



MINISTRY OF  
FOREIGN AFFAIRS  
OF DENMARK  
*Danida*

# Chicken Value Chain Manual





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**Disclaimer**

This training guide is for advisory use only. Users of this manual should verify details that relate to their agro-climatic zones from their area agricultural extension officers. It is also advised that this training manual should be used in conjunction with the respective value chain handbook and other relevant resource materials.

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# Foreword

The Micro Enterprises Support Programme Trust (MESPT) is a local development organization founded in 2002 through a partnership between the Government of Kenya (GoK), the European Union (EU), and later, the Royal Danish Government. MESPT's main goal is to eradicate poverty by supporting the growth of micro-enterprises, including agricultural production, agribusiness, and afro-processing. This support aims to foster social, economic, and environmentally sustainable growth by increasing access to financial and business development services, creating jobs, and promoting sustainable micro-enterprises. Our vision is to build a more prosperous society, and our mission is to provide sustainable business development and financial services to smallholder farmers and agri-MSMEs in Kenya.

For over two decades, our team of professionals has been at the forefront of developing cost-effective and scalable solutions that promote financial inclusion and support the growth of sustainable agribusinesses. We accomplish this by providing tailored financial solutions that meet the specific needs of various agricultural value chains, delivered through a wholesale lending model to financial service providers such as SACCOs, MFIs, and Farmer Cooperatives. These providers, in turn, extend loans to smallholder farmers and micro agricultural enterprises.

Our approach emphasizes delivering integrated financial and business development services to smallholder farmers and MSMEs in Kenya, helping them access finance, boost agricultural productivity, improve afro-processing and connect to markets. Over the years, we have worked closely with county governments, development agencies, donors, and investors to strengthen business development capacities in the agricultural sector, using a unique tripartite model that connects farmers, SMEs, and financial institutions.

Chicken is among key value chains that have been supported by MESPT over the years through various interventions in order to enhance commercialization. MESPT appreciates the importance of documenting best practices for the value chain in facilitating effective delivery of training for farmers and Agri-preneurs. Therefore, MESPT has facilitated the development of this manual alongside the value chain trainers' guide and other resource materials through Green Employment in Agriculture Programme (GEAP) with support from DANIDA.

This guide is expected to enhance effectiveness in delivery of trainings on Good Agricultural Practices and commercialization of the value chain. I am optimistic that this manual will be helpful to partners in the value chain including county governments. I am grateful to DANIDA for the continued support to MESPT programmes. I am also thankful to the value chain experts who spearheaded compilation of this manual.

**Rebecca Amukhoye,**

**Chief Executive Officer, Micro-Enterprises Support Programme Trust**

# Preface

The Green Employment in Agriculture Programme is a 5 years' programme (2021 to 2025) funded by DANIDA and implemented by Micro-Enterprises Support Programme Trust (MESPT). GEAP seeks to contribute directly to Kenya's vision 2030 and to one of Denmark-Kenya Strategic Framework on accelerated decent employment creation in MSMEs and improved competitiveness of targeted value chains in agriculture which will contribute to transforming the economy towards a greener and more inclusive growth.

GEAP programme targets 40,000 smallholder farmers and will be implemented in 12 counties namely, Kilifi, Kwale, Nakuru, Nyandarua, Siaya, Kisii, Kakamega, Bungoma, Trans Nzoia, Uasin Gishu, Makueni and Machakos. The programme facilitates increased commercialization, decent employment, and green transformation through targeted interventions in selected agriculture value chains that include, Cassava, Coconut, Dairy, Export Vegetables, Pineapple, Indigenous Poultry, Moringa, Pineapple, and Aquaculture.

MESPT through GEAP tasked multidisciplinary teams to develop resource materials tailored for extension service providers and farmers. This Avocado value chain manual is one of the series of the materials that were developed. MESPT further tasked value chain experts to develop a value chain trainers' guide for avocado. This manual is to be used as a reference material for training on implementation of good agricultural practices, value addition and marketing for the value chain. Relevance of the content is based on needs identified among value chain players, actors and aligned to GEAP project objectives.

MESPT is grateful to the value chain experts who spearheaded the development and production of this manual. It is my hope that counties and other users will adopt and optimally use this resource so as to increase productivity and profitability while ensuring a greener and more inclusive growth.

**Doreen Kinoti**

**Programme Manager, Green Employment in Agriculture Programme**

# Acknowledgements

The Green Employment in Agriculture Programme (GEAP) participating counties (Kilifi, Kwale, Nakuru, Nyandarua, Siaya, Kisii, Kakamega, Bungoma, Trans Nzoia, Uasin Gishu, Makueni and Machakos) are acknowledged for providing resource persons in compilation of the document. The technical support and expertise provided by Kenya Agricultural and Livestock Research Organisation in development of the document is appreciated. Thanks to the Royal Danish Government's Danish International Development Agency (DANIDA) for facilitating the development of this re-source material. Micro Enterprises Support Programme Trust (MESPT) is appreciated for co-ordinating the process of development and production of this document.

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# List of abbreviations

<b>BSF</b>	Black Soldier Fly
<b>CCP</b>	Critical Control Point
<b>FCR</b>	Feed Conversion Ratio
<b>GAP</b>	Good Agricultural Practices
<b>GEAP</b>	Green Employment In Agriculture Programme
<b>GHO</b>	Good Hygienic Practices
<b>GMP</b>	Good Manufacturing Practices
<b>HACCP</b>	Hazard Analysis And Critical Control Point
<b>IIC</b>	Improved Indigenous Chicken
<b>KALRO</b>	Kenya Agriculture And Livestock Research Organization
<b>MESPT</b>	Micro-Enterprise Support Programme Trust
<b>Q&amp;A</b>	Question And Answer
<b>SDL</b>	State Department Of Livestock Production
<b>TOT</b>	Trainer Of Trainers

# Definition of terms

## Feed Conversion Ratio

Is a measure of an animals efficiency in converting feed into body mass. The ratio of the amount of feed given to an animal relative to the amount of meat and eggs produced

## GOOD AGRICULTURAL PRACTICES

It refers to a set of principles , regulations and technical recommendations that are applied to farming and agricultural processes to ensure safe , sustainable and high quality production of food and non food agricultural products.

## GOOD HYGIENIC PRACTICES

These are the fundamental procedures and guidelines that ensure cleanliness safety and sanitation in food production, handling and processing environments.

## GOOD MANUFACTURING PRACTICES

It is a system of guidelines and regulations to ensure that products are consistently produced and controlled according to quality standards.

## HAZARD ANALYSIS AND CRITICAL CONTROL POINT

It is a systematic preventive approach to food safety that identifies evaluates and control hazards in food production processes.

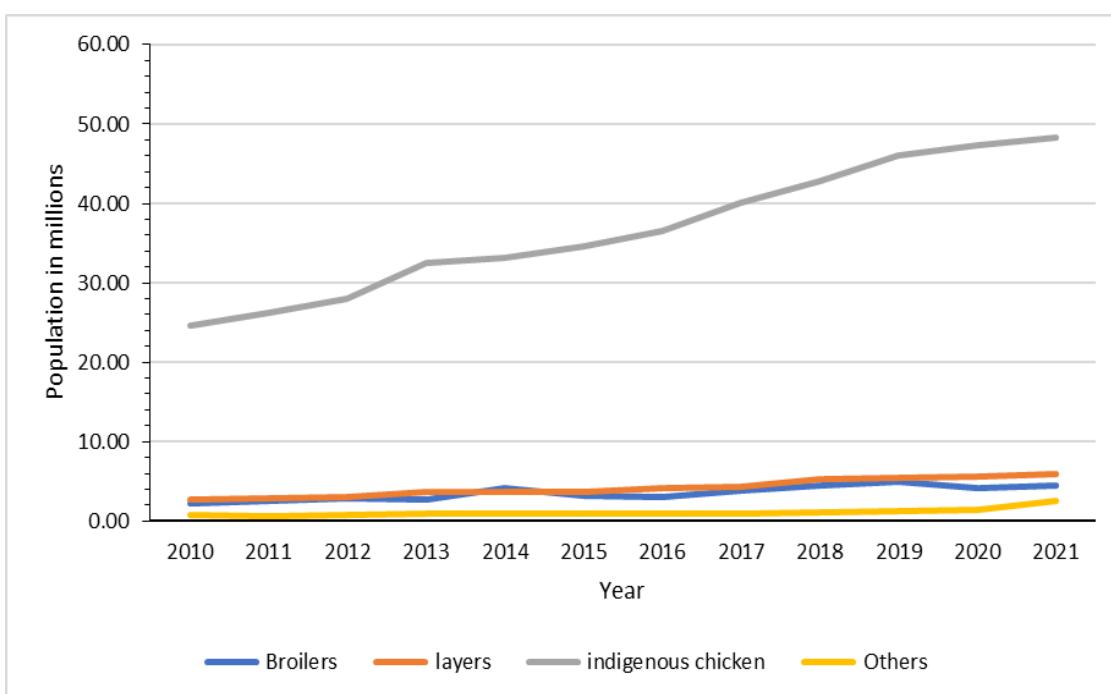
## IMPROVED INDIGENOUS CHICKEN

Is a type of chicken that originates from traditional indigenous breeds but has been selectively breed for better productivity and resilience.

# Chapter I: Introduction

## 1.1 Background

Kenya boasts of a dynamic poultry industry that plays a pivotal role in the nation's economy and food security, contributing 4% to the agricultural sector's GDP. The primary poultry species raised in various agricultural settings is the chicken (*Gallus gallus domesticus*), revered for its versatility, adaptability, and significant contributions to food production. Small-scale farmers involved in backyard or modest commercial operations characterize chicken farming in Kenya. The industry features three primary types of chickens: broilers, layers, and indigenous chicken comprising a total population of 61,353,678 birds. Figure 1 shows that the indigenous chicken population comprises 48.3 million birds (79%), with an average flock size of less than 30 birds per household. Broilers constitute 7%, with a population of 4,484,199 birds, layers account for 10%, with 5,984,449 birds, and other birds make up 4%, totaling 2,617,643 birds (SDL, 2021).



**Figure 1** Chicken population trends in Kenya. Source: SDL, 2023

The chicken population has exhibited a mixed growth response, experiencing notable increases from 2015 to 2019 across all major types. However, the broiler population notably decreased by 14% in 2020 due to reduced demand for broiler meat amid COVID-19 containment measures, leading to the closure of eateries compared to the previous year in 2019 (Figure 3). Despite lack of measurable indicators, indigenous chicken is recognized as an important economic tool for poverty alleviation and household food and nutrition security at national and local levels by County governments.

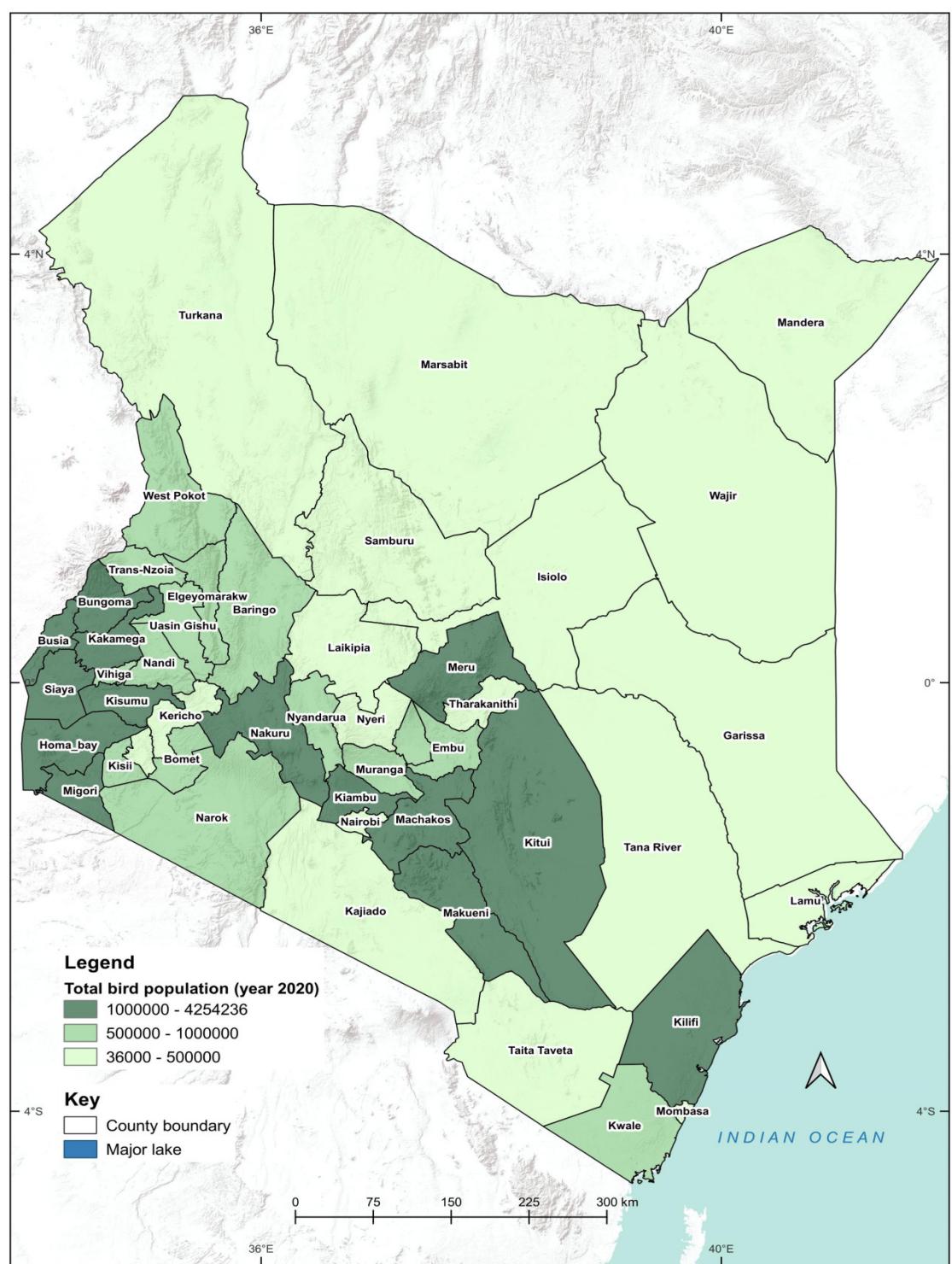
The chicken value chain stands out as one of the most rapidly expanding enterprises in Kenya, aligning with the national blue print of the government (BETA) with potential to address high cost of living, generating revenue, increasing foreign exchange earnings, creating jobs and with inclusive growth. The BETA is aligned with Vision 2030, Medium Term Plan (MTP) IV and Agriculture Sector

Transformation and Growth Strategy (ASTGS) that focuses on transforming the livestock sub sector (including chicken) to a modern commercially oriented sector through increased productivity and value addition.

With more than 80% of Kenyan households engaging in chicken farming, the sector plays a pivotal role in shaping the nation's agricultural landscape. The acceleration of urbanization, evolving lifestyles, population growth, and improved incomes collectively fuel the increasing demand for both chicken meat and eggs. This surge in demand underscores the strategic importance of the chicken value chain, not only in economic terms but also in addressing the evolving dietary preferences and nutritional needs of the Kenyan populace.

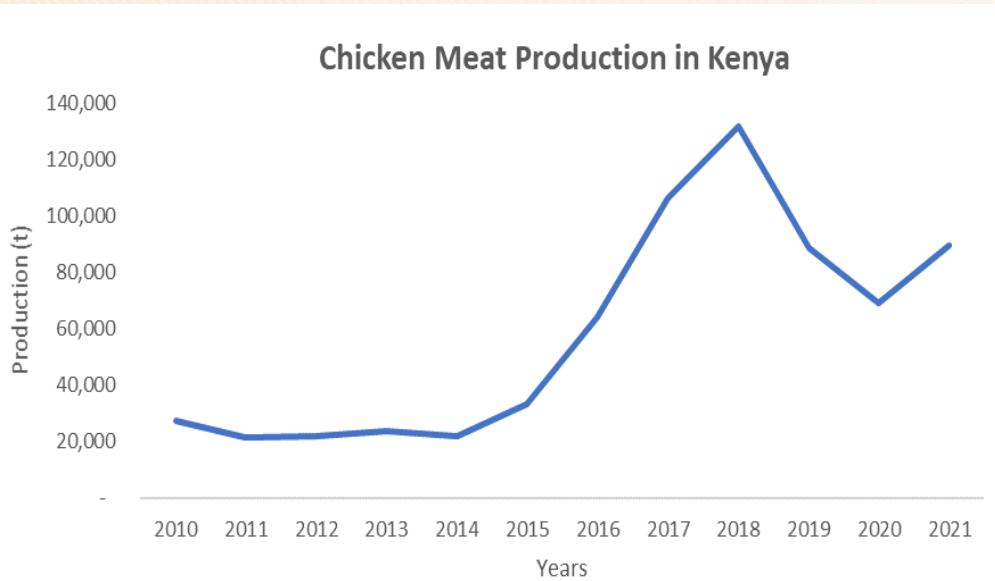
Chicken production in Kenya is distributed across various regions, reflecting the diverse agro-ecological conditions and farming practices prevalent in the country. Small-scale poultry farming is widespread, with rural and peri-urban areas hosting numerous households engaged in backyard chicken rearing. Additionally, commercial chicken farms are strategically established in different counties, especially those with favorable climatic conditions and proximity to urban centers. Key poultry-producing regions include the Rift Valley, Central, Eastern, and Western Kenya. These areas not only accommodate large-scale commercial farms but also feature a multitude of small-scale farmers contributing significantly to the overall chicken production landscape. The decentralized nature of chicken farming in Kenya underscores its adaptability to different geographic and economic contexts, playing a crucial role in meeting both local and national demands for chicken meat and eggs. Figure 4 shows the regions in Kenya where chicken production is undertaken.

Contribution of indigenous chicken meat is 30% of the total chicken meat production in Kenya. The dressed weight of indigenous chicken is 1.5 kg while that of broiler is 1.3kg at maturity. Indigenous chicken meat production is estimated at 89,288 MTs (61%) valued at 44.6 billion. Broilers produce approximately 76,570 MT valued at KES 26.4 Billion (KPBA 2023). Culled hybrid layers produce about 17,953 MTs.<sup>1</sup>.



**Figure 2** Kenyan chicken populations. Source: SDL, 2023

The contribution of indigenous chicken egg production is 40% of the total egg production in Kenya. The egg production for layers is 280 per laying cycle of one (1) year, while the indigenous hens lay 15 eggs per clutch and have 2-3 clutches per year. The chicken egg production is estimated at 240,854,186 trays, valued at KES 91 billion (SDL, 2021). Chicken meat production in Kenya fell to roughly 69,200 MTs in 2020, down from 88,700 metric tons in the preceding year. Previously, chicken meat production in the country had increased overall (Figure 5). In 2018, it reached nearly 131,700 metric tons before decreasing in the following years.



**Figure 3** Chicken meat production trends in Kenya. Source: SDL, 2023

Chicken meat consumption per capita in Kenya is 1.7kgs (FAOSTAT 2021). This is a 37.2% decrease from the previous year. Historically, poultry meat consumption per capita in Kenya peaked at 2.58 kg in 2018. The World Health Organization recommends a minimum per capita consumption of 12 kg. The current per capita egg consumption is 32. The per capita egg consumption in Kenya rose 8.92% to 1.71 kg in Kenya in 2020 (FAOSTAT, 2020).

## 1.2 CHICKEN PRODUCTS EXPORTS AND IMPORTS

Kenya has been exporting chicken and chicken products to neighboring countries and in the Middle East. These include day-old chicks, eggs and meat. In 2021, Kenya exported \$243,000 in poultry meat in various destinations including Rwanda (\$133,000), Somalia (\$27,000), Democratic Republic of the Congo (\$23,200), Uganda (\$17,900), and South Sudan (\$17,500). The fastest growing export markets for poultry meat of Kenya between 2020 and 2021 were DRC (\$22,800), Uganda (\$12,000), and Somalia (\$9,820). In the same year, Kenya also imported \$3.48M in poultry meat, from: Uganda (\$1.78M), United Arab Emirates (\$1.05M), Brazil (\$400,000), Turkey (\$78,200), and United States (\$72,400). The fastest growing import markets in poultry meat for Kenya between 2020 and 2021 were United Arab Emirates (\$949,000), Uganda (\$633,000), and Turkey (\$78,200).

Kenya also import poultry products from countries such as Uganda (\$5.02M), Brazil (\$2.63M), United Arab Emirates (\$2M), Turkey (\$832,000) and Germany (\$36,900). The fastest growing import markets for in poultry meat for Kenya include Uganda (\$3.4M), Brazil (\$2.23) and United Arab Emirates (\$941,000) (OEC World 2022).

# Chapter 2: Improved indigenous chicken production systems

Indigenous chicken farming can be practiced using different production systems. These will be determined by the overall objective of keeping indigenous chicken for commercial or subsistence purposes and, more importantly, the level of resources at the farmer's disposal.

## 2.1 Characteristics of Each Production System

### 2.1.1 Extensive Rural Production

- Feeding mode Birds housed at night and forage during the day
- Involves not only chickens but mixed livestock species. IC's are kept
- Housing is Rare for the IC's and if done, local materials are used for construction
- Flock size ranges from 1-50 birds
- There is minimal Vet services, with traditional treatment remedies being offered
- Birds feed on scavenging resources
- Supplementation is done occasionally
- Time devoted to the birds is minimal
- High mortality is experienced within the flocks
- Hens have long broody periods, and there is no controlled breeding.
- There is no access to urban market

### 2.1.2 Intensive- Birds Are Confined 24hrs

- Chickens are kept in total confinement, in good quality houses built using conventional materials, requiring a high capital input
- Chickens are offered commercial balanced rations leading to a reliable energy supply
- Flock size >200
- There is frequent use of private veterinary service providers, for vaccinations and treatment.
- Exotic breeds are kept, in this system for commercial purpose of their products.
- Time devoted to the flock, by the farmer exceeds an hour.
- Exotic breeds are kept, in this system for commercial purpose of their products.
- Time devoted to the flock, by the farmer exceeds an hour.

### 2.1.3 Semi Intensive- Birds Confined But Have A Run

- Birds have access to reliable energy supply
- Feeds include: scavenging resources and supplementation with commercial rations
- Breeds kept are Improved indigenous chickens
- Poultry houses are of valuable qualities, built using conventional materials
- Breeding is controlled in this system, and the hens have Short broody periods.
- There is an access to urban markets
- There is frequently use of private veterinary service providers with moderate mortality of the birds being experienced.
- Flock size range from 50-200 birds

**Table I:** Summary of the different production systems

Criteria	A:Traditional free range	B: Improved semi-free range	C: Small scale confined
Flock size	1-10 birds	5-50 birds or above	More than 100
Inputs	Low	Medium	High
Ownership	Mostly owned by women	Owned by women and family	Businessmen and women
Purpose	For home consumption	Home consumption/ income generation	Income generation
Social Role	Social & cultural importance	Social importance	No social importance
Genotypes	Indigenous	Indigenous/improved	Improved
Mortality	High mortality	Moderate mortality	Low mortality
Feed Source	Scavenging	Scavenging+ Supplementation	Commercial feeds
Disease control	No vaccination	NCD vaccination and occasionally Fowl pox	Various vaccination schemes
Housing	Shared with other household members at night	Simple housing made of local material with a run	Housing made of conventional material
Annual egg production	30-50	50-180	250-300
Broodiness	Long	Short	No
Growth rate	Low	Moderate	High
Market orientation	Minimal	Moderate (Based on need)	High (Must have readily available market)
Labour	Minimal	Average	Intensive

## 2.1.4 Breeds of Improved Indigenous Chicken

In Kenya, there are different breeds of Improved Indigenous Chicken

<b>KARI Improved</b> <ul style="list-style-type: none"><li>Developed by the Kenya Agricultural and Livestock Research Organisation (KALRO).</li><li>Grow fast, growing to a weight of 1.5 kg in 5 months.</li><li>Lay around 200-270 eggs per year.</li></ul>	
<b>The Kuroiler Bird</b> <ul style="list-style-type: none"><li>Easily convert the kitchen and farm waste into meat and eggs.</li><li>They are a fast-growing breed.</li><li>They lay around 150 eggs per year.</li></ul>	
<b>Rainbow Rooster</b> <ul style="list-style-type: none"><li>Fast growing multi-coloured bird.</li><li>Bred at Indbro Research &amp; Breeding Farms in India.</li><li>They have to be fed commercial layer feeds to lay 160-180 eggs/year.</li></ul>	
<b>Kenbro Chicken</b> <ul style="list-style-type: none"><li>They have red feathers.</li><li>They grow fast.</li><li>If kept for meat, they can grow to a weight of 1.5 kg in 3 months (12 weeks).</li><li>If kept for eggs, they will start laying in 22-24 weeks.</li><li>They lay around 200 eggs per year.</li></ul>	
<b>Sasso</b> <ul style="list-style-type: none"><li>Multi-coloured birds.</li><li>They grow slowly.</li><li>Lay around 150-200 eggs with good management.</li><li>Mostly raised for meat and is left free to eat grass, worms, and insects with little supplementation.</li></ul>	

Source: The Handbook on Improved Kienyeji Chicken( GIZ 2023)

### Suitability of different breeds for the various production Systems

When evaluating the suitability of different breeds for various production systems, it's essential to

consider the breeds characteristics, environmental adaptability, and production goals.

**a. Free range system:**

The breeds must be hardy and capable of foraging, making them ideal for systems where birds have access to outdoor and natural vegetation as diet. They adapt well to different climates and can be raised with minimal interventions.

**b. Semi-intensive system:**

Breeds are chosen for their unique appearance, docile temperament, and ability to thrive in small diverse flocks with low maintenance.

**c. Intensive system**

These birds are optimized for rapid growth and high feed efficiency, making them ideal for commercial production. They perform best with controlled environments with regulated feeding and lighting schedules.

When identifying the key strengths and weaknesses of different breeds you need to consider the following factors:

- Climate will influence the suitability based on the local environment. Some breeds are more tolerant of heat or cold places.
- Resistance to diseases
- Feed availability
- Market demand by understanding consumer preferences.

### 2.1.5 Deep Liter System

ADVANTAGES	DISADVANTAGES
<ul style="list-style-type: none"><li>• Good management of the flock</li><li>• Increased production</li><li>• Reduced labor cost</li><li>• Relatively hygienic</li></ul>	<ul style="list-style-type: none"><li>• High initial costs</li><li>• Must provide all the feeds</li><li>• High risks of diseases e.g coccidiosis and worms</li><li>• Birds develop bad habits like pecking</li></ul>

### 2.1.6 Exetensive System

ADVANTAGES	DISADVANTAGES
<ul style="list-style-type: none"><li>• It's cheap</li><li>• Birds exercise</li><li>• Birds have to green vegetation for vitamins and minerals</li></ul>	<ul style="list-style-type: none"><li>• Birds are exposed to climate elements, diseases, thieves, and predators</li><li>• Eggs laid out can be soiled</li><li>• The lay few eggs due to insufficient nutrient intake</li></ul>

# Chapter 3: Breeding and Selection

## 3.1 Introduction

It is important to plan ways to increase the flock size, especially in a commercial production system. Knowledge of different breeds of chicken, their merits, demerits, and their use in cross-breeding is also required. Farmers must be equipped with knowledge and skills on breeding and selection and the best approach to use. Breeding and selection are also crucial to maintaining a vibrant, high-performance flock that provides a good pool of birds to select from while avoiding inbreeding.

Selection involves separating the well-performing growers and productive hens and the well-sized, active cocks, from the flock. A set of criteria illustrating the features to assess is used to distinguish the best performers from the rest of the birds for the hens, cocks, and growers. Selection is further facilitated by the presence of performance records kept on the farm.

## 3.2 Process and approach to the breeding and selection of indigenous chickens

I. The desirable meat and egg production traits in improved indigenous chicken

- High growth rate,
- High feed efficiency,
- High muscle mass,
- High Egg production,
- Broad vent size,
- Mothering ability,
- Broody behavior

2. Selection of males and females based on the following traits of economic importance.

- Feed efficiency/Feed Conversion Ratio (FCR) to meat or eggs
- Early growth rate especially for laying birds is required to reach laying age quickly.
- Production efficiency, e.g. egg laying rate,
- Reproductive ability,
- Mothering ability,
- Adaptability to environment, etc.
- Meat quality in terms of breast size, meat tenderness and carcass yield.
- Disease resistance.

3. Features to use in the selection of cocks, growers and hens identified as follows

a. Laying birds should

- appear healthy and lively,
- feathering normal for the breed,
- A red comb (more coloured when inlay),

- eyes clear and shiny, clean, dry beaks and nostrils,  
clean feathers around the vent, straight legs and toes, with no signs of scaly legs,
- Legs less coloured inlay,
- The breast bone should not be too sharp, but with big, broad bottom.

b. Cocks should be:

- Alert and protective nature,
- shiny and normal feathering for the breed, clear and shiny eyes,
- Clean, dry beaks and nostrils,
- Clean feathers around the vent,
- Straight legs and toes with no signs of scaly legs,
- Large size relative to the hens.

### **3.3 Principles Of Negative Selection In Poultry**

Is a breeding practice that involves identifying and removing birds with undesirable traits from the flock. This approach helps in maintaining or improving the overall quality of the flock by preventing propagation of undesirable characteristics. Here are some of the key principles of negative selection in poultry:

- Identify undesirable traits e.g poor growth rate, low egg production and deformities
- Systematic evaluation of undesirable traits to be removed
- Early selection especially at chick stage when the bad traits are noticed
- Consistent culling but always is good to maintain flock diversity.
- Record keeping that is effective to track the selection process
- Balanced selection to make sure that the overall genetic quality and flock performance is improved

### **3.4 Measuring Traits Of Importance In Poultry**

Measuring traits of importance in poultry is essential for effective selection and breeding practices. Here is how you can measure some of the key traits

1. Growth rate is measured regularly weighing of body weight periodically in grams or kgs.
2. FCR is calculated as a ratio of feed intake to weight gain or to egg mass produced for layers.
3. Egg production of a set period of time
4. Egg quality by assessing the shell strength internally; yolk color
5. Age at sexual maturity in days measured from hatch to the first egg laid by the hen.
6. Disease resistance

#### **4.1.4 How to use trait values in production that farmers should look for in Layers and**

## **cocks**

### **a. Laying birds:**

should appear healthy and lively, feathering normal for the breed,

A red comb (more coloured when in lay), eyes clear and shiny, clean, dry beaks and nostrils, clean feathers around the vent, straight legs and toes, with no signs of scaly legs,

Legs less coloured in lay,

The breast bone should not be too sharp, A big broad bottom.

### **b. Cocks should be:**

- Alert and protective nature, shiny and normal feathering for the breed, clear and shiny eyes,
- Clean, dry beaks and nostrils,
- Clean feathers around the vent,
- Straight legs and toes with no signs of scaly legs,
- Large size relative to the hens.
- The ratio of male to female birds during stocking depends on the flock , whwther it is for breeding , or meat production:
- Breeding flock the male to female ratio is 1:10 that will ensure adequate fertilization by minimizing competition and stress among the roosters.
- Dual purpose flock the ratio is up to 1:15

# Chapter 4: Incubation And Brooding Management

## 4.0 Introduction

This topic seeks to impart knowledge and skills to value chain actors on requirements for egg incubation and hatching, types of incubation, handling of eggs for hatching, selection of quality eggs and production of quality day old chicks. The main Objective is to commercially produce improved indigenous chicken through support of input suppliers targeting farmer groups.

This process involves maintaining the eggs under controlled conditions to ensure successful development of the embryo and the eventual hatching of a healthy chick.

The topic will also take the value chain actors through the requirements for chick brooding management. This involves the preparation of a chick brooder, acquiring day-old chicks, feeding brooding chicks, managing brooder house micro-climate, maintaining brooder hygiene, performing chick vaccination, controlling chicken vermin, controlling chicken predators and monitoring chick performance.

## 4.1 Steps In The Incubation And Hatching Process

### 4.1.1. Selection of eggs for incubation

Choose clean, free from cracks , and of normal size and shape by avoiding small or large eggs

Choose fertilized eggs laid in the past 7 days for setting

Egg storage at a temperature of 13oc to 18oc with a relative humidity of 75%. Turn eggs several times a day.

### 4.1.2 Incubation conditions

An incubator is a machine designed to provide conducive condition for embryonic growth.

Low efficient incubators always give low output hence discourages poultry multipliers.

High efficient incubators fitted with oxygen shower and inbuilt – backup enables the machines to hatch 99% hence encourages poultry production.

### 4.1.3 Types of Incubation

#### A Natural incubation

#### B. Artificial (single stage and multistage) incubation.

- Parameters that affect incubation
- Temperature 37.5 to 37.5 oC
- Humidity 50 to 55%
- Ventilation should be good to remove carbon dioxide and provide oxygen
- Egg position
- Turning 3 to 5 times a day

### 4.1.4 Hatching Eggs

- Select eggs from a mature healthy flock
- A flock which is not directly related
- Avoid excessively large or small eggs

- Avoid cracked eggs or those with thin shells
- Avoid misshapen eggs

#### 4.1.5 Egg Management

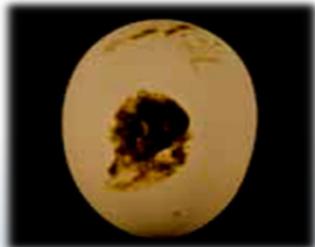
Optimum hatchability and chick quality can only be achieved when the egg is held under optimum conditions between laying and setting in the incubator. Remember that a fertile egg contains many living cells. Once the egg is laid, its hatching potential can at best be maintained, not improved. If mishandled, hatching potential quickly deteriorates. Use of floor eggs depresses hatchability which should be collected and packed separately from nest eggs, and clearly identified.

- Prevent hair-line cracks by handling eggs carefully at all times.
- Place hatching eggs carefully into the setter tray or transport tray, small (pointed) end downward.
- Take care with egg grading. During the early production period check the weight of borderline sized eggs to select hatching eggs.
- Store the eggs in a separate room in which the temperature and humidity are controlled or at best maintained
- Keeps the egg handling room clean and tidy.
- Maintain good vermin control in your egg room.
- Refuse to accept dirty egg containers from the hatchery and other places
- Remove and discard eggs unsuitable for hatching.

Shown below are Dirty, Cracked, Small (According to Hatchery Policy), Very large or double yolk, Poor shells -but any shell color should be acceptable for hatching, Grossly misshapen eggs.



BLOODSTAINED



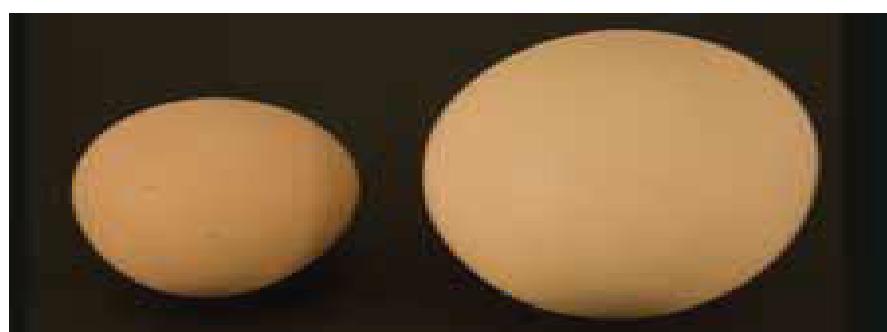
DIRTY EGG



ROUND EGG



TOE PUNCTUREDEGG



#### 4.1.6 Egg Storage Conditions

A relationship exists between the length of time eggs are stored and the optimum temperature and humidity for best hatchability. The longer eggs are to be stored, the lower the storage temperature and vice versa.

#### 4.1.7 Main Effects Of Storing Eggs

Storage prolongs incubation time. On average, one day's storage adds one hour to incubation time. Hatchability is depressed by prolonged storage. The effect increases with storage time after the initial six-day storage period, losses of 0.5 to 1.5% per day in hatchability. Chick quality will be affected and hence chick weights can be depressed from eggs that have been stored for 14 days or more.

#### 4.1.8 Do Not Abuse The Incubators

Energy consumption, labor usage, durability, maintenance and capital costs influence the design of incubators. The optimum physical conditions for any embryo to grow successfully are:

- Correct temperature
- Correct humidity
- Adequate gas exchange
- Regular turning of eggs

#### 4.1.9 Incubation Time Of Eggs

Incubation temperature is normally fixed for any hatchery, but to achieve a desired pull time for chicks, variation in the time at which eggs are set can be modified according to; Age of eggs; stored

eggs take longer to incubate. You will need to add extra incubation time if eggs are stored over 7 days. (1 hour per day of storage), Size of eggs: larger eggs take longer to incubate.

#### **4.1.10 Egg Turning**

Eggs must be turned during incubation. This prevents the embryo from sticking to shell membranes, particularly during the first week of incubation, and aids development of the embryonic membranes.

As embryos develop and their heat production increases, regular turning will aid airflow and assist cooling.

#### **4.1.11 Eggs Transfer**

Eggs are removed from the setter after 18 or 19 days and transferred to the hatcher trays.

This is done for two reasons;

The eggs are laid on their sides to allow free movement of the chick out of the shell at hatching.

It also assists hygiene; large quantities of fluff are generated during hatching and could spread this potential contamination around the hatchery.

#### **4.1.12 Chick Size**

Egg size is the main factor affecting chick size.

Chick weight is normally 66-68% of egg weight.

Chicks from eggs averaging 60 grams will on average weigh around 40 grams.

Individual chick weights are likely to range from 34 to 46 grams.

### **4.2. Brooding and Chick Management**

#### **4.2.1 Why Brood?**

A newly hatched chick has not developed the mechanism to regulate its body temperature. Therefore, it cannot maintain its body temperature properly for the first few weeks which can easily be subjected to chilling hence artificial brooding is mainly aimed at providing the right temperature for the chick. Brooding helps to provide extra heat, from external sources to newly hatched chicks as they will not take sufficient feeds and water to keep warm. This leads to the retardation of growth and poor development of internal organs, responsible for digestion thus the chick will not be able to digest the yolk completely.

Egg yolk is highly nutritious feed for chicks and when the yolk is not absorbed completely by the chick, results in growth and multiplication of bacteria on the yolk leading to Early Chick Mortality (ECM) and growth retardation. This condition is termed as OMPHALITIS (yolk infection)

#### **4.2.2 Brooding Fundamentals**

- Pre-Placement Preparation
- Feed Management
- Light Management
- Water Management

Temperature Management- The ideal brooding temperature are as measured at the edge of the hover and 5 cm above the litter surface

Air Quality and Ventilation

#### **4.2.3 Placement Of Chicks -Preparations**

Brooding house/shed MUST be cleaned, preferably using a sprayer.

The floor should be soaked preferable with a strong disinfectant or 10% Caustic soda (sodium hydroxide) overnight to clear the viruses. (Jik).

Curtains used should be soaked in disinfectant and hanged in the sun to dry

Feeders and drinkers should be washed and disinfected then sun-dried for two days.

The house maybe white washed with a solution of lime

Arrange all equipment in the house and spread the litter, prepare the brooder ring and fix the curtains on the open sides to insulate the brooder house

Fumigate the brooder with potassium permanganate and formalin. CAUTION- this gas is highly corrosive

Use a good quality terminal disinfectant such as OMNICIDE (@7ml/L) for the final spraying before the chicks are placed.

Provide foot baths at the entrance with lime powder or any other disinfectant e.g. Kerol, TH4, LYSOL

#### **4.2.5 Preparation of a Chick Guard**

Use 18 inch cardboard sheet, Aluminum sheet, coffee wire as brooder guard material to make a circle that uses 20 feet in diameter of the brooder guard for 50 chicks;

25 feet for 100 chicks;

30 feet for 150 chicks;

35 feet for 200 chicks

The brooder should be ready prior to fumigation.

Fill the ring with litter material such as wood shaving, straw etc. upto 4 inches thick from the floor

Spread newspapers on the floor to cover the litter



Place the heat source at the Centre of the brooder ring



Source: KALRO

#### **4.3.0 Feed Management**

The use of supplemental feeder trays at placement is recommended to help chicks get off to the best start possible

Trays should be provided at the rate of 1 per 100 chicks and should be placed between the main feed and drinker lines and adjacent to the brooders.

Supplemental feeders should be provided for the first 7-10 days.

#### **4.3.1 Chick Check**

The crops of chicks should be checked the morning after placement to ensure they have found feed and water. At this time, a minimum of 95%

of the crops should feel soft and pliable indicating chicks have successfully located feed and water.

Hard crops indicate chicks have not found adequate water and water availability should be checked immediately.

Swollen and distended crops indicate chicks have located water but insufficient feed and in this case the availability and consistency of the feed should be immediately evaluated

#### **4.3.2 Feeder Management**

The feed trough or pan height should be adjusted so that they rest on the litter for the first 14 days to ensure all birds can easily access feed without having to climb into the feeder

Thereafter, feeders should be raised incrementally throughout the growing period so that the lip of the trough or pan is level with the birds back at all times

#### **4.3.3 Light Management**

Continuous lighting should be provided for the first 48-72 hours post placement.

Provide an intensity of 20-60 lux (~2.0-6.0 ft. candles) for the first 7 days to help chicks find feed and water more easily.

is highly recommended that all rearing houses be light tight with all flocks grown under blackout conditions or use natural light

#### **4.3.4 Brooding Temperature**

The ideal brooding temperature is as measured at the edge of the hover and 5 cm above the litter surface

Evening is the best time to observe the chicks and make temperature adjustment

Thermometers may not always be available.

Therefore, use the behavior of chicks as a guide

Adequate floor, feeder and drinking spaces are also important

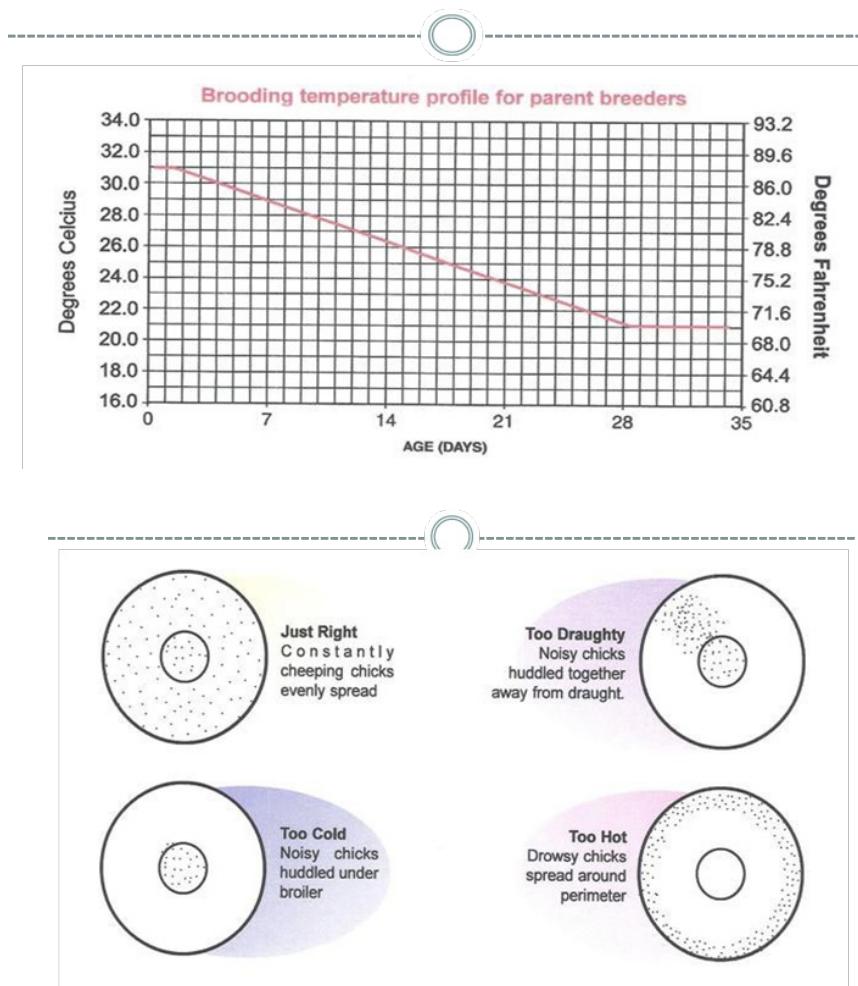
Relative humidity, light and ventilation should be provided for optimum comfort of the chicks

Free moving spaces should be provided all around the feeders and drinkers, so that the chicks can feed and drink freely



#### 4.3.4 Brooding temperature

- The ideal brooding temperature is as measured at the edge of the hover and 5 cm above the litter surface
- Evening is the best time to observe the chicks and make temperature adjustment
- Thermometers may not always be available.
- Therefore, use the behavior of chicks as a guide
- Adequate floor, feeder and drinking spaces are also important
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- Free moving spaces should be provided all around the feeders and drinkers, so that the chicks can feed and drink freely



**Figure 4:** Brooding temperature profile. Source: KALRO

## Sources of Heating

- Domestic heaters (jiko) 1 for 100 chicks
- Infrared lamps (250 watts) 1 for 250 chicks
- Pancake heater 1 for 1000 chicks

## 4.4 Chick Mortality

It's important to understand the reasons for early chick mortality as these can be prevented.

These may include;

- Poor brooding conditions- high and low brooding temperature
- Feed poisoning - fungal, toxins, litter poisoning (ingestion of sawdust)
- Injuries- rough handling and pro-longed transportation stress
- Starvation
- Humidity
- Nutrition deficiency
- Genetic disorder
- Predators

## 4.5 Fumigation Method

Fumigation is done with 40 gm potassium permanganate and 80 ml of Formalin for 100 cc ft area

- Keep the shed closed for at least 12 hours after fumigation
- Spray the shed with 5% Formalin before fumigation for better results
- Note-effective only in airtight houses

**FUMIGATION SHOULD ALWAYS BE DONE UNDER THE STRICT SUPERVISION**

## 4.6 Introduction Of Chicks

- Light the brooder heat source an hour prior to chick arrival so that the ring temperature is 32o C
- Count the chicks proper while receiving
- Release the chicks into the brooder ring after dipping their beaks in water
- Wait for some time to allow the chicks to drink water and keep feed in a chick feeding tray or clean egg tray. Do not sprinkle feed on the newspaper as this will get contaminated.
- For the first 3 days watch the chicks at 2-3 hours interval whether they have taken feed and water

- Remove and replace the top newspapers daily and remove any wet litter immediately

#### **4.6.1 Hay box brooder**

A hay box is easy to make and is basically a wooden trunk with a top that can be opened or closed. The box is insulated from inside (along the sides) by hay, demarcated by chick mesh wire creating a central warm area where the chicks will sleep this is only an overnight box and chicks are taken out during the day. Feed and water are kept out. Provide shelter and make sure the chicks are not exposed to bad weather during the day

# Chapter 5: Improved Indigenous Chicken Housing And Feeding Management

## 5.0 Introduction

This manual will guide the trainees through the competencies required to construct and equip chicken houses. This involves designing chicken structures, determining the properties of a good chicken structure, acquiring construction materials, and general management of chicken house construction and stocking density.

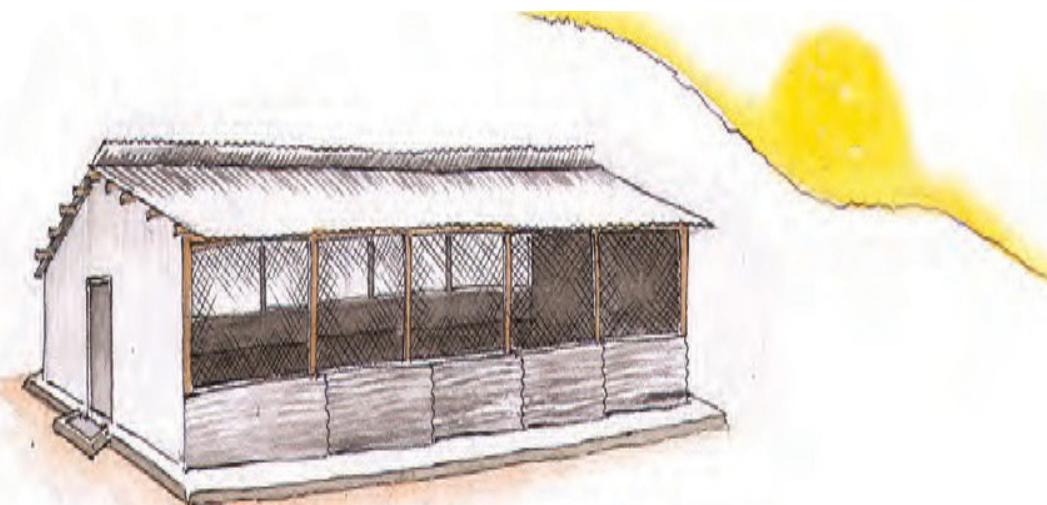
Successful poultry production requires proper planning which involves constructing suitable infrastructure and having enough land for expansion. It also enables you to avoid bio-security threats. Planning starts with selecting an appropriate site, followed by designing a farm lay out plan; constructing poultry houses and infrastructure; installing bio-security measures and procuring the right production equipment.

This topic will also help the value chain actors understand different levels of nutrients and feed requirements at different stages of production and production systems.

- Free range
- Semi intensive
- Intensive(Commercial)

## 5.1 Site Selection For Poultry Houses

The site should be dry and flat or alternatively the house can be elevated from the ground. Trees and bushes close to the site will provide shade, windbreaks and protect birds from flying predators. The site should be secured near the family house so as to hear the chickens get disturbed at night by predators or thieves. In a rectangular house the end walls should face East and West to ensure that only the end walls face the hot afternoon sun and wind. Clear all grass and bushes for about 3 meters on all sides of the house to keep snakes and rats away



*A chicken house (to accommodate up to 300 birds) set in an East West direction fully covered on the east and western sides and open on other sides*

### **5.1.2 What to consider when selecting a site?**

- i. The land should be flat, well drained and not swampy.
- ii. Location should have a good flow of fresh air.
- iii. Land should be accessible but not on the highway.
- iv. The site should be far from other poultry farms, piggery or dairy to avoid noise and diseases.
- v. There should be a reliable source of water.
- vi. Where possible, the land should have some trees and grass cover for shade to cool the poultry houses during hot periods.

### **5.1.3 Farm lay out**

A good poultry farm should have the following components (Figure 8):

- i. Perimeter chain link
- ii. An entry-gate
- iii. Poultry houses
- iv. Offices and toilets
- v. Changing room and shower facility
- vi. Disinfection barriers (at main gate and entrances to poultry houses)
- vii. Feed and equipment store
- viii. Clean water source
- ix. Access roads
- x. Toilets
- xi. Incinerator or sanitary pit

### **5.1.4 Materials for building a poultry house**

Use cheap and locally available material like timber, off-cuts, reeds, and thatch grass or clay bricks. Remove the bark from the wood to reduce the parasites load. Parasites often hide beneath the bark. Poultry houses should have openings on either side for ventilation. In addition a hole or ridge on the roof will ensure proper ventilation and give light making it easier to work in the house. Make sure winds ventilate the house without causing draughts (cold). Heat, humidity, and harmful gasses may be considerably reduced through good ventilation. High temperatures may cause deaths, a drop in egg production, low shells quality and reduced weight gain. A combination of high temperatures and high humidity may cause death in young chicks. To protect against build-up of disease causing agents and parasites the house must be accessible and easy to clean. Use slatted or raised floors to remove droppings and avoid predators. Remove any sharp edged objects from the house to prevent possible injury to the birds and humans.

### **5.1.5 Example fully slatted floor of**

Example Fully slatted Floor

**Table 2: Housing Density (for adult birds)**

Production System	Floor type	Flocking density	
Intensive	Slatted (Raised)	6-8 birds per m <sup>2</sup>	2 birds per sq. ft.
	Deep-Litter	4-5 birds per m <sup>2</sup>	1 bird per sq. ft.

*NOTE: This spacing will cater for mature chicken and equipment*

### **5.1.6 Importance of housing**

- Provides chicken with comfort and protects them from extreme weather-rain, wind etc.
- Offers adequate space for the flock - Stocking density 2 square ft per bird
- Houses should have an East-West orientation to minimize sunlight inside
- Should be open sided to allow natural ventilation
- Floors and surrounding made of Cement floors are the best finishing for easy cleaning
- A foot bath should be placed at the entrance
- All vegetation surrounding the house should be cleared in an area of 3-5 m to discourage rodents
- Chicken houses should be constructed in isolated areas to decrease the risk of contamination
- Houses should be fenced off to exclude animals and visitors

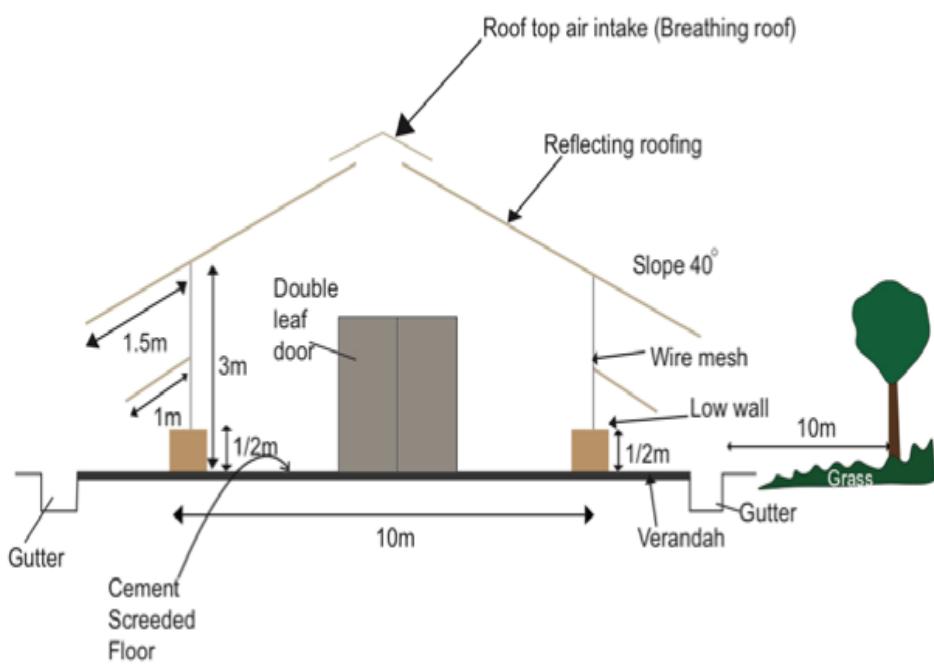
### **Ventilation**

This is the circulation of fresh air in a chicken house as Air passes from one side of the house and exhausts through the opposite side

Ventilation serves several functions;

- Removing excess heat and moisture
- Providing clean air (oxygen)
- Removing harmful gases
- Reducing dust from the air

Ventilation can be managed by opening and closing the curtains which are often made from gunny bags stitched together.



**Figure 6:** Poultry structure design. Source: MAAIF, 2019

## 5.2. Poultry equipments

Poultry equipment is essential for the efficient and effective management of a poultry farm. Here is a list of common poultry equipments and their uses:

### 1. Housing equipment:

- Nesting perches helps to reduce stress and promote natural behavior
- Nesting boxes to provide comfortable space to lay eggs.

### 2. Feeding equipments:

- Manual Feeders
- Automatic feeders

### 3. Drinking equipments

- Manual drinkers
- Automatic drinkers

### 4. Heating equipment

- Brooders – they can be gas, electric or infrared

### 5. Ventilation equipment for cooling the houses especially if large scale production

### 6. Lighting equipments

### 7. Litter management /tools for removal of litter and keeping the environment clean.

### 8. Incubation equipments i.e incubators, Hatchers, egg candlers

### 9. Egg handling equipment such as trays, egg graders, Egg washers

### 10. Waste management equipments

11. Health management equipments such as vaccination, weighing scale, bio- security equipment
12. Transport cages

### **5.3. Improved indigenous chicken nutrition and feeding**

Production based on improved breeds with commercial diets requires the feeds to provide the following;

- Starter diet:— broiler starter and chick mash - high in protein offered up to 8 weeks
- Growers' diet/mash:—medium in protein offered from 9- 19weeks
- Layer diet/mash:- lower in protein offered from 19 weeks onwards

#### **What the farmer needs to know!**

There is a physiological relationship between all the nutrients, especially energy and proteins. This should be used when mixing feeds in order to minimize costs and maximize output. Feed consumption is regulated in most cases by the energy content. For instance, birds eat less of high energy feed rations. Therefore, high energy feed should also have high concentration of all other nutrients. Birds also eat less of imbalanced rations especially when amino acids are disproportionate. Fiber content regulates feed intake for example if feed has high fiber, it stays partially digested in the digestive system for a long time. This lowers feed intake and reduces nutrient supply to the bird. Anti - nutritional factors in some feed stuffs (like soya) affect the digestibility and bioavailability of nutrients in the feeds, therefore such feedstuffs should be well processed (for example heat treatment of soya to remove trypsin inhibitor).

#### **5.3.1 Feedstuffs**

Feedstuffs are materials with different nutrients. Poultry have different nutrient requirements for different breeds, age groups and production systems.

#### **What are nutrients?**

Nutrients are chemicals in feedstuffs required by organisms to live, grow, reproduce and produce. Different poultry require different amounts of nutrients grouped in 6 categories:

- i. Energy (from carbohydrates, fats, oils and proteins)
- ii. Proteins
- iii. Fatty acids
- iv. Minerals
- v. Vitamins
- vi. Water

Energy and protein nutrients contribute over 70% of poultry practical rations.

### **5.3.2 Common feedstuffs used in poultry diets are classified in 6 groups:**

- i. Energy sources (cereals grains, and their by-products, root crops and lipids (fats and oils))
- ii. Protein supplements
- iii. Mineral supplements
- iv. Vitamin supplements
- v. Synthetic amino acids
- vi. Non-nutritive feed additives

A balanced ration / diet is a feed formulation that contains all nutrients in adequate amounts required for the different poultry breeds, production systems and age.<sup>89</sup>

### **5.3.2 Importance of minerals in development of birds**

- Important for bone formation
- Egg formation (strong eggshells)
- Optimal health status
- Important minerals are calcium and phosphorous balanced

### **Roles of vitamins**

- Important for optimal health status ie disease prevention
- Important vitamins are A, B2 and D
- Vitamins A and D can be derived from greens and sunlight
- Vitamin D may come from fresh cow dung and by giving multivitamins

### **Simple feed mixing**

- Advisable to make semi balanced feed for small chicks from 0-6 weeks
- Ingredients should be dried in the shade
- Crash or grind grains for proper mixing
- Use local containers to measure those ingredients
- Mixed feeds should not be stored for more than a few weeks to avoid contamination
- Above 8 weeks of age, poultry could be fed in a cafeteria system to save energy and time in mixing the feeds

## Simple ration formulation

Ingredient	Quantity
• Crushed maize/sorghum or millet	• 1 kg tin
• wheat/sorghum or millet	• kgtin
• sunflower/sesame/groundnut cake	• matchboxes
• Bone/saltnix	• matchbox
• Blood or fishmeal	• matchboxes
• Sesbania / leucaenaleaves	• 2 match boxes

## Some problems related to some feed

Fish - fishy taste to meat and eggs

Cassava – May contain cyanide which is toxic

Oil and seed cakes - Can contain excessive amounts of oil and fiber.

Beans and peas - Contain a number of anti-nutritional substances

### 5.3.3 Feed management

- Use local ingredients for local birds
- Know the quality of feed value and prices of each feed ingredient
- Buy missing feed ingredients such as vitamins or proteins source from local stockiest.
- Change feed formulation depending on availability, quality or feed value and price.
- Reduce the flock size under free range system during lean seasons when feed cost increase
- Change feeds slowly but gradually

Table showing Poultry feeding schedule

Age (weeks)	Type of feed	Feed cosumption (Gms/bird/day)
1		12
2		18
3		25
4		31
5		35
6		41
7		45
8		49

<b>Age (weeks)</b>	<b>Type of feed</b>	<b>Feed cosumption (Gms/bird/day)</b>
9	Change to growers mash	52
10		60
11		70
12		75
13		80
14		85
15		92
16		100
17	Gradual change to layers mash	102
18		114
19		120
20 Onwards		120 To 140 at max.

# Chapter 6: improved indigenous chicken health

## 6.0 Introduction

This topic will also take the value chain actors through the competencies required to manage chicken health and welfare. It involves farm bio-security, acquisition of health control equipment and supplies, parasite control, vaccination programs, disease control and record keeping

### 6.1 What is disease?

Disease can be defined as any change or impairment of normal body function that affects the chickens' ability to survive, grow or reproduce.

An understanding of the cause of a disease and its method of spread (transmission) will assist in controlling it. Knowledge of the clinical signs of a disease and the characteristics of lesions found at Post-mortem will help in its diagnosis and instituting preventative measures.

### 6.2 Why learn disease management and control?

- Diseases kill
- Interfere with normal growth
- Reduce productivity (eggs/meat)
- Diseases lead to heavy losses
- Affects local and international trade

#### 6.2.1 Causes of disease

Many diseases – called infectious diseases – are caused by organisms that can be transmitted from one bird to another. Such organisms include viruses, bacteria, fungi and protozoans. Other infectious organisms are external (lice, fleas and ticks) or internal (roundworms, tapeworms, flukes) parasites.

In many cases, disease results from a combination of factors such as husbandry, nutrition, environmental factors and flock management. All these have a direct and important influence on the health and productivity of chickens.

### 6.3.0 Vaccines and vaccination

Vaccines protect chicken from infectious diseases but they cannot treat diseases. Moreover, vaccines are disease-specific and protect chicken against a specific disease rather than all diseases. Vaccines work best on healthy, well-managed chicken.

#### 6.3.1 Why Vaccinate?

- Because many infectious disease agents are always present in the environment and are difficult to control even with the best bio-security measures.
- To reduce losses due to morbidity and mortality caused by infectious agents
- To protect chicken against diseases causing egg production drop and egg shell deformities

### 6.3.2 Vaccine Specificity

A particular vaccine will protect chicken against a specific disease. Chicken may suffer from other diseases despite successful vaccination. VACCINATION can NEVER provide 100% protection; but it is part of a complex preventative policy of which bio-security and hygiene are equally essential.

### 6.3.3 Rules of Vaccination

- Vaccination **should not** be administered to sick birds
- Always adhere to the genetic make-up of the chicken
- Cost the benefits of vaccination against potential loss
- Maternal antibody status - often have a significant effect on the design of a vaccination programme.

### 6.3.4 Vaccine Administration

Vaccines should be stored at 4 - 8°C and protected from heat and direct sunlight. Vaccines should be transported in a cool box. All equipments used for vaccination should be disinfected in boiling water. Vaccines should be used within 60 minutes after reconstitution. Always consult a veterinarian when in doubt before vaccination.

Vaccination programmes are NOT universal and have to be designed based on:

- Type of chicken
- Production systems
- Disease prevalence in the local area
- DO NOT USE CHEMICALS to disinfect vaccination equipment. Instruction on vaccine dilutions should be followed as per the manufacturer's instructions

**Table 3. Diseases & their management**

Disease	Causative Agent	Transmission	Common Signs	Effects to Birds	Management & Control
Newcastle	Viral Virus can survive in dead host or excretions up to 12 months; Virus is sensitive to disinfectants, fumigants and sunlight.	Aerosols, Ingestion, Contact (Human, dead birds, droppings, eggs-contaminated shells)	Coughing, nasal discharge, gasping, Drooping wings, Paralysis Twisting of head and neck Swelling of head Greenish/watery diarrhea High mortality PM-Petechiae in proventiculus, gizzard and enteritis	Death in high numbers Drop in egg production Blood spots in eggs Rough/shell-less egg Reduced hatchability	Quarantines Institute bio-security measures All in-all out Vaccination

Disease	Causative Agent	Transmis-sion	Common Signs	Effects to Birds	Management & Control
Gumboro	Viral  Ages severely affected 14 -28 days;  Signs commonest at 4-6 weeks of life. Virus resistant in houses and droppings.	Oral, Respiratory tract	Vent pecking, Diarrhea with urate in mucus, Sudden death, PM-Skeletal bleeding, Swollen Bursa of Fabricius, Dehydration, Swollen kidneys with urates.	Moderate deaths  Secondary infections	Vaccination as scheduled
Fowl pox	Viral	Contact	Cutaneous form: Nodular lesions or non-feathered skin  Diphtheritic form: Lesions on mucus membranes of mouth, oesophagus, pharynx and trachea	Retarded growth  Decreased egg production  Low or moderate mortalities	Vaccination and Quarantine

**Table 4:** pictorial representation of diseases

Type of disease- description- images
<b>I. Avian Flu</b>
Description  Purple discoloration of wattles and combs with swelling caused by accumulation of fluid, swollen head, accumulation of liquid in eyelids and comb, pinpoint bleeding under the skin mostly seen on feet and shanks, bleeding in ovaries, bleeding gizzard, bleeding in the mucous of trachea, bleeding in the muscle and the fat around the heart.

## **2. Fowl Pox**

### Description

Dry-form wart like nodules on the skin (combs, face and wattles), Wet-form cankers are embedded in the membranes of the mouth, larynx and trachea, brown nodular lesions in the mucous, membrane of larynx and eroded area is left.

## **3. Infectious Bronchitis (corona virus)**

### Description

Respiratory signs: - Difficult in breathing (open beak) and swelling of face, marked drop in egg production and increased number of poor quality eggs soft shelled with watery content, mild to moderate irritation of respiratory tract with

swelling of trachea, swollen and pale kidneys with distended urinary tubes



## **4. Gumboro**

### Description

Bleeding into skeletal muscles, enlarged bursa of fabricius, bleeding into skeletal muscles of leg.

## **5. Mareks**

### Description

Paralysis of wings characteristic dropping of limb, twisted neck, lameness, brachial plexus is two or three times the normal thickness, swelling caused by fluid. Enlarged liver with diffuse greyish nodules formed by abnormal growth of tissue, enlarged liver with diffuse grayish nodules formed by abnormal growth of tissue, enlarged spleen with diffuse grayish discoloration, solid nodular lesions formed by abnormal growth of skin around the feather follicles, nodular skin lesions (abnormal growth of skin).

## 6. Newcastle Disease (Paramyxoviridae)

### Description

Weakness (no lameness and no stiff neck), Pink eye and swollen eyelids with abnormal accumulation of liquid, Foamy discharge from respiratory tract, Foamy nasal discharge, accumulation of liquid in the lungs, Bleeding throughout the intestine, Acute form: bleeding into the mucosa of the trachea.



## 7. Fowl Cholera

### Description

Blue coloration of wattles, swollen wattles and face, yellow-brown pus accumulated in a swollen wattle, pus

(Whitish to yellow) accumulated in a hock joint, pinpoint bleeding in the muscles of heart

## 8 Infectious Coryza (Haemophilus) Coccidiosis - Eimeria necatrix

Eyelids stick together by mucous and exudates, Watery swollen eyes and face, purulent nasal exudates, Intestine is distended twice its diameter, bloody areas are clearly seen without opening the intestine, Partially clotted blood in the small intestine, Intestine contains mucous, fresh blood and its membrane is widely covered with red tiny spots.

## 9. Eimeria Tenella. (Caeca distended with blood)

Large quantity of blood present in the caecal walls are thickened, Tiny red spots scattered on caecal wall and bloodycontent

*E. tenella* (3<sup>rd</sup> degree lesion):



## 10. Heterakis

Small white worms found in the tip or blind ends of the caeca (female : 10-15 mm long ; male 7-13 mm long)



## **11. Ascarides**

Ascaride worms (roundworms) in the large intestines



## **6.4 Biosecurity in a farm**

Introduction to Bio-security:

- Involves the practices, procedures and policies used that reduce the risk of pathogens introduction to a facility.
- Farmers have a responsibility to ensure quality and safety of products for human consumption

Why do I need bio-security?

- Reduce risk of disease introduction
- Minimize spread on-farm or to new areas
- Promote health of livestock
- Protect economic investment
- Protect against new diseases
- Protect human health

Disease transmission in a farm can take place via:

- Direct contact between animals
- Entry through skin, open wounds, gills/mouth
- Ingestion (oral)
- Infected live animal
- Cannibalism of dead or dying animals
- Water Sources

Main risk pathways for pests and diseases to spread on to, within and from a farm

Recommended Practices to reduce the risks:

- Keep stock stress to a minimum
- Maintain appropriate stocking densities.
- Provide appropriate diets and nutrition.

- Keep transfers within or between farms to a minimum.
- Remove dead or dying stock from remaining stock as soon as practicable

Monitor and keep records of stock health management (e.g. water quality parameters, stocking densities, handling events, growth and feed conversion ratios)

## **1. Stock health management**

- Only stock of known health status should be introduced onto your farm.
- Birds sourced from other farm facilities should be inspected for known diseases and quarantined.
- Keep accurate records of all stock movements onto, within or off your farm

## **2 . Stock movements and containment**

- Locate water intake and outflow pipes to avoid cross-contamination
- Install screens on intake pipes to prevent entry of undesirable organisms
- Maintain good water quality at all times

## **3.Water**

- Standard operating procedures with dedicated infrastructure should be in place for cleaning, disinfection and drying of equipment
- Farms should have dedicated and well- designed delivery and loading areas
- Avoid sharing equipment between farms or designated locations within a farm.
- Where equipment travel between farms, appropriate cleaning, disinfection and drying should be carried out and documented

## **4. Equipment**

- Manage farm access (e.G. Signage)
- All visitors should be briefed regarding on-farm biosecurity
- Preventive measures for pest and disease entry and spread should apply to all farm staff and visitors (e.G. Dedicated changing areas, separate production areas, footbaths and hand washing facilities)
- Restrict staff and visitor access to sensitive areas (e.G. Brood stock, hatcheries, and quarantine areas)
- Keep records of all visitors to your farm and education and staff training.

## **5. People management**

- Source feeds from reputable suppliers to ensure they provide assurances of quality and content
- Store feeds in designated areas (e.G.Clean and dry) to avoid contamination and reduced feed quality
- Regularly inspect feed to check for the presence of mould, vermin, and other undesirable organisms.

## **6. Feeds and feeding**

- Control or exclude predators, and other organisms
- Regularly inspect farms for biosecurity breaches or signs of potential breaches and remedy as required
- Keep records of any presence biosecurity breaches and any preventive or corrective actions taken

# Chapter 7: feed formulation

## 7.1 Introduction

This topic will take the value chain actors through the knowledge and skills required to produce quality chicken feed. It involves designing and equipping a simple feed composition, acquisition of feed ingredients, assessing ingredient quality, formulating feed rations, mixing ingredients, assessing ration quality, costing and storage.

Making a good formulation that meets all the nutrient requirements of the target bird is one major step towards good feeding but does not guarantee good results. Proper mixing of the ration to ensure that the feeds meet the target nutrient level is very important. Secondly, the feeds should be ground to the recommended particle size for the different ages of birds. For example, day old chicks can't consume big particle feeds.

To ensure that the feeds mixed matches with the formulation made, samples of the feeds should be collected and taken to a nutrition laboratory for testing the nutrient content. The results will guide on how well the feeds match with the formulated ration and the necessary adjustments required.

The mixed feeds may be presented in either mash, crumb, or pellet form to the target birds. All these forms are suitable under specific conditions of the birds. Day old birds (up to 1wk old) will benefit more from crumbs. Older birds will benefit more from pellets. The formulated feeds should be packed in water-proof sacks to avoid development of molds. Avoid compacting the feeds in sacks as this will create anaerobic conditions that encourage mold formation.

The shelf life of mixed feeds is two weeks beyond which it turns moldy and becomes unfit for consumption. Always mix feeds that will last for not more than two weeks and store them in a dry damp-free and rodent free place. Mark the date when the feeds were mixed to ensure proper utilization before they get spoilt.

## 7.2 Feed formulation processes

### 7.2.1 Factors to consider when formulating chicken feed rations

- Cost of feeds tuff
- Availability of feedstuff
- Nutritional content and values of feed stuff
- Ability to test feedstuff quality
- Toxins and anti-nutritive factors
- Competition with humans
- Types of costs
- Good Manufacturing Practices (GMP) and Hazard Analysis Critical Control Point (HAC-CP)

### **7.2.2 Feed manufacturing process**

The quality and cost of feed ingredients are a major determinant of the cost of feeds. It is better to use more expensive feed ingredients of high quality than cheaper ones that are heavily contaminated and of low nutritive value. Quality feed ingredients will provide the targeted nutrient levels more accurately and birds will grow faster, produce more and attain market weight early using less feeds.

### **7.2.3 Processing methods for feed ingredients**

- Drying
- Roasting or boiling
- Grinding
- De-hulling or de-husking
- Oil extraction (pressing or solvent)

#### **Mixing feeds by the backyard farmer.**

Formulation of compounded poultry feed is both an art and science. Hands on field demonstration are essential. Ensure that the raw materials are of high quality, wholesome and safe for consumption. Pay attention to adequate mixing of minerals/vitamins in the animal feeds using a formula from a feed nutritionist. Correctly weigh and measure feed ingredients, premix with a portion of the major ingredients in a good mixing facility. Use a spade or a fabricated mixer.

To mix good quality feeds, the farmer should follow the following steps:

- Get a feed formula for the target animal species and age from a qualified animal nutritionist.
- Put a handful of maize grains after drying and half a handful of table salt in an empty dry soda bottle.
- Shake the bottle vigorously for 2-3 minutes. Allow the grains to settle at the bottom of the bottle.
- Observe whether salt sticks onto the walls of the bottle. If salt sticks to walls of the bottle, this is an indication that the maize has not dried properly for storage.
- Dry the maize and repeat the test until no salt sticks to the sides of the bottle. The maize can then be stored without danger of developing moulds/aflatoxins. For cereal by-products, ensure that they are thoroughly dried after processing and make sure the bran is dusty to avoid caking during storage.
- The formula should be based on the feed ingredients that are locally available within the farmer's environment.
- Collect and weigh all the target feed ingredients to be used and ensure that they are available in the required quantities for the amount of the feed ration you are preparing to mix.
- Get a clean cement screened floor of about 10ft × 10ft surface area.
- Get a shovel or a fabricated mixer, a simple motorized hummer mill, 10 new bags, a role of string, and a marker.
- Premix the raw materials with a shovel to get a homogenous mixer.
- Using a simple hummer mill, mill the ingredients to the right particle size for the different

age groups of birds (Chicks, growers, layers, broilers etc.).

- Weigh the smallest quantities first and mix them together to make a homogeneous mixture.
- Mix the ingredients of close weights together to get a homogeneous mixture.
- Make the final mixture by mixing the mixture with the bulkiest ingredient.
- Spread one ingredient thinly on the ground and spread the other ingredient on top, then mix them together using your hands or spade to make a heap. Transfer the mixture from one heap to another while pouring the ingredients on top of the heap.
- Mix the raw materials and the premix – mineral mixture thoroughly for between 15 to 20 times to achieve a uniform mixture.
- Bag the feeds in new 50kg bags and tie the bags with a string.
- Label the feeds with a maker to show the type of feed and date of mixing.
- Store the feeds on wooden pallets not more than 5 bags one on top of the other in a well-ventilated feed store.

#### Caution:

- Avoid compacting feeds in bags.

Use complete compounded feeds within two weeks from the time of mixing. Beyond this period, the feeds will go bad and become dangerous to the birds.

- For any issues concerning feeds and formulation consult a qualified feed nutritionist.
- Make use of the feed laboratories to confirm the quality of the feeds.
- When mixing large amounts of feeds, use motorized mixers. Two types of motorized mixers exist – vertical mixers and horizontal mixers. Vertical mixers are easily available in the country; easy to fabricate, take a longtime to thoroughly mix and produce a less fine mix of the feed.
- Horizontal mixers are faster, more accurate in mixing and produce a more homogeneous mix of the feed in a short time.

#### Mixing methods

- Manual
- Mechanical
- Types of mixers
- Vertical
- Horizontal
- Transverse

#### Forms of feed presentation

- Post mixing processing
- Pelleting

- Crumbing

#### Milling environment

- Bio-security measures
- Occupational safety and health procedures in the feed milling plant

#### Packaging and sealing methods

- Post packaging labeling

#### Feed sampling methods

- Animal feed regulatory bodies and commercial feed standards
- Feed analysis methods
- Chemical
- Physical
- Costing
- Inputs

#### **7.2.4 Feed storage conditions**

- GMP and HACCP
- Feed dispatch procedures
- Feed milling plant hygiene procedure
- Cleaning and sanitization methods for feed handling equipment and structures
- Control methods and points for human and traffic movement
- Feed traceability and recall systems
- Types of feed formulation records
- Feed plant waste management

#### **7.2.5 Methods of feed formulation**

- Pearson square
- Algebraic equations
- Step by step
- Trial and error
- Computer simulation

# Chapter 8: good-safety concerns in improved indigenous chicken

## 8.1 Introduction

Food safety can be defined as the system that keeps food and food products free from substances hazardous to human health. Food safety should be a part of governments' strategies to ensure secure food for the consumers. In this context, a "hazard" refers to any biological, chemical or physical property that may cause unacceptable risk (FAO, 1998). The emergence and discovery of new food-borne pathogens and other food-related hazards has increased the need for food-safety measures. The intensification of food production has also changed food processing and handling systems and raised new challenges for food-safety institutions. Intensification has led to large amounts of potentially infectious material being concentrated at single sites, such as large industrial production establishments or processing plants, and has therefore contributed to the potential for large-scale outbreaks of infection. Changing consumption patterns – street vendors and home cooking of primary products are giving way to the purchase of processed food from supermarkets—make food-safety an issue of public concern rather than just a matter for individual consumers.

Developing countries are faced with difficulties in achieving food-safety standards in animal production systems. These difficulties result in inadequate infrastructure and investment in food-safety measures and research, as well as from inadequate consumer information. Responsibility for ensuring safe food for the consumer has traditionally been seen as a responsibility of public institutions. However, with the intensification and industrialization, responsibility has been shifted to a wider set of stakeholders including the private producer and the consumer.

## 8.2 The potential risk factors

Three types of food-borne risk factors for human health can be recognized (FAO, 1998). The first group of risk factors comprises microbiological factors such as *Campylobacter*spp. and *Salmonella* spp. The second group of risk factors comprises chemical factors such as residues from veterinary medications, pesticides, natural toxins or environmental pollution. Excessive use of medication during poultry production, or disinfectants used in the food-processing industry, can lead to the problem of resistance. This adds to the problem of food hygiene. The third group of risk factors comprises physical hazards such as bone-pieces in meat; this group is not further considered here.

## 8.3 Microbiological risk factors

Microbiological risk factors include bacteria, viruses, protozoa, helminths and myco-toxins. The most important group with respect to poultry are bacteria such as *Salmonella*spp, *Campylobacter* spp., *Listeria*, clostridia, enterococci and *E. coli*. As far as viruses are concerned, the significance of avian influenza should not be overlooked. Helminths and protozoa are not considered to be major threats to food hygiene in industrial poultry production. Microbiological risk factors can be found in all poultry production systems. The most common microbiological pathogens connected with shell eggs are *Salmonella*, *Campylobacter*, *Listeria* and other enterobacteriaceae (Jones et al., 2006). The eggs can be infected vertically before laying or as a result of contamination from the environment. Cracks and other damage to the egg shell are obvious locations for pathogen multiplication.

## Bacteria

One of the most studied food-borne pathogens is *Salmonella* spp. It is easily spread during the trade and processing of poultry products, specifically non-processed and non-heat handled products. Changing consumption patterns may also be a factor. Forsythe and Waldroup (1992) suggest that changes to consumer behaviour, such as eating out more, increased use of microwaves for heating and re-heating food, and increased use of salad bars outside the home, have contributed to the increase in human *Salmonella* infections. *Salmonella* is also vertically transmittable, and some human infections can be traced to eggs. Infection with *Salmonella* can occur before laying (Humphrey, 1994), but the surface of the eggs gets contaminated quickly if there is infection in the environment. Chicks hatched uninfected can also be colonized very quickly. In the latter case, the infection can be detected two weeks after hatching, i.e. after the so-called lag phase. Animal feed is a potential source of *Salmonella* infection. Crump et al. (2002) report several cases in which the *Salmonella* strains found in human food have been traced back to animal feed.

## Mycotoxins

Mycotoxins secreted from certain strains of fungus can be found in various feed ingredients, including those used in poultry feed. Mycotoxins can infect the plants during their growth or during processing and storage; they can be distinguished into plant pathogens and storage mycotoxins (D'Mello, in FAO, 2004a). The main toxins of food-safety concern are the carcinogenic mycotoxins aflatoxin B1, aflatoxin M1 and ochratoxin A (FAO, 2000). This implies a lack of good management practices on the part of the poultry producer. These substances should be carefully monitored in poultry meat and eggs because of their carcinogenicity to humans. Industrial feed processing mills use various methods to control the risks associated with mycotoxin, including pelleting, heat treatment and irradiation.

### 8.4 Chemical risk factors

Some chemical substances can be traced all the way into poultry end-products. There are, nowadays, strict restrictions in many countries, but elsewhere residues of antimicrobial medicines can still be found in the end-products.

During the production of feed, there is a need to control the residues of organic and inorganic environmental pollutants such as dioxins, chlorinated biphenyls, furans and heavy metals (Saegerman et al., 2006). The control of feed quality and safety is increasing in importance as a result of the expanding trade in animal feed products.

### 8.5 Antibiotic residues

Antibiotic residues in food products can be the result of excessive use of antimicrobials in veterinary practice or as a supplement in ready-produced animal feed. There are two ways in which the antibiotics in feed can affect human health: the direct effect of the residues in poultry meat and eggs, and the indirect effect resulting from the selection of antibiotic resistant strains of pathogenic bacteria. The issue of the use of antibiotics as feed additives and the restriction of this use is somewhat controversial.

## 8.6 Pesticides

Intensive use of pesticides in many developing countries also affects the safety of food via animal feed with a high level of residues. In order to control plant pests and vectors of disease, the use of versatile pesticides has been wide spread in many parts of the developing world. This practice has not been without consequences for the environment, production animals, feed, food crops and public health. There have been studies of immune system-related illnesses, such as immune suppression and hypersensitivity (Street, 1981), as well as many other illnesses that could be related to the excessive use of pesticides and the resulting residues in food products.

### Other chemical risk factors

Disinfectant agents used in production establishments and processing plants are also risk factors. Chlorinated water used in rinsing the carcasses has also raised concerns among consumers. The use of disinfectants to clean the equipment in production and processing establishments might, as mentioned above, also give rise to a problem of resistance.

## 8.7.0 The vertical chain

The different steps of the food production system need specific regulations. However, food-safety interventions should optimally be considered as a whole i.e. should be coordinated through the whole vertical system (see Figure below). The chain from “farm to fork” starts with feed production, and continues through the hatcheries to the slaughter houses, processing plants, wholesalers, retailers and the end consumer. Between these steps there is transport and storage, during which maintaining the cold-chain is crucial. The hygienic behaviour of the end consumer, such as washing hands and kitchen utilities after handling raw poultry meat or eggs, is the final factor in avoiding the food-borne illnesses related to poultry products.

WHO formulated a three-step approach to mitigating the risk posed by *Salmonella* spp. (WHO, 1980); the terms used are also relevant for other microbiological hazards. The first step is pre-harvest control, which focuses on the feed and poultry producers. The second step is harvesting control, which covers hygiene measures at the time of slaughter; these are described in the Codex HACCP model. The third step is post-harvest control, which covers the product from the processing establishment all the way to the end-consumer. Each of these three stages has to be taken into consideration in order to prevent risk factors entering the chain.

**Table 5: HACCP model for raw chicken: process flow diagram for slaughter house**

Inputs	Processsteps	Edibleoutputs
Live birds	1.Receiptoflivebirds	
	2.Hanging	
	3.Stunning	
	4.Killing	
	5.Bleeding	
	6.Scalding	
	7.Defeathering	
Water (possibly with bactericidal agent)	8.Washing	
	9.Headpulling	Head
	10.Hock cutting	Feet
	11.Venting	
	12.Evisceration	Edible offal (liver,gizzard,heart)
Water (possibly with bactericidal agent)	13.Washing	
	14.Cropremoval	
	15. Neck cracking/cutting ofneckflap	Necks
Water (possibly with bactericidal agent)	16.Washing(inside/out-side)	
Water with ice (possibly also with bactericidal agent)	17.Chilling	
	18.Re-hanging	
	19. Conveying to secondary processing area	
	20.Portioning	
	21a.Storage	
	22b.Deboning	
Packaging materials	22. Packaging	
	23.Chilling/freezing	
	24.Storage	
	25.Dispatch	Packed whole chicken or chicken portions

**Source:**MAF(2000).

Poultry producers have an important role in preventing risk factors from entering the food chain. This role has become more or less clear to the farmers as a result of official regulations and increased hygiene demands originating from consumers and retailers. The enforcement of these regulations is done through control visits by governmental authorities to production establishments themselves. An efficient traceability system linking the food product to the farm has enabled efficient and rapid intervention measures in the event of an out-break of a food-borne disease.

Slaughter houses and food-processing establishments are the next links in the chain of food safety. The post-slaughter poultry carcass is a suitable growing medium for many pathogens, including human pathogens. Hygiene procedures when handling the carcass are, therefore, crucial and should be carefully planned and monitored to avoid contamination and cross-contamination of the food products. Packaging, transport, shelf-life and storage, as well as the maintenance of the cold-chain are important considerations. The cleaning and disinfecting of the premises and transport vehicles involved in these processes should be controlled. Resistance issues should be considered in the choice of the products used. Food products are then transported to wholesalers, retailers and finally to the consumers. Many cases of food-borne illnesses could be avoided by applying good hygiene practices in the home or in restaurants. Consumer information and education is, therefore, crucial especially in local slaughter houses where hygiene standards are inadequate.

### **Responsibility for control**

Three major stakeholders can be identified in an industrial poultry production value chain – the producer, the consumer, and the government. According to this value chain, the optimal role of the government is to guarantee the system through administrative and regulatory methods – the producer being the one managing the systems. A major factor in the prevention of food-borne illnesses is to ensure that stakeholders from all sides understand their responsibilities and voluntarily introduce good hygiene practices.

# Chapter 9: innovations and green transformation

## 9.1 Introduction

Innovations are technologies or practices that have not been used by value chain actors in that specific value chain, area, and have the potential to increase productivity or efficiency of the chain. They are used in addressing identified needs in a value chain. The innovations need to be strategic to address the needs effectively in nodes/functions.

Green transformation in poultry refers to the process of making poultry farming more sustainable, environmentally friendly, and efficient. This involves adopting practices and technologies that reduce environmental impact of poultry production while maintaining or even improving productivity and animal welfare.

The ability to convert many types of feed, such as residuals from agricultural activities, households and food processing industries, into animal products and protein sources is more efficient than most other animal species. Their contribution to food security, protein supply, and peoples' livelihood makes them valuable animals on a global level. In many ways, the notion of 'sustainability' and 'sustainable development' is contested. It is challenging to deal with all aspects of it in connection with a single sector within agriculture because it is interlinked with so many other sectors and developments, including the global food system. This core principle of sustainable development aims to balance economic, social, and environmental interests.

### 1. Types of innovations (Alternative protein sources and brooding)

- Black soldier flies
- Red wriggler worm
- Hydroponics
- Hay box brooder
- No charcoal brooder
- Solar-powered incubators and brooders

### 2. Attributes of innovations

- Job creation
- Income growth
- Capacity to benefit all value chain nodes/functions.
- Enhance commercialization

### 3. Developmental needs the innovation will meet

- Reduce cost of production
- Provision of manure to improve kitchen gardens (Agri nutrition)
- Improve on greening of the environment

#### 4. Potential impact of the innovations

- Improved economic status
- social aspects
- Food security
- Contribute to environmental resilience

#### 5. Sustainability needs to embrace social inclusion

### **9.2 Key aspects of green transformation in poultry:**

#### 1. Sustainable feed production:

- Alternative feed ingredients from BSF, algae, and by-products from industries to reduce reliance on grain based feeds
- Use of technology to promote precision feeding for efficient utilization of feeds.

#### 2. Energy efficient and renewable energy:

- Implement good structural designs in poultry structures including better insulation, natural ventilation and energy saving lighting.
- Integrate solar panels or biogas that can provide renewable energy.

#### 3. Water conservation

- Promote automated drinking to reduce wastage.
- Use of quality water in your manage to prevent contamination and environmental impact

#### 4. Waste management and circular economy:

- Manure management like composting to reduce pollution and create additional income.
- Circular economy practices within the farm to reduce waste environmental impact.

#### 5. Traceability and certification systems to ensure that all stages of poultry production are sustainable and comply with environmental standards.

# Chapter 10: Agribusiness and marketing in improved indigenous chicken production

## 10.1 Introduction

The decision to engage in II Chicken VCAs in production can therefore be assumed to be profit motivated, in addition to food provision and as a leisure activity. II Chicken VCAs can therefore be considered to be operating microenterprises, which combine factors of production and available technology to produce outputs. Such microenterprises, range from small-scale producers, service provision, and agro-microenterprises to provide employment opportunities to a significant proportion of the population in the country, thereby contributing to poverty reduction and food security. To achieve the above all service providers must understand fully every node of the value chain with respect to the following:

Production cycle which involves the following:

- Breeding and Hatchery
- Brooding
- Growing
- Laying
- Finishing
- Processing
- Waste management
- Marketing
- Restocking

Poultry value chain functions encompass all the activities involved in production, processing and distribution of poultry productions, such as meat and eggs. Here are the key functions within the value chain that are interlinked for overall success and sustainability of poultry industry:

### 1. Input supply

- Feed supply
- Breeding stock
- Veterinary services
- Equipment supply

### 2. Production

- Breeding
- Hatchery/incubator operations

- IIC farming
- Health management

### 3. Processing

- Slaughtering
- Meat processing
- Egg processing

### 4. Marketing and distribution

- Whole sale
- Retail
- Export
- Cold chain management

### 5. Consumption

- Local consumption of poultry products
- Food services in hotels

### 6. Waste management and By-products

- Manure management
- Processing of By-products
- Spent hens processing into meat

### 7. Support services

- Extension services
- Financial services
- Research and development

### 8. Regulatory and Quality control

- Government enforcement of laws
- Quality assurances

## 10.2 Production plan

Creating a poultry production plan involves several steps, including choosing the type of poultry, setting up the infrastructure, managing the flock and considering the financial and marketing aspects. Here stated below is the basic outline to help you get started:

### 1. Define your goals:

- Purpose for raising your flock e.g. meat or eggs
- Scale of production i.e. small/medium or large

### 2. Choose your poultry type i.e. IIC, Dual purpose or layers

3. Select appropriate breed to meet your requirements
4. Plan your infrastructure depending on flock size, equipments and bio-security measures
5. Feeds and nutrition for each stage of production to maximize on genetic potential.
6. Flock management in terms of:
  - Daily feeding ,watering and cleaning
  - Heath management
  - Record keeping to track growth rates ,mortality and production levels.

#### 7. Financial planning considering the following factors

- Initial investment by considering the cost of chicks , housing ,equipments and feeds
- Operating costs for example Feeds , labor, energy, water and health care
- Profitability analysis that is break-even point, pricing strategy and expected profit margins

#### 8. Marketing plan the following must be taken into consideration.

- Identify your target market
- Sales channel like direct selling to customers or online
- Branding and packaging
- Regulatory compliance

#### 9. Environmental considerations such as

- Proper waste management
- Bio-security measures in place.

#### 10. Expansion and sustainability of your project by looking at possibility of <

- Scaling up
- Use of renewable energy

### **10.3 Economic analysis and simple risk assessment by having a production budget**

Before starting any poultry production enterprise, calculate if it is economically feasible, thereby making the right decisions regarding the production system and the necessary interventions.

#### **10.3.1 Revenue or income**

Revenue or income is all the money earned in relation to the poultry enterprise such as: Income from sale of live birds, e.g. growers, cockerels or spent hens; Income from sale of eggs; Value of eggs or poultry consumed or given away.

Also value the standing stock, e.g. the production flock which is the foundation of future income. Poultry manure also represents a value when used on the farm or sold for other activities which can reduces the cost of buying fertilizer and thus improves regeneration of soil for better farm productivity.

### 10.3.2 Expenditure or costs

These are costs involved in relation to the poultry enterprise as listed below:

- Material for baskets, shelters or poultry houses;
- Starting up flock e.g. Growers, hens or cocks;
- Fertile eggs for incubation;
- Day old chicks;
- Supplementary feed, vitamins or minerals;
- Vaccines and other medication;

### 10.3.3 Labor and technical advice

When the birds are offered crops (*cereals or forage*) that would otherwise be sold, this also represent a value and should be included in the calculation. Money acquired through loans, the repayment and interest on loans is also an expense that has to be included among the inputs. In a free range system outputs are usually low because of low inputs. This means that expenses for buildings and other equipment are kept at a minimum. Small basket or shelters maybe built using locally available materials without incurring high costs.

## 10.4 Cost benefit analysis of a small scale indigenous chicken production system

**Table 6: Input and output of a free range indigenous chicken enterprise**

Flock size	Numbers
Hens laying and brooding	3
Hens laying and not broody	2
Cocks	1
Surviving chicks/hen/batch*	8
Growers. Weeks 4-24	24
<b>Total flock size</b>	<b>30</b>
Feed consumption:	Kg
Assumption(1 kg/bird/4 weeks = 35 g/bird/day)	
Adult feed: 1 kg x 6 birds x 52 /4 weeks	78
Chicks/growers feed: 1 kg x 24 birds x 46/4 weeks	276
Egg production	Numbers
Broody hens. 72 eggs/bird/year	216
Hens not going broody. 104 eggs/bird/year	208
Eggs for hatching. 3 hens x 12 eggs x two batches/year	72
Home consumption: 1.5 egg/week	82
Saleable birds: 3 batches x 8 growers	Numbers
Cockerels. 22 weeks of age	24
Pullets for sale. 24 weeks of age	24

Supplementary feeding should also be low to reduce costs. However, chicks aged a day old-to-8 weeks should be supplemented. On average each bird will be given 2 kg feed for 8 weeks. This cor-

responds to 2,000 g/56 days. Chicks will eat or feed on less while older birds will eat more. 2 batches of 24 growers will require feed two times 22-24 weeks, i.e. 44-48 weeks, on average 46 weeks. The total annual need for feed in a flock of 6 adults and 24 chicks and growers is calculated below.

### **Example of Supplementary feed needed for a flock of 30 birds in one year.**

#### **10.5 Improved indigenous chicken gross margins**

**Table 7: Gross Margin Analysis for improved indigenous chicken production**

Cost of producing 400 improved indigenous chicken under Intensive (IS)and Extensive(ES) systems						
	Input description	Qty	Unit cost	Total Cost- IS	Total Cost -ES	Cost
1	Day old chick	400	100	40,000.00	40,000	
2	Feeds	Cost/kg	Kgs			
	Chick Mash	55.00	2.1	55.00	46,508.00	46,508.00
	Grower's mash	44.00	3.3/2.5	44.00	57,974.40	43,480.80
	Subtotal (1+2)			144,482.40	129,988.80	
3	Drugs + Labour + brooding +water +lighting +Vaccine <i>Worked at 10% of above subtotal</i>			14,448.24	12,998.88	
4	Mortality- Based on estimated 5 % and 10 % of (2+3) <i>respectively</i>			7,946.53	14,298.77	
5	<i>Incidental costs Worked out at 5 % of (2+3+4)</i>			8,343.86	7,864.32	
6	<i>COST of production in KES.</i>					
	<b>Grand Total (2+3+4+5)</b>			<b>175,221.03</b>	<b>165,150.77</b>	
	Worked cost benefit analysis <i>Sale of 400 (2 kg liveweight) @ KES 400/Kg</i>	1.5	400	240,000	240,000	
	Revenue generated			64,778.97	74,849.23	
	Interest on funds invested %			37	45	

**NB-** The unit cost of inputs/outputs will vary depending on the area

#### **10.6 Record keeping**

Maintaining accurate and detailed records is crucial in poultry management for effective monitoring, decision making and ensuring overall success of the operations. Below are the key types of records

that should be kept in poultry management

### **10.6.1 Importance of record keeping**

- Improved decision making
- Cost management helps to identify areas of intervention.
- Health monitoring
- Regulatory compliance by avoiding fines
- Performance tracking

### **10.6.2 Types of records**

#### **1. Flock Records**

- Stock records: Information on the number of birds, breeds, age, and source (hatchery or suppliers)
- Mortality records: Daily records of bird's death.
- Culling records: Details on birds that were removed from the flock due to illness, poor productivity or other reasons

#### **2. Production Records**

- Egg Production: Daily records of egg production, including the number of eggs, quality(size, shape, shell condition) , and any abnormalities
- Meat Production: Records of birds processed for meat, including weight at processing , feed conversion ratios, and yield
- Feed conversion: Daily or weekly remains of feed.
- Feed consumption: Daily or weekly of feed usage, including types of feed and quantity consumed.

#### **3. Health Records**

- Vaccination Records: Dates and type of vaccines administered ,along with the number of birds vaccinated
- Treatment Records: Details of any medical treatments given, including medications, dosage, and the number of birds treated
- Disease Records: Details of any disease outbreaks, symptoms observed, affected birds and measures taken.

#### **4. Financial Records:**

- Expense records: Detailed records of all costs associated with the poultry operation, including feeds, labor, utilities, equipments, and veterinary expenses.
- Income Records: Records of all sales ( meat, eggs, by-products) and other sources of income
- Profit and Loss Statement: Regular summaries of income verses expenses to assess profitability

5. Inventory records:

- Feed inventory: Records of all feed stock
- Supplies inventory of all supplies of production.

6. Breeding records where applicable

7. Environmental records in terms of temperature in the structure that can affect production.

8. Labor records

9. Bio-security records on disinfection procedures plus areas treated

## **10.7 Marketing and market access**

Marketing involves activities and processes that are used to promote, sell, and distribute a product or service. There is need to understand customers needs, create value, and communicate this value to your target customer.

### **10.7.1 Marketing strategies will encompass:**

- Market research
- Product development
- Branding
- Promotion
- Sales

While market access thus refers to the ability of a firm to enter and compete in a particular market. Market access activities include:

- Regulatory compliance
- Pricing strategy
- Insurance

### **10.7.2 Market linkages**

It's the connection between producers and markets where their products are sold. Effective market linkages are crucial for poultry producers to be able to sell their products at a fair price, reach to a larger market, and maintain sustainable income flows. Below are key aspects of market linkages in poultry production:

#### **1. Market access**

- Local market usually have low transportation costs and minimal intermediaries
- Urban market can offer higher prices but quality standards are high.
- Export market has stringent health, safety, and quality regulatory requirements.

#### **2. Value Chain Integration**

- Input suppliers

- Processing and packaging
- Distribution and retailers

### 3. Market information

- Market real price trends
- Demand and supply dynamics
- Customer preferences

### 4. Cooperatives and Associations

- Collective Bargaining power by pooling resources together to reduces overhead costs.
- Shared resources to improve efficiency and reduce post – harvest losses.

### 5. Digital Platforms allow poultry producers to reach a broad customer base.

## 10.8 Value addition

Value addition in poultry production involves enhancing the value of poultry products through various processes, treatment, or innovations before they reach the consumer. By adding value can command higher prices, differentiate their products to access new markets.

Here are the key ways to add value in poultry production:

- Processing and Packaging
- Cutting and deboning
- Packaging
- Grading and sorting of eggs
- Sell in parts
- By-product utilization
- Safety certification
- Branding and Marketing

## 10.9 Financial literacy

Financial literacy in poultry production involves understanding and managing the financial aspect of running a poultry farm effectively. This includes the following:

- Budgeting and planning
- Cost Analysis
- Profitability assessment
- Market understanding
- Risk management
- Record keeping

- Access to finance

Improving financial literacy in these areas can significantly enhance the ability of poultry producers to run profitable and sustainable operations.

## 10.10 Business opportunities in chicken

Managing poultry is highly competitive in terms of feeds, market and infrastructure as explained below:

1. Production of feeds – Availability of fertile soils, good weather and climate provides an opportunity to produce cheap raw materials for making feeds.
2. Processing of feeds-There is potential for exploiting the existing gap for feed production and processing for most feed manufacturers.
  - a) Access to feeds - Many mushrooming small-scale feed producers, increase access to feeds by small scale poultry farmers.
  - b) Domestic market–Existence of potential effective demand caused by high rate of urbanization and population growth in Kenya.
  - c) Export market - Uganda is strategically located in the Great Lakes region which is ideal for supplying the growing regional markets in Kenya.
  - d) Affordable inputs-Livestock feed and labor for poultry feed production.
  - e) Improved transport infrastructure: Inform of upgraded road network and air transport.
  - f) Availability of fresh water bodies provides adequate fish raw material resources for production of feeds.

# Chapter III: Gender equality, human rights and social inclusion

## III.1 Background

Studies conducted during implementation of the various value chains identified gender and human rights related challenges to participation. Women reported that cultural issues affected their rights to own land preventing their involvement in value chain activities as they could not make decisions on what to plant since all agricultural activities are dependent on land as a factor of production.

Gender roles, triple roles for women-Reproductive. Productive and community management for women while Men's role is productive and community politics were also sited as a hindrance to women's involvement in value chains.

Cultural practices like wife cleansing and inheritance, especially in some counties, denied widows an opportunity to participate in the value chain activities. Decision making at the household level relating to value chain selection were mostly done by men, though in some instances, women also participated in the process. But where men had migrated to towns, women were the sole decision makers on selection of value chain(s). In some counties, men dominated in decision making concerning value addition, grading, marketing, savings, access to agricultural and marketing information, as well as access to credit and training. Women and youth could not initiate any agriculture-based Income Generating Activities (IGAs) without permission from the husbands/fathers or the elderly men in the family due to cultural beliefs and patriarchy.

High illiteracy levels and low skills especially among women left them vulnerable in terms of technical matters in the value chain activities. Several farmer groups believed both English and Kiswahili languages be adopted during training, Trainers were said to use a lot of English when training and it confused the farmers making language and methodologies used a barrier.

Lack of markets: Exploitation by intermediaries affected the prices of most of the value chain produce. It was suggested that market linkages with potential external buyers be established and strengthened.

Gender and extension services - Extension services were provided to the farmers through group training and through telephone calls by private extension officers and county government extension officers. The youth indicated that the extension training courses were done early during the day when they had reported for other activities such as attending other fishponds, harvesting excluding them from the services. Women also complained that the time at which the extension trainings are done did not favour them as they are attending to domestic chores or farm activities denying them the opportunity to gain experience.

Youth attributed their inadequate participation in value chain production activities to lack of land ownership since the parents (fathers) were not willing to give them land on a permanent basis. As a result, there was serious conflict between the young men and their fathers in counties in some countries. The fathers felt that the sons (youth) were irresponsible people who would sell the land upon being given, and the money spent on drinking alcohol. This would render the entire family landless.

Widowhood – Women in all the sampled counties were targeted because of their status as widows, and the fight for family land and other capital assets always starts immediately after the husband died. Being a widow left them vulnerable to other families or even community members who want their land and other assets. In some cases, family members secretly alter particulars of ownership documents such as title deeds to the disadvantage of widowed women.

People with disabilities often experience discrimination in their everyday life. Discrimination describes a situation where an individual is disadvantaged in some way because of a 'protected characteristic.' Discrimination takes place in different forms. It can be direct or indirect, manifest in the form of harassment, or there can be direct instructions to discriminate. Direct discrimination is based on negative attitudes, prejudice, and/or on discriminatory legislation. Indirect discrimination, for example, can be caused by physical barriers, such as stairs as the only means to get to vital locations, or using media. For example, people who are visually impaired or have difficulties hearing cannot use media without assistance.

Most of the respondents requested special training on gender mainstreaming and gender-based violence and human rights, hence this manual. The findings came from the report below and gender analysis of selected value chains conducted by the Gender Youth and Social Inclusion Advisor, MESPT in August 2024 (G.V. Masinde and C.K. Wambu, PhD November, 2021 Final draft report A Gender Equality and Human Rights Approach for The Green Employment in Agriculture Programme (GEAP), MESPT)

#### 11.1.1 Definition and key concepts

**Sex:** It identifies the biological differences between men and women. Kenya recognized and counted intersex persons during the census in 2019.

**Intersex:** Intersexuality is an overarching term that refers to human bodies that fall outside the strict male and female binary. The term refers to the many variations—often present at birth—that can affect a person's reproductive or sexual anatomy, which may involve genitalia, hormones, reproductive organs, and chromosomes.

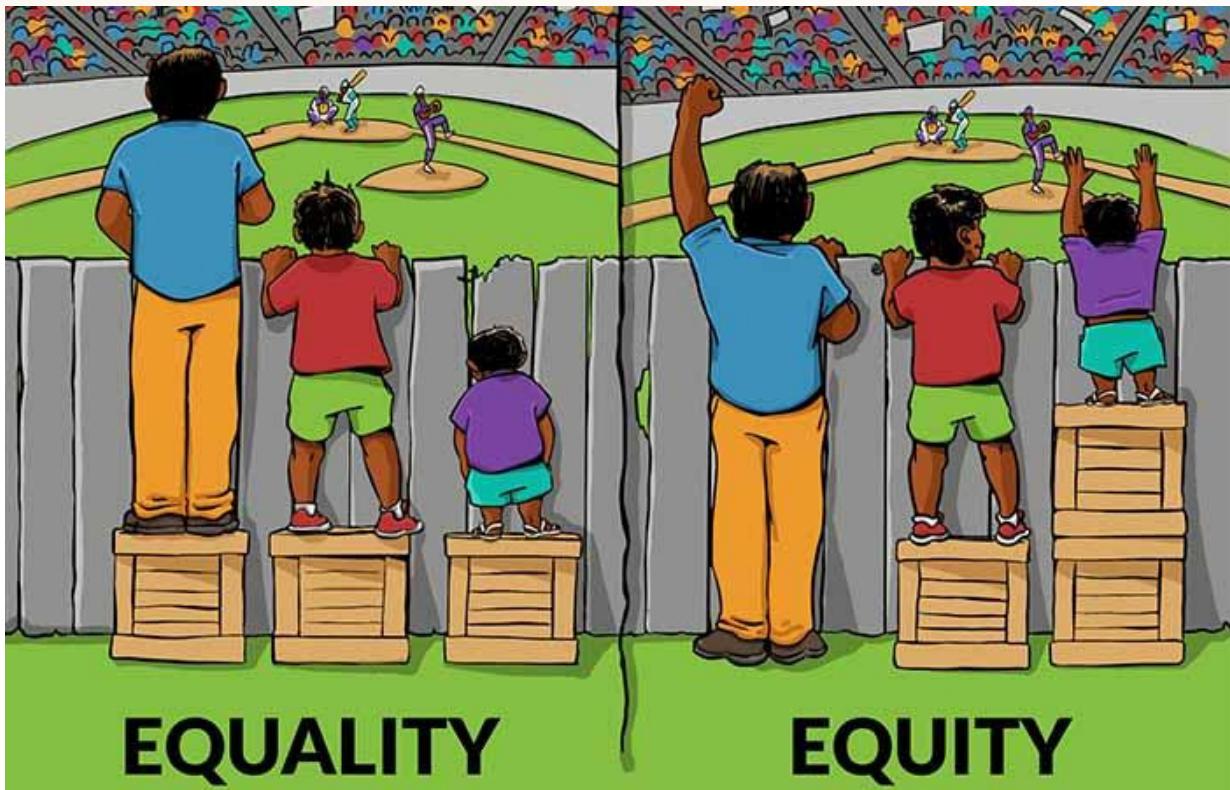
For example, these variations might include being born with "female" anatomy on the outside, such as a vaginal opening, but having "male" sexual organs on the inside. - [Intersex: What It Means, How It's Identified](#) accessed on 14/11/2024



**Figure 1:Kenya recognizes three genders [Two genders? No, we should recognize the three in Kenya | Nation](#) accessed on 14/11/2024.**

**Gender :** Refers to the socio-cultural differences and relations between men and women that are learned, changeable over time, and have wide variations both within and between societies and cultures. The concept of gender also includes expectations held about the characteristics, attitudes and behavior of women and men (femininity and masculinity).

**Gender equality:** This is a human right that is enshrined in several declarations and conventions, including the legally binding Convention on the Elimination of All Forms of Discrimination against Women (CEDAW).

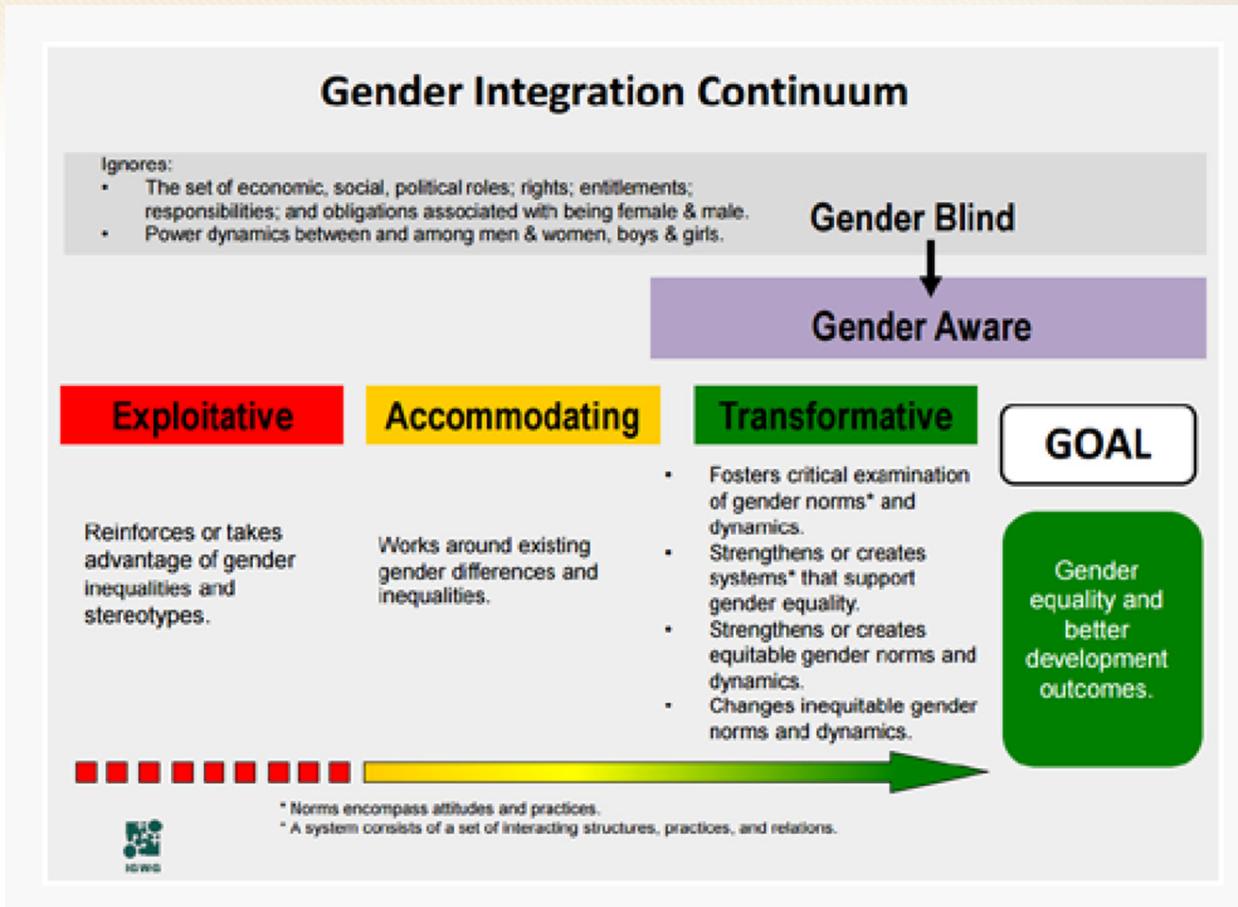


**Figure 2 Equality and Equity illustrated**

**Equality** does not mean that women and men are the same but that women's and men's rights, responsibilities and opportunities should not depend on whether they are born male or female. Gender equality implies that the interests, needs and priorities of both women and men are taken into consideration, recognizing the diversity of diverse groups of women and men(UN General Assembly, 1979). The centrality of **gender equality** to development is its establishment as a goal (goal 5) of the Sustainable Development Goals (SDGs) and included as a target in other SDGs.

**Gender Equity:** This is about fairness and being sensitive to the peculiarities of individuals, socio-economic groups, or communities. It is about equality of outcome or result of an intervention. Gender equity involves considering the different social, cultural, and economic situations of women, men, girls, and boys right from the design of an intervention through implementation to monitoring and evaluation.

**Gender sensitivity:** The ability to recognize the differences in terms of roles, contributions, needs and experiences of both women and men, and create a conducive environment for effective application of their specific knowledge, skills, and experiences in meeting their prioritized needs.



**Figure 3:** Gender Integration Continuum

**Gender aware:** Recognizing or being aware of the existence of gender and gender differences in society; recognizing that men and women are positioned differently; that they have different experiences, different needs and interests, different strengths, and skills, and that these need to be considered while planning for any intervention.

**Gender responsiveness:** This describes the policies, programmes and projects that focus on transforming existing gender disparities to create a more balanced relationship between women and men in terms of power and decision-making as well as access to and control over productive resources. Gender responsiveness is key in meeting strategic gender needs (strategic gender needs are the needs women identify because of their subordinate position in society. These needs are long-term and relate to the empowerment of women. Strategic gender needs for women might include land rights, more decision-making power, equal pay, and greater access to credit. Addressing these needs allows people to have control over their lives beyond socially defined restrictive roles)

Practical gender needs are defined as: Needs that respond to immediate necessities such as adequate living conditions, water provision, health care, and employment. Gender-specific needs that do not challenge gender roles, such as access to healthcare, water availability, and employment opportunities.

### Gender transformative

Addressing gender imbalances, changing gendered power relations, and actively building equitable social norms and structures. An organization is aware that women and men do not have equal opportunities in the household, at community level or at work. They may, for example, create equal working conditions for women and men, recognizing that special means may be required to increase the number of women in management positions or to achieve an environment free from gender-based

violence (GBV). Gender transformative approaches are characterized by explicitly centering gender norms and are thus common for interventions that have the primary goal of addressing gender issues and transforming gender relations to promote equality.

Transformative Gender Programming includes policies and programs that seek to transform gender relations to promote equality and achieve program objectives. This approach attempts to promote gender equality by:

1. fostering critical examination of inequalities and gender roles, norms, and dynamics,
2. recognizing and strengthening positive norms that support equality and an enabling environment,
3. Promoting the relative position of women, girls, and marginalized groups, and transforming the underlying social structures, policies and broadly held social norms that perpetuate gender inequalities.
4. Most importantly, program/policy planners and managers should follow two gender integration principles:
  - First, under no circumstances should programs/policies adopt an exploitative approach since one of the fundamental principles of development is to “do no harm.”
  - Second, the overall objective of gender integration is to move toward gender transformative programs/policies, thus gradually challenging existing gender inequities and promoting positive changes in gender roles, norms, and power dynamics.

**Empowerment:** Is about improving women's and men's status to enhance their decision making-capacity at all levels. It refers to the process in which women and men reflect upon their reality and question the reasons for their situation in society. It includes developing alternative options and taking opportunities to address existing inequalities. It enables them to live their lives to the fullest of their capabilities and their own choices in respect of their rights as human beings.

**Gender Mainstreaming:** **Gender equality** can be achieved by a strategy of mainstreaming which is defined by the United Nations, as ‘...the process of assessing the implications for women and men of any planned action, including legislation, policies, or programmes, in all areas and at all levels. It is a strategy for making women's as well as men's concerns and experiences an integral dimension of the design, implementation, monitoring and evaluation of policies and programmes in all political, economic, and societal spheres so that women and men benefit equally, and inequality is not perpetuated. The goal is to achieve gender equality.’

Gender mainstreaming aims to ensure that women and men, particularly those who are disadvantaged, equally participate in and benefit from the activities of a given organization, and that all implemented projects and programmes consider women's and men's concerns and experiences as an integral dimension of their cycles. This intervention ensures that existing democratic relations are protected, at the same time preventing the further perpetuation of inequalities and the creation of new ones.

### 11.1.2 The Business case for gender mainstreaming

**Gender mainstreaming** in Agri-enterprises is not only a matter of social equity but also makes strong business sense. Here are some key points that highlight the business case for gender mainstreaming in this sector:

**Increased Productivity:** Women make up a sizable portion of the agricultural workforce. By

providing them with equal access to resources such as land, credit, and training, productivity can be significantly increased. Studies have shown that closing the gender gap in agriculture could increase yields on women's farms by 20-30%

**Enhanced Innovation:** Diverse teams bring varied perspectives, leading to more innovative solutions. Women often bring unique insights into agricultural practices and market needs, which can drive innovation and improve business outcomes.

**Market Expansion:** Women are key players in local markets and value chains. By empowering women, Agri-enterprises can tap into new markets and consumer bases, enhancing their market reach and profitability.

**Improved Financial Performance:** Companies that invest in gender equality tend to perform better financially. Gender-diverse companies are more likely to have higher returns on equity and better financial performance overall.

**Risk Mitigation:** Gender mainstreaming can help mitigate risks associated with labor shortages and community relations. Empowering women can lead to more stable and resilient communities, which in turn supports sustainable business operations.

**Compliance and Reputation:** Increasingly, investors and consumers are looking for companies that adhere to social responsibility standards. Gender mainstreaming can enhance a company's reputation and compliance with international standards, attracting more investment and customer loyalty.

By integrating gender mainstreaming into their operations, Agri-enterprises can not only contribute to social equity but also enhance their competitiveness and sustainability.

### 8.1.3 Steps to mainstream Gender

Gender mainstreaming in Agri-enterprises involves several strategic steps to ensure that gender considerations are integrated into all aspects of the business. Here are some specific strategies:

1. **Conduct Gender Analysis:** Start with a thorough gender analysis to understand the distinct roles, needs, and challenges faced by men and women in the agricultural sector. This analysis should inform all stages of project planning and implementation.
2. **Develop Gender-Responsive Policies:** Create policies that promote gender equality and address specific barriers faced by women and youth. This includes policies on equal access to resources, decision-making, and opportunities for training and development.
3. **Capacity Building:** Provide training and capacity-building programs for both men and women to enhance their skills and knowledge. This can include technical training, leadership development, and financial literacy.
4. **Gender-Responsive Budgeting:** Allocate budget specifically for gender mainstreaming activities. This ensures that there are sufficient resources to support gender equality initiatives.
5. **Participatory Planning:** Involve both men and women in the planning and decision-making processes. This ensures that the perspectives and needs of both genders are considered and addressed.
6. **Monitoring and Evaluation:** Establish gender-sensitive indicators and regularly monitor and evaluate the impact of gender mainstreaming activities. This helps in assessing progress and making necessary adjustments.

7. **Promote Women's Leadership:** Encourage and support women to take on leadership roles within the enterprise. This can be achieved through mentorship programs, leadership training, and creating an enabling environment for women leaders.
8. **Address Social Norms:** Work on changing discriminatory social norms and practices that hinder gender equality. This can be done through community engagement, gender transformative approaches including Gender action learning systems(GALS), community conversations, model families, among others that seek to address root causes of discrimination.

## 11.2 Human rights

**Human Rights:** These are rights inherent to all human beings, independent of nationality, place of residence, sex, national or ethnic origin, race, religion, language, or any other status. All human beings are equally entitled to human rights without discrimination. These include the right to life, equality before the law, the right to work, social security, education, and the right to development. These rights are all interrelated, interdependent and indivisible(Access the comprehensive text here [30 articles on the 30 Articles of the Universal Declaration of Human Rights | OHCHR](#)

# UN Universal Declaration of Human Rights

Adopted: December 10, 1948

- |   |  |
|---|--|
| 1. We are all born free and equal                 | 16. All may marry and establish families   |
| 2. Everyone has rights despite differences        | 17. All may own property   |
| 3. All have the right to live, and live in safety | 18. All may think freely, including religion   |
| 4. No one may enslave you                         | 19. All may freely express opinions  |
| 5. No one may torture you                         | 20. All may assemble peacefully  |
| 6. You have rights no matter where you travel     | 21. All may participate in governing   |
| 7. All are equal before the law                   | 22. All have rights to dignity and social protections  |
| 8. Human rights are protected by law              | 23. All have free choices of employment  |
| 9. No one should be unfairly detained             | 24. All have rights to rest and leisure  |
| 10. All have a right to a fair trial              | 25. All have the right to an adequate standard of living                                       |
| 11. All accused are innocent until proven guilty  | 26. All have a right to education  |
| 12. All have a right to privacy                   | 27. All have rights to intellectual property   |
| 13. All have the right to move freely             | 28. All have the right to a world that enables and protects rights                             |
| 14. All may enjoy asylum from persecution         | 29. All rights have responsibilities and can only be limited when infringing on others' rights |
| 15. All have a right to nationality               | 30. No one can take away your human rights   |

Figure 4: 30 articles of Huma rights

Children rights are also enshrined in the convention on the rights of the child(1989). Kenya enacted this into a children's act 2022.



## CONVENTION ON THE RIGHTS OF THE CHILD

**A human rights-based approach (HRBA):** This is a conceptual framework based on international human rights standards and directed towards promoting and protecting human rights. HRBA seeks to analyze the inequalities which lie at the heart of development problems and redress discriminatory practices and unjust distributions of power that impede development progress.

**HRBA** is concerned with empowering people to know and claim their rights and increasing the ability and accountability of individuals and institutions who are responsible for respecting, protecting, and fulfilling rights. The HRBA approach aims to eliminate or at least diminish the impediments of existing exclusion and discrimination within the implementation of any programme or project. HRBA gives equal attention to both achieving development goals and to the processes that are chosen to achieve these goals. So, within HRBA, the processes that enable the participation and inclusion of all stakeholders are important.

### **11.2.1 About hrba and pant principles**

The HRBA builds on the norms and principles outlined in the Universal Declaration of Human Rights, and the subsequent legally binding UN treaties, which form the basis for all development cooperation. Application of the HRBA contributes to effective development cooperation processes and sustainable development outcomes. It challenges unequal power relations and social exclusion that deny people their human rights and often keep them in poverty and oppression. Microenterprise support Programme Trust (MESPT) is committed to the HRBA in all interventions.

HRBA places people living in poverty and oppression (rights holders) at the center. It is about:

- Empowering rights-holders to enable them to take action to address their situation and to claim their rights individually and collectively.
- Developing capacities and interests of duty-bearers to fulfil their obligations to respect, protect and fulfil human rights.

PANT is a tool that guides staff on the practical application of the HRBA.

It has four elements:

**Participation:** Do all stakeholders engage actively, in a way which allows rights-holders to contribute meaningfully and influence processes and outcomes?

Everyone has a right to freely participate in decision making that affects them and their environment. People of power have an obligation to offer meaningful participation and consultations to people affected. Everyone has the right to organize and hold opinions without any interference, and to seek, receive and impart information and ideas through any media regardless of frontiers. Promoting participation is essential for the outcome of projects and programmes. It is stated in international treaties that women, men, girls, and boys have a right to participate in decision-making that affects them. Social and cultural roles that are prescribed women and men have impact on their possibilities of choices, economic independence, access to natural resources, access to land tenure, access to clean and safe water, and decisiveness on housing, education, and livelihood.

**Guiding questions are:**

- Are fair and effective platforms for public-private dialogue in place, and do they give space to representatives of women and men with less power and status?
- Are measures taken to include and enhance the capacity of those with less knowledge and power so that they can participate meaningfully in the consultative processes? For example, do all stakeholders have sufficient and accessible information on the issues being addressed? Are they invited to truly participatory processes? Are barriers removed, e.g., no expensive travelling, not during busy seasons, not inaccessible for women or persons with disabilities?
- Are stakeholders actively engaged at all stages of the programming process?
- Do initiatives make space for vulnerable people to take actions of their own choosing to manage perceived risks? This is especially important in ‘transformative’ efforts that encourage profound changes in livelihood systems in response to climate change or market upheavals.

**Accountability:** Who are the duty bearers on various levels, and do they have sufficient capacity and interest to be accountable to rights holders?

The state has an obligation to respect, fulfil and protect the rights of its population. It entails a functional regulatory system for climate and environmental issues, labour law, land systems ; concrete plans for disaster risk reduction and response; rule of law including a justice system providing legal aid to poor and marginalized people and their organisations; and functional and accessible complaints mechanisms. Emphasizing the accountability of all actors (both state and non-state), whose actions impact the environment and natural resources, is a central element of HRBA. Asserting human rights without supporting effective and precise frameworks to hold duty bearers accountable is of little practical use. Strengthening the governance of natural resource management and securing natural resources tenure while also taking rights of local people, women and men, ethnic minorities, nomadic or other marginalized groups into account, can

- i. minimize corruption.
- ii. have positive effects on conflict management.
- iii. be a key step towards alleviating tensions in society and consolidating peace in post-conflict societies.

**Guiding questions are:**

- Are the duty bearers and other actors with power identified?
- Does the initiative contribute to ensuring that public and private sector actors have systems in place to monitor and disclose social and environmental impacts according to national and international standards?
- Do monitoring and evaluation arrangements involve civil society organisations representing the concerned population?
- Are there consequences (legal, financial, or moral) for non-compliance with human rights objectives and principles?
- Has the contribution established accessible and effective mechanisms for redress and complaints?
- Does the contribution facilitate access to networks, organisations and other sources of information that may assist duty bearers to enhance their accountability and rights holders to claim their rights?

**Non-discrimination :**Are rights holders and the root causes of their lack of human rights identified and considered, particularly those most subjected to discrimination, marginalization, and vulnerability?

All women, men, girls, and boys are, without any discrimination, entitled to equal access to ecosystem services , market systems and natural resources as well as resilience for a standard of living adequate for their health and well-being. Discrimination may be expressed in law (explicit discrimination) and hence be part of official policy such as lack of land rights; or it may be found in practice and behavior (implicit discrimination)such as where a remote group cannot access water services because drinking wells provided by the state are too far away.

**Key questions are:**

- Are vulnerable groups specifically identified and targeted?

- Is there a proper analysis of the consequences of the contribution for these women, men, girls, and boys?
- Is there a plan for their inclusion and benefit including disaggregated data and indicators?
- Are tariffs and fees also adjusted to accommodate poor and marginalized groups?
- Are land and property rights addressed to ensure that women, minorities, and poor people are protected or compensated?
- Are the livelihoods supported resilient to risks related to climate and market volatility and uncertainty, and therefore relevant for vulnerable populations that cannot afford to shoulder uncertain risks?

**Transparency:** What measures are put in place to ensure that all stakeholders can access relevant information and knowledge regarding the contribution?

**Transparency** All people have the right to obtain information in an accessible and timely manner, e.g., about pollution levels, water quality, environmental health risks, exploitation plans, land use plans and disaster preparedness plans. Granting sufficient and accessible information to affected women and men in planning and policy making processes is of key importance to their ability to influence and monitor developments. It is also important to consider local traditions, survival strategies and indigenous people's dependence on natural resources, and ensuring that separate views are documented. It is also essential to consider access to natural resources for people living in poverty and that a long-term sustainable development can be promoted, to avoid future opposition and conflicts.

#### **Guiding questions are:**

- Are the plans and goals of the contribution made public and explicit in an accessible manner to all stakeholders concerned, including the most marginalized groups so that they understand benefits and risks?
- Will affected women, men, girls, and boys receive sufficient, timely and accessible information, including separate views on the plans, and will they be able to take meaningful part in and influence the process?
- Will access to information regarding the local risk situation be improved and will early warning systems be developed so that the ability of vulnerable groups to protect themselves and quickly recover after disasters is strengthened?
- Does the initiative contribute to capacities and commitments for greater transparency in policies and practice affecting land and natural resource tenure, particularly in new forms of land acquisitions and concessions?

### **11.3 Social inclusion**

Social inclusion is the process of improving the terms on which individuals and groups take part in society—improving the ability, opportunity, and dignity of those disadvantaged based on their identity.

## what is the difference between diversity and inclusion?

diversity is a fact,  
inclusion is an act

### DIVERSITY

Diversity refers to who's at work: who is recruited, hired, and promoted by a company.

Diversity is the full spectrum of human demographic differences.



### INCLUSION

Inclusion refers to how people feel at work.

Inclusion is all about concrete methods and strategies to make all team members feel accepted and engaged when different people are in the same territory.



**Figure 5** Diversity vs Inclusion DRP Group. (n.d.). What is the difference between diversity and inclusion? DRP Group. Retrieved November 14, 2024, from <https://www.drpgroup.com/en/blog/what-is-the-difference-between-diversity-and-inclusion>.

**In every country, some groups confront barriers that prevent them from fully participating in political, economic, and social life.** These groups may be excluded not only through legal systems, land, and labor markets, but also discriminatory or stigmatizing attitudes, beliefs, or perceptions. Disadvantages are often based on gender, age, location, occupation, race, ethnicity, religion, citizenship status, disability, and sexual orientation and gender identity (SOGI), among other factors. This kind of social exclusion robs individuals of dignity, security, and the opportunity to lead a better life. Unless the root causes of structural exclusion and discrimination are addressed, it will be challenging to support sustainable inclusive growth and rapid poverty reduction.

Social inclusion is the right thing to do, and it also makes good economic sense. Left unaddressed, the exclusion of disadvantaged groups can be costly. At the individual level, the most measured impacts include the loss of wages, lifetime earnings, poor education, and employment outcomes. Racism and discrimination also have physical and mental health costs. At the national level, the economic cost of social exclusion can be captured by foregone gross domestic product (GDP) and human capital wealth. Exclusion, or the perception of exclusion, may cause certain groups to opt out of markets, services, and spaces, with costs to both individuals and the economy.

Ensuring inclusivity means no one is left behind (leave no one behind-LNOB). The following steps make this possible.

### **8.3.1 Leave no one Behind**

#### **STEP 1: Who is being left behind? Gather data.**

Identify who is being left behind and in what ways, and who among them is the furthest behind.

- Gather and analyze all data and information on who in the community is left behind in group activities and project interventions-sub populations and geographic localities among others with due attention to the human rights-based approach and gender considerations.
- Include and analyze data and information from a range of sources, including from national statistical offices, national human rights institutions, international human rights mechanisms, ILO supervisory bodies, civil society organizations, particularly organizations of marginalized communities as well as women's organizations, and/or community-level data, citizen science initiatives and scientific journals.
- Seek feedback and input from diverse stakeholders, including groups and populations left behind, throughout the process, from initial gathering of data to review and analysis.
- Identify data gaps.
- Complement existing data where needed, to further understand which subpopulations may be left behind, and which ones are furthest behind, using participatory approaches to gathering data.
- Combine relevant national and UN development, human rights, conflict, inequalities, political, risk and humanitarian analysis for more joined up assessment of who is left behind and why – with a view to identifying the furthest behind.
- Triangulate the data from the above sources through a consultative analytical process to develop a mutual understanding across all interventions that consider the voices and experiences of communities together with other data sources.

#### **STEP 2: Why? Prioritization and analysis**

- Frame as problems the LNOB assessment's main findings are about the ways in which people are left behind. Identify the relevant human rights and international labour standards.
- Conduct a root cause analysis to identify why people are being left behind and to enable responses to the root and underlying causes of inequalities, including gender inequalities, vulnerability, deprivation, discrimination, displacement, and exclusion.
- Conduct a role pattern analysis.
- Conduct a capacity gap analysis.
- Questions to be asked at each step: Causal analysis WHY? Which rights are implicated that explain why there is a problem? Role pattern analysis WHO? Who is the duty-bearers? Who are the rights holders? Who must do something about it? Capacity gap analysis WHAT? What capacity gaps are preventing duty-bearers from fulfilling their duties? What capacity gaps are preventing rights holders from claiming their rights? What do they (each) need to act?

#### **STEP 3: What? What should be done?**

Identifying what should be done and by whom.

- Identify actions and interventions to address challenges, barriers, and capacity gaps. Areas include advocacy, enabling the environment, capacity development ,community empowerment, quality and accessibility of services, partnerships including civil society.
- Prioritize, considering the commitment to address the furthest behind first.

#### STEP 4: How? How to measure and monitor progress

- Help identify and contextualize LNOB indicators and targets – having a clear overview of data and data gaps and a plan for monitoring progress is an important precondition for effective follow-up and review.

Quantitative and qualitative indicators will be necessary – measuring commitments, processes, and outcomes.

- Support innovative ways of tracking, visualizing, and sharing information.
- Develop the stakeholder capacity to monitor inequalities, including gender inequality and discrimination, including that of governments (national, subnational) and communities.

#### STEP 5: Advancing accountability for LNOB.

- Ensure accountability for LNOB within the organization and the interventions.
- Support the integration of LNOB in interventions follow-up and review processes, including in narrative reports.
- Support national accountability to people left behind.

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## **ANNEX I: Sample training programme**



**CHICKEN VALUE CHAIN TRAINING WORKSHOP FOR XXXX**

**TRAINING VENUE: XXX**

**DATES: XXX**

## **SAMPLE PROGRAMME**

## **ANNEX II.: List of participants who validated this value chain manual**

S/NO	NAME	INSTITUTION
1	Joseph Kairu	County Government of SIAYA
2	Winston Motanya	County Government of KISII
3	Nicholas Manyinsa	County Government of KISII
4	Cecilia Mutuku	County Government of MACHAKOS
5	Paul Busienei	County Government of NAKURU
6	David Kimera	Youth Agri-Preneur
7	Lawrence Swanya	County Government of MACHAKOS
8	Kenneth Kagai	County Government of TRANS-NZOIA
9	Benedict Khanyifu	County Government of TRANS-NZOIA
10	Mwalimu Menza	Kenya Agricultural and Livestock Research Organization
11	George Kamami	County Government of MAKUENI
12	Moses Munialo	County Government of BUGOMA
13	Agesa Eric	County Government of KAKAMEGA
14	Benard Mainga	County Government of KWALE
15	Jane M Kamamu	County Government of KILIFI
16	Teresia Ndungu	County Government of NYANDARUA
17	Wilbur Mutai	County Government of UASIN-GISHU
18	Stephen Odipo	Kenya Agricultural and Livestock Research Organization
19	Solomon Mbivya	PAPA FARMERS Limited
20	William Mwangi	County Government of MAKUENI
21	Doreen Kinoti	Micro-Enterprises Support Programme Trust
22	Serah Nzau	Micro-Enterprises Support Programme Trust
23	Margaret Kikuvi	Micro-Enterprises Support Programme Trust



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