. Ensure the water is clean, safe, and always available for healthy chickens.

Where can a farmer get a raw-materials to make chicken’s feed?

- A farmer can get ingredients to make chicken feed from his own farm. Bran, fishmeal, etc., can be found around nearby markets. Other materials like shells can be found near the beach or nearby markets or livestock supply shops. Also, different types of bran can be obtained using various milling machines.
- Oilseed cakes (residues after oil extraction) can be obtained from machines used to extract oil from cottonseed or sunflower seeds.

Caution: Feeds that are not safe for human consumption are also not safe for animal feed (e.g., moldy or rotten feeds, those with fungi, etc.).
Always ensure the feed contains essential nutrients (pesticides such as aflatoxins should be avoided). It is advised to use yellow maize (nutritional maize) because it has high levels of vitamin A.

ADDITIVES AND MINERALS

- For additive needs such as pre-mixes, amino acids, bone meal, limestone, etc., which provide essential nutrients to poultry feed. These additives are available in livestock supply shops found in various parts of Tanzania.



Bags of additives and minerals.

MIXING DIFFERENT RAW MATERIALS TO MAKE POULTRY FEED (FEED FORMULATION)





This is the act of mixing different raw materials in specific quantities as recommended by a formulator to obtain feed with the right nutrients/vitamins. Things to consider before preparing poultry feed:

i. Type of chicken (species/breed)

ii. Age of the chicken/bird

iii. Gender (male and female have different nutritional needs)

iv. Reproductive status (e.g., layers need different nutrients compared to cocks

v. Temperature of the farming area (cold or hot area)

Methods of Mixing Poultry Feed: There are two methods of mixing poultry feed:
a. Mixing Feed Using a Machine
This method is used in factories to mix poultry feed for chickens raised on large-scale farms.

b. Mixing Homemade Feed (home-made ration)
This method is used to mix feed for chickens raised in small groups or backyard systems, and it's suitable for smallholder farmers.

Equipment for mixing poultry feed at home;
Spade, clean wheelbarrow/tray, sieves, sacks/bags for storing the mixed feed.

i. Before mixing raw materials for poultry feed, first mix the additives such as amino acids, premix, etc., then complete the mixture with other ingredients like maize, fishmeal, bran, etc.

ii. When mixing poultry feed, it is recommended to use a special hand-powered machine for mixing, like the one shown below.

iii. If you don’t have powered machine (small farmers) use manual tools like Shovel or spade, (Koleo au Jembe) this can help to mix small batches of feed on a clean floor or large container.

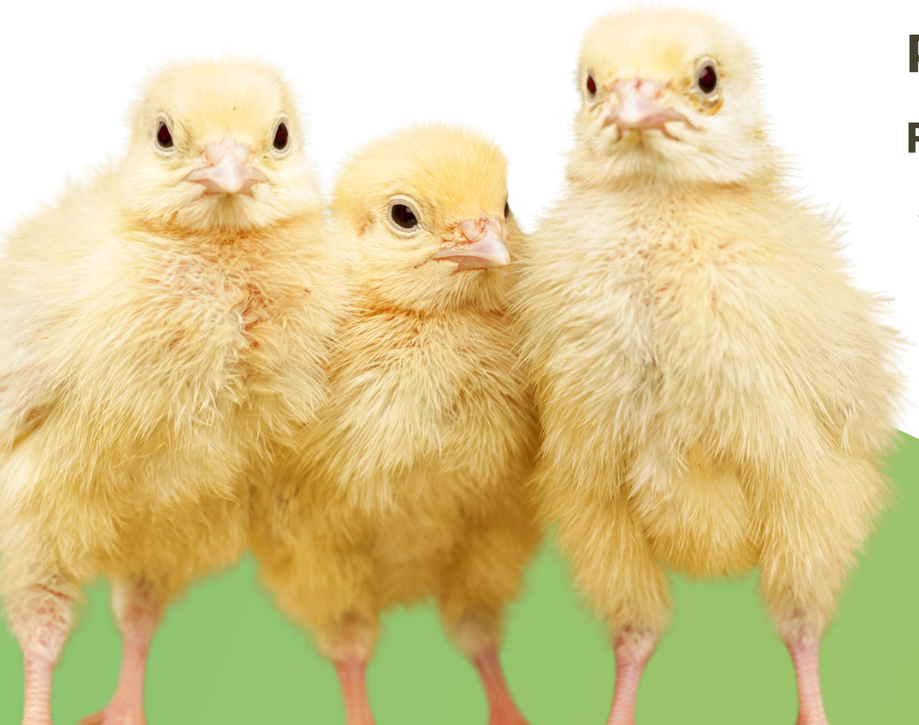
PROTEIN REQUIREMENTS FOR DIFFERENT POULTRY GROUPS

a) From day 1 to week 4, give chick starter mash containing 20% protein

b) From week 4 to week 8, give chick grower mash containing 16% protein

c) From the beginning of laying to the end, provide layers mash with 16–18% protein

d) Broiler mash – requires a higher protein level to support fast growth, so from purchase to sale, feed them mash with 22% protein



Preparing feed for different poultry groups

For Chicks:

- Chick feed should be softer than that of mature chickens. For chicks under two months, prepare the following mixture. This is one example for preparing 100 kg of chick feed. If you only need 50 kg, use half the amount specified in this table. Chicks are fed the amount they can finish (not measured).

Day 1 to 2 months.

Ingredient	Quantity per 100 kg
Fishmeal (powder or heads)	15
Cereal bran (maize or sorghum)	40
Oil cakes	20
Bran	23
Limestone	1
Bone meal (premix)	0.75
Salt	0.25
TOTAL	100Kg

Growing Chickens (Growers) 2 to 4 Months.

Ingredient	Quantity per 100 kg
Fishmeal (powder or heads)	7
Cereal bran (maize or sorghum)	30
Oil cakes	20
Bran	38
Limestone	2
Bone meal (premix)	1.75
Salt	0.25
TOTAL	100Kg

Layers (Egg-laying Chickens) aged 5 Months and above

Ingredient	Quantity per 100 kg
Fishmeal (powder or heads)	13
Cereal bran (maize or sorghum)	25
Oil cakes	20
Bran	39
Limestone	2.75
Bone meal (premix)	2
Salt	0.25
TOTAL	**100Kg**

Note: These feed mixing guidelines are for reference purposes for the poultry farmer and may change depending on the availability and type of raw materials. Therefore, it is advisable to test samples of the feed at livestock laboratories before and after mixing to ensure the nutritional content levels meet the needs of the chickens in question. Also, seek advice from a livestock specialist.

MARKETING AND SALES.

Local markets

Farmers sell chickens and eggs at local markets or to neighbors. Live chickens are often sold for celebrations, such as weddings, or during religious festivals.

Value addition

Some farmers raise chickens specifically for meat, while others sell eggs. In some cases, eggs may be used to make local dishes, such as “Chips Kuku or Chips Mayai" (via local Swahili recipes).

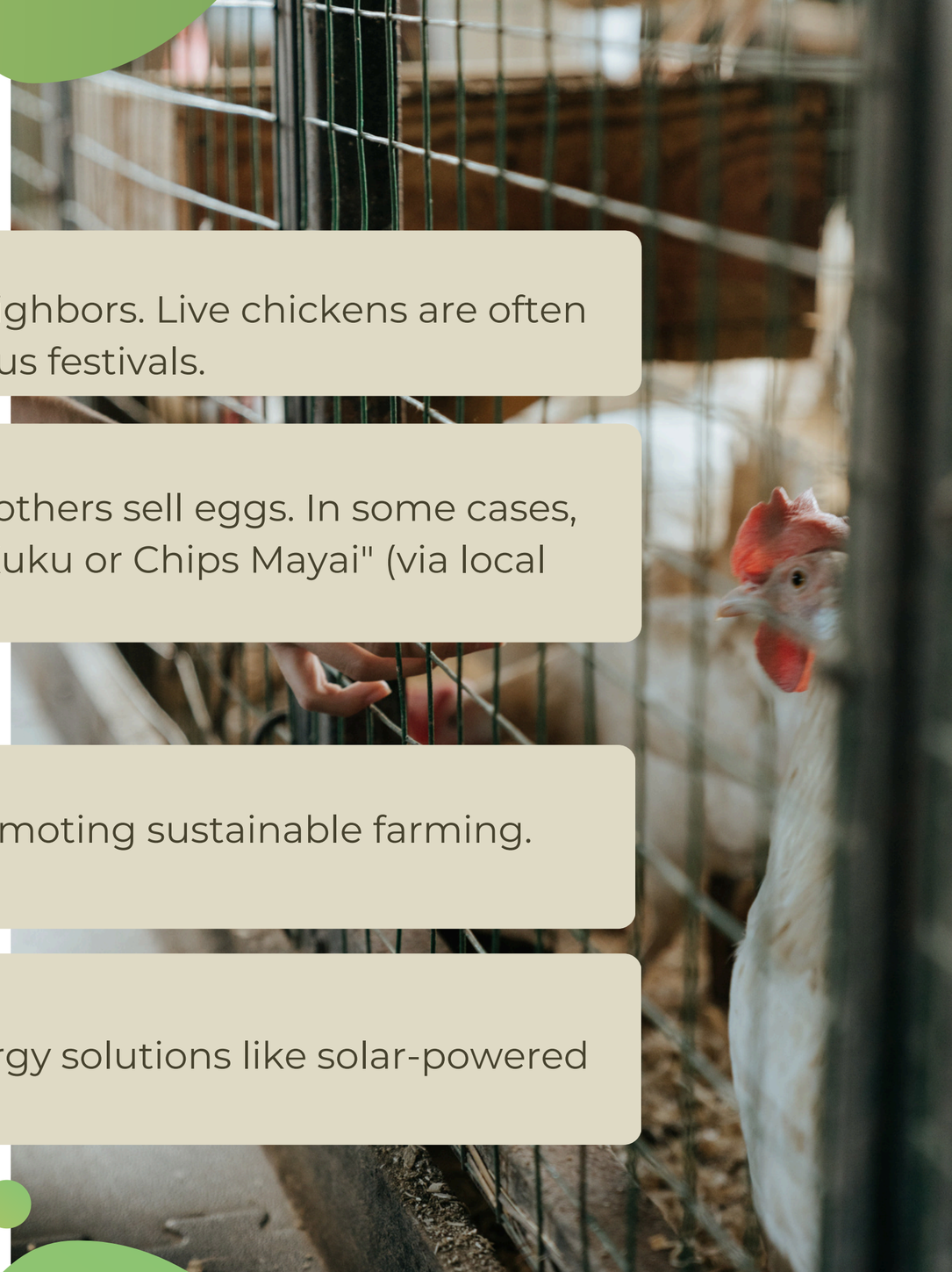
Sustainable Practices

Waste recycling

Chicken droppings can be used as fertilizer for crops, promoting sustainable farming. This method reduces waste and enriches the soil.

Energy efficiency

In rural areas, farmers often use low-cost, renewable energy solutions like solar-powered lights or biogas for cooking and heating in chicken hou



CHALLENGES IN CHICKEN FARMING

Predators: Hawks, dogs, and snakes can threaten free-range chickens. Proper fencing or keeping chickens in secure houses is crucial.

Market access: Rural farmers may face challenges in accessing markets for selling their chickens and eggs, limiting their income.

Community support: Farmers often share resources, knowledge, and labor within communities. Chicken farming cooperatives and local poultry groups are popular for sharing expertise.

Climate variability: Changes in weather, such as droughts or heavy rains, can affect the availability of feed and water. Chickens are quite adaptable but they grow best regions with moderate climate. Choosing the right breed for your climate is one of the smartest things a poultry farmer can do. Example in a cooler-regions like Mbeya, Iringa and some part of Rukwa, improved local breeds (Chotara) chicken are the best, while in regions like Dodoma, Shinyanga, Singida, and all hot regions, local native breeds are the best to adopt to the local heat and diseases.

Diseases such as Newcastle, fowl pox, coccidiosis and Infectious bronchitis to chickens leads a great loss to many poultry farmers moreover it’s necessary for them to implement biosecurity measures in their poultry farms for avoiding further consequences.

GENERAL CHICKEN FARMING CONSIDERATIONS

- ✓ Ensure the poultry house and feeding equipment are kept clean to prevent diseases.
- ✓ Do not mix chickens and ducks in same house because Ducks love water and makes a mess with it, while chicken needs dry, warm, and clean environments. Moisture from ducks can lead to damp bedding, which encourages bacteria, mold, and diseases that can seriously harm chicks.
- ✓ Provide supplementary feed, especially for chicks. You can either buy specialized feed or make your own. Feed supplements are those with additional nutrients that boost their growth, health, and productivity (protein, vitamins, Energy supplement, green feed supplements, and limestones.
- ✓ Vaccinate your chickens.
- ✓ Young chicks (up to 8-weeks old) require proper care. Follow the guidelines as shown above to prevent deaths. Losing a chick is loss just like losing a mature hen or rooster.
- ✓ Select eggs for incubation (for large farming) carefully as instructed to avoid infertile eggs.
- ✓ Selling chickens in bulk can increase your income. Strive to get many chicks to have more chickens in the future.
- ✓ Consult a nearby livestock expert for further advice.



Scenario 1: Ribolius Raulian Daudi

Unite Scholar Ribolius Raulian Daudi and his family started chicken farming in 2013 with one cock and one hen, and they now have 50 hens. The chickens are allowed to find their own food in the environment which makes it a low-cost method of farming. The family benefits from the chicken farming in forms of eggs and meat which are important for their diet and help to prevent malnutrition.

Additionally, the chickens provide a source of income through selling. However, they face challenges such as difficulty of treating diseases because the animal medicines are not easily available in their village. Another challenge is the present of hawks, which hunt and eat the chickens, making it harder to increase their flock.











Questions

1. Can you list three things that Ribolius and his family can do to best protect their chickens, grow their flock, and increase their chickens' productivity?
2. What should be done to Ribolius family to increase the number of flocks
3. Do environmental factors pose a threat to chickens and their growth? If yes, in how?
4. Why the method used to feed chickens is considered to be the cheapest method?
5. How Ribolius family benefits from chicken farming?

Scenario 2:
Lucas Henry a Unite Scholar from Sumbawanga, Rukwa.

Lukas Henry, a university scholar from Sumbawanga-Rukwa decided to invest in poultry keeping project in 2023. He started with 50 chickens and worked hard to manage the project. By 2024, his project grew to 300 chickens. However, he faced several challenges, including food shortage for his hens, difficulty in providing medical treatments, and the frequent loss of chickens due to diseases. One of the most significant setbacks occurred on February 14, 2024, when 25 chickens died due to an outbreak avian flu.

Despite these difficulties, Lukas did not give up. He continued to work hard, and through his perseverance, he not only improved his life but also gained financial independence. The profit from the poultry business enabled him to save money for his family and cover personal expenses, which has reduced his dependency on his family.











Questions

1. What motivated Lukas to start the poultry keeping project?

2. How do you think Lukas grew his poultry project from 50 to 300 hens in a year?

3. What are the three lessons you learn from Lukas' project?

4. If you were to meet Lukas what are things would you like to ask him about his poultry project?

Scenario 3: Isaac Mwimanzi from Nankanga, Sumbawanga

Isaac Mwimanzi practices semi-intensive chicken farming. His poultry farm is enclosed with a high fence to prevent his chickens interacting with neighbor's chickens, which could lead to the spread of infections and diseases. His chicken house is roofed with local grasses, and it has large windows. Isaac feeds his grown-up chickens with local feed such as maize, sorghum, and green vegetables. He fees his chicks with commercial feed specific starter (mixture of food ingredients) to speed up their growth. Isaac vaccinates his chickens regularly again such common diseases as fowl pox, Newcastle and flu.

Isaac has attended a number of short poultry courses to learn the best way to keep his chickens healthy. He now uses strict biosecurity measures at his poultry farm, including farm hygiene (regular cleaning). He limits the number of visitors to his farm, and he use specific clothing and footwear when feeding the chickens. Isaac sticks to the complex vaccination schedule to prevent his chickens from getting fowl pox. He also makes his own chicken feed by mixing sunflower cake, maize bran, rice bran, salt, bone meal, limestone, and Dicalcium phosphate (DCT).

Now from his poultry farm, Isaac is successfully selling eggs and chickens. He also uses chicken manure in his vegetable garden to increase his crop yield.











Questions

1. How did attending poultry short courses help Isaac with his poultry farming?

2. How could Isaac further improve and grow his farm business?

3. What have you learned from this scenario?

4. Mention common diseases Isaac’s chickens faces

5. Why Isaac’s chicks experienced excessive mortality.



Right: The formal breed Isaac was keeping before he attended the course.
Below: The new chicken breed Isaac began keeping after attending the poultry short course.



Isaac Moses Mwimanzi feeding his chicken.

Scenario 4:
Veronica Moses, a Unite Scholar from Dar es salaam.

Veronica Moses, a passionate and determined student from Muhimbili University, began her poultry business while still in secondary school in 2021, driven by the need to support her family during financial hardship. With limited resources, she started small, caring for just 4 chickens and learning through trial and error. However, during Form Six, a major setback occurred when the family couldn't afford proper medication and vaccines due to ongoing financial struggles. This led to two of the chickens dying from preventable diseases, causing both financial and emotional distress. The situation was worsened by a lack of consistent record-keeping, making it difficult to monitor feeding, vaccinations, or early signs of illness. Additionally, starting with breeds unsuited to the local climate meant the chickens were vulnerable to temperature changes and disease, compounding the losses. Despite these obstacles, Veronica remained resilient. She realized the importance of planning, especially for health-related emergencies, and learned valuable lessons about the significance of climate-appropriate breeds, proper record-keeping, and financial preparedness. Although there were no savings or emergency plans in place, the experience taught her that even small-scale projects require structured management.









Rather than giving up, Veronica used the failures as learning opportunities, refined her approach, and pushed forward with greater awareness, preparation, and determination to grow her project into a more stable and successful venture.

Questions

1. What motivated Veronica to start a poultry business while still in secondary school?

2. What serious challenge did Veronica face during Form Six, and what were the effects?

3. How did the lack of record keeping affect the progress of the poultry project

4 Why was choosing the wrong chicken breed a setback in the project's success?

5. If you were to meet Veronica, what advice would you ask them about managing setbacks in poultry farming?









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