

**Rural Youth Employment  
Opportunities:**  
Support to integrated  
agribusiness hubs in Nigeria



**Poultry  
Production  
Training Manual**

# Poultry Production Training Manual

## Disclaimer:

This training was developed and prepared by ILRI Nigeria Office adapted for the Rural Youth Employment Opportunities: Support to integrated agribusiness hubs in Nigeria (IFAD-Agrihub Nigeria project) and IITA Youth in Agribusiness office.



# TRAINING

## Outline

# MODULE

- 1 General Overview of Poultry Industry/Poultry Types
- 2 Poultry Housing and Equipment
- 3 Bird Stocking & Brooding Management Techniques
- 4 Commercial Broiler (Meat) Production
- 5 Feeds and Nutrition
- 6 Farm Records and Product Marketing

# MODULE 1

## General Overview of the Poultry Industry

### Module Objectives

- At the end of this module, the trainee should be to
- Know the challenges and importance of poultry farming
- Identify the breeds of poultry
- Familiarize with major terms in poultry farming

### 1.1 Overview of Poultry Farming

The word poultry refers to all domesticated birds such as chicken (domestic fowl), geese, duck, quails, guinea fowl, turkey and so on. Poultry production is gaining ground in Nigeria because of the part it plays in contributing high quality protein for human consumption through poultry meat and eggs.

Poultry farming has also provided employment opportunities for Nigerians. However, in Nigeria, the use of modern technology has been integrated in poultry production with facilities such as hatcheries, feed mill among others hence, local poultry production is encouraged as there is embargo on the importation poultry products.

### Challenges of Poultry Industry

- a. Insecurity
- b. High cost of inputs (feed)
- c. Diseases
- d. Lack of funds

### Employment opportunities along the poultry value chain

Poultry value chains link the actors and activities involved in delivering poultry and poultry products to the final consumer, with products increasing in value at every stage (FAO).

Below are various employment opportunities along the poultry value chain:

- Production – Feed, Meat, Egg, Drug, vaccine, equipment
- Transport – input and products
- Processing – feed and products (meat, egg)
- Packaging and storage
- Retailing – including buying and selling of inputs and products at varying marketing scale
- Servicing

## 1.2 Poultry Types and Breeds

Poultry birds are basically classified into three based on their productivity:

### Egg Producing Types/ Breeds (Layers)

These are birds raised primarily for egg production. Under good management, the birds start laying eggs within their 16 – 20 weeks of age and continue for about 78 weeks. Some highly productive breeds are Hyline, Isa brown, Black Arco (dominant black), Lohmann etc.

### Meat Producing Types/ Breeds (Broilers)

These birds are for meat production with very soft and tasty meat, with expected body weight of 2 to 2.5 kg within 6 to 8 weeks of age, consuming about 4 kg of feed. Examples include Arbor Acre, Ross 308, Marshal, Cobb, etc.

### Dual-Purpose Poultry Breeds

Dual-purpose poultry breeds are bird reared for both meat and egg production. Examples include Noiler, FUNAAB Alpha, Hampshire, Australorp, Rhode Island red, Plymouth etc.

**Layers**



**Broilers**



# MODULE 2

## Housing and Equipment for Commercial Broiler Production

### **Module Objectives**

*At the end of this module, trainee should be able to:*

- i. The needful in building poultry house*
- ii. Identify various housing management system, and be able to select the appropriate one*
- iii. Identify equipment used in poultry farming based on the usage*

### **2.1 Housing**

In poultry and as with any livestock enterprise, next to feeding is housing. Housing is very important for protection of birds from predators, theft, adverse weather conditions. A good poultry house should be well ventilated, cleaned, spacious, built with strong and durable materials, and not built at flood prone area. The orientation should be east-west direction, as this will prevent direct sunshine over the birds.

Based on management practices, poultry housing can be classified into three:

1. Intensive system: Deep-litter and Battery Cage system
2. Semi-intensive system
3. Free range or extensive system

#### **1) Intensive system**

Birds are totally confined to houses either on ground / floor or on wire-netting floor in cages or on slats. It is the most efficient, convenient, and economical system for modern poultry production with huge numbers. However, intensive system can be:

- i. Deep-litter system:** Here birds are kept on the floor, with feeders and water-trough made available. The birds are kept on suitable litter material of about 3" to 5" depth which could be paddy husk, saw dust, ground nut hulls, chopped paddy straw or wood shavings. The litter is expected to be changed as the need arises, depending on the breed of the poultry, stocking rate and prevailing weather conditions. Though consider cheaper than battery cage system, it has some advantages and disadvantages which include:

Advantages	Disadvantages
Vit B2 and Vit B12 are made available to birds from the litter material by the bacterial action.	Because of the direct contact between bird and litter, bacterial and parasitic disease may be a problem.
Welfare of birds is maintained to some extent.	Respiratory problems may emerge due to dust from the litter
The deep litter manure is a useful fertilizer.	The cost of litter is an additional expenditure on production cost.
Lesser nuisance from flies when compared to cage system.	Faults in ventilation can have more serious consequences than in the cage system

ii. Cage system: Birds are raised on wire netting floor called cages fitted with stands on floor of house. This housing system Even though this housing system have huge initial start-up capital, yet it has been proved very efficient both for broiler and layers. Feeders and waterers are placed within or outside the cage, but however accessible to the birds. Auto-operated feeding and water system devices as well as egg collection can also be used in this rearing system. The droppings are either collected in trays underneath cages or on belts or on the floor or deep pit under cages, depending on type of cages.

Advantages	Disadvantages
Minimum floor space is needed	High initial investment cost.
More number of eggs per hen can be received	Handling of manure may be problem. Generally, flies become a greater nuisance
Less feed wastage	In case of broilers, incidence of breast blisters is more, especially when the broilers weight is more
Better feed efficiency	Faults in ventilation can have more serious consequences than in the cage system
Protection from internal parasites and soil borne illnesses	
Sick and unproductive birds can be easily identified and eliminated.	
Eggs come out clean	
Vices like egg cracking, eating, and pecking is minimal.	
No need for litter material	

**Broilers cage****Layers cage**

## 2) Semi-Intensive System



Birds are half-way reared in houses and half-way on ground or range, i.e. birds are confined to houses at night or as per need and they are also given access to roam. The feeding and watering facilities are provided in the pen.

## 3) Free-Range/ Extensive System



This is the traditional method of raising birds, adopted in rural areas or where adequate land is available to ensure desired stocking density. A range provides shelter, greens, feed, water and shade. Foraging is the major source of feeding for birds. Shelter is usually provided by temporary roofing supported by ordinary poles.

## Poultry Equipment

Poultry equipment can be broadly grouped into two based on their usage: general and specific.

**General equipment:** feeders, drinkers, broom, packer etc

**Specific equipment:** brooders, defeathering machine, crate, transferring cage etc.





Wheelbarrow

Broom

Shovel

Bow/bucket

# MODULE 3

## Birds Stocking and Brooding Management

### Module Objectives

Trainees are expected to

- i. Know the major housing preparation for stocking new birds
- ii. Know major reputable hatcheries for sourcing day old chicks (DOC)
- iii. Know how to check for quality DOC
- iv. Know the primary cares giving to DOC on arrival
- v. Know major brooding management practices

Broilers occupy 1 square feet per bird. For example, if you intend to keep 2000 broiler birds the house should measure 100ft by 20ft.

### Stocking of birds

Preparation for the arrival of chicks (Housing preparation)

- Cleaning of the pen from waste of previous production
- Disinfecting of the pen with disinfectant at least two weeks to stocking
- Perform any repair in the pen (patching of any opening in the floor, mending the net, etc)
- Disinfecting of the equipment
- Provision of the heat source
- Provision of beddings (in deep litter)

Sourcing for day old chicks from reputable hatcheries (Agrited, Amo, Zartech, Chi etc.)

- Source DOC from reputable hatcheries (if possible, book directly)
- Count the birds per box (51 birds)
- Check for any deformities (twisted beak, eye deformation, inability to work, etc.)
- Reject any deformed DOC
- Transport DOC during under a cool weather condition or AC fitted vehicle

Handling of chicks on arrival

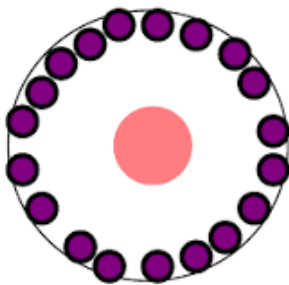
- Prior to the arrival, pre-heat the room with both feed and water containing antistress made available as well as the foot dip
- Let birds out of the box gently
- Do not over crowd the room
- On letting out of the DOC observe any weak or non-active ones

Management of chicks in the brooder

Brooding is the process of caring for young chicks from day-old to three weeks of age (depending on weather and breed type). Successful brooding is a precursor for survivability and good production. It entails the provision of the following essential factors:

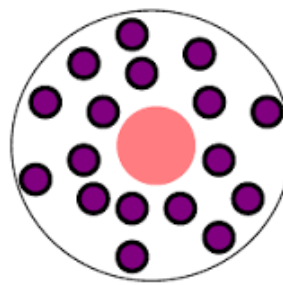
- Heat: (Infrared light brooder, electric bulb, gas and coal pot etc.) between 87- 92° F (30- 33°C) depending on the prevailing weather condition.
- Light – at least 20-22 hours per day. This allows them to eat as much as possible
- Ventilation – avoid building of Ammonia in the pen
- Feeds/watering- serve both quality feed and clean water ad lib, but avoid wastage
- Health packages (vaccination and medication) - adhere to required vaccination and medication

## Brooding - Temperature



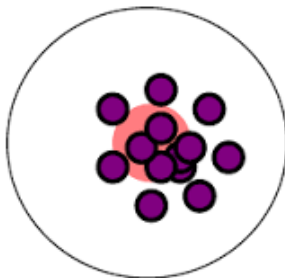
Chicks make no noise, chicks pant, head and wings droop. Chicks away from Brooder

**TEMPERATURE TOO HIGH**



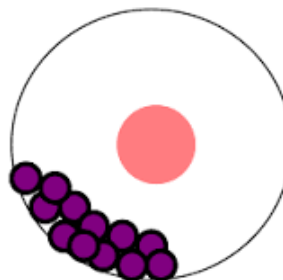
Chicks evenly spread. Noise level signifies contentment

**TEMPERATURE CORRECT**



Chicks crowd to brooder. Chicks noisy, distress calling

**TEMPERATURE TOO LOW**



This distribution requires investigation. Influenced by draft - uneven light distribution - external noises.

**DRAFT**

# MODULE 4

## Commercial Broiler Production/Management

### **Module Objectives**

*Trainees are expected to*

- i. Basic broiler production management practices*
- ii. Basic procedures in broiler processing*
- iii. Broiler marketing*
- iv. Basic broiler health management*
- v. Identify major broiler diseases*
- vi. Keep biosecurity measure in broiler farm*
- vii. Major vaccination schedule in broiler production*

### **Management Practices in Broilers production**

The essential conditions for broiler rearing include the following:

- Adequate temperature (Heat)
- Good ventilation
- Lighting
- Feeds
- Floor Space Requirement - 0.06m<sup>2</sup> from day old to market age.

### **Tips for broiler Health Program**

- Strictly adhere to guides on sourcing of DOC and brooding management
- Administer appropriate drugs and vaccines
- Provide sufficient feeders and drinkers (especially on deep litter)
- Keep feed away from water and rodents
- practices good biosecurity practices
- If there are more than one age group on the farm, the younger batch should be attended to first while performing daily routine works.
- Good litter management

### **Processing of broilers**

Under normal condition, at body live weight of 1.8 – 2.2kg broiler meant for meat is ready and usually at 4-7 week of production (depending on the quality and quantity of the feed and other management practices). During processing, birds selected for slaughtered should be fasted at least 4-6 hours. This is to allow the intestine to be emptied and prevent gut rupturing during carcass evisceration and its content will contaminate the carcass. Processing can be automated on a large

farm and highly commercial level or manually in a small scale on a subsistence level. Nonetheless, it involves the following:

- Slaughtering
- Scalding
- Evisceration/Carcass Preparation
- Cold chain maintenance
- Preservation
- Storage

## Marketing

The objective of any production schema is marketing and profitability. Broiler can be marketed either as live or processed. In broiler production, identification of an appropriate market is panacea to the success of the business. Processed broiler is profitable than marketing it live, though the later can be quickly than the former. Processed broiler can be sold as whole chicken or in parts.

## Health management

### Poultry Disease and its management

Disease is deviation from normalcy which is caused by living factors like viruses, bacteria or parasites, or non-living factors such as nutritional deficiencies, toxins and other physical or chemical agents. Diseases can be classified depending on the causative factors. Diseases cause severe economic loss in poultry production - death of birds and loss in production.

### Examples of Poultry Diseases

- Viral: Gumboro, Newcastle, fowl pox, Mareks etc.
- Bacterial: Fowl typhoid, fowl cholera, pullorum etc
- Fungal: Aspergillosis.
- Parasitic/Protozoan: Could be external parasite such as Lice, fleas, mites or internal parasites like roundworms, tape- worms etc. Protozoan like Eimeria- spp which causes Coccidiosis.
- Nutritional deficiency: In poultry feeding, absence or low level of some vitamins, minerals and certain nutrient can lead to diseases. However, unlike the diseases caused by the micro-organism, these can be easily and quickly controlled. For instance, deficiency of protein and vital amino acids and insufficient energy in feed cause poor growth and ruffled feathers while low level of calcium leads to lameness and walking difficulty as well as soft eggshell in layers.

### How to Identify Healthy and Unhealthy birds

Healthy Bird	Sick Bird
Bright eyes and comb	Dull eyes and comb
Walk, run, stand, and scratch	Sit or lie down for long periods
Smooth and neat feathers	Ruffled feathers
Soft compact droppings	Wet droppings with blood or worms
Lay eggs normally	Lay less or stop laying eggs
Breathe quietly	Cough, sneeze and breathe noisily
Eat and drink normally	Eat and drink less

## Biosecurity Measures

Biosecurity (biological security) is securing the environment from biological agents and is the best form of defense against emergency diseases on poultry farms. This means preventing the entry of disease-causing organisms into a farm.

### ***Some Biosecurity measures in Poultry Production***

- Source disease-free chicks
- Build shelters against wind and rain
- Clean houses regularly and apply disinfectant timely.
- Provide dry litter regularly/Good litter management
- Do not put too many birds in a pen/overstocking
- Different species of poultry, for example hens, turkeys, pigeons, ducks and guinea fowls should be kept separate
- Separate chicks from adult birds, establish an “All in, all out” rule
- Vaccinate against diseases and re-vaccinate if necessary.
- Regulate visitor’s entry the farm
- Control wild birds, rodents, and reptiles
- Avoid visiting neighbor’s farm and returning to your own without a complete change of footwear and clothing.
- Practice sanitary clean-up and waiting period (2-weeks minimum) before introducing a new flock to used pens. Exposure to direct sunlight kills many germs.
- Give access to the right feed (free from aflatoxin) and clean water always.
- Remove dead birds immediately and get rid of them by burning or deep burial.
- Ensure disinfectant is in the foot dip and at the entrance of farm.

### **Some common poultry diseases and their control or preventive measures**

Diseases	Symptoms	Control/Prevention
Coli-bacillosis	Lethargy and diarrhea	<ul style="list-style-type: none"> <li>o Appropriate temperature during brooding</li> <li>o Provision of clean water</li> <li>o Adequate ventilation</li> <li>o Proper litter management</li> </ul>
Salmonellosis	<ul style="list-style-type: none"> <li>o Huddling</li> <li>o Pasting of vent feathers</li> <li>o Whitish diarrhea</li> </ul>	<ul style="list-style-type: none"> <li>o Proper hatchery management</li> <li>o Pelleting of the feed</li> <li>o Antibiotic e.g furazolidone</li> </ul>
Coryza	<ul style="list-style-type: none"> <li>o Swollen faces and swollen eyes filled with a cheesy substance</li> <li>o Respiratory distress</li> <li>o Reduced feed intake</li> </ul>	<ul style="list-style-type: none"> <li>o Avoid overcrowding</li> <li>o Wet litter</li> <li>o Proper ventilation (it reduces ammonia load)</li> </ul>
Infectious bronchitis (IB)	<ul style="list-style-type: none"> <li>o Respiratory distress</li> <li>o Rales and gurgling sounds</li> </ul>	IBD vaccination.

Diseases	Symptoms	Control/Prevention
Fowl cholera	<ul style="list-style-type: none"> <li>o Swollen and bluish of combs and wattles</li> <li>o Watery nasal discharge and saliva dripping</li> <li>o High mortality and morbidity</li> <li>o Pinpoint blood spots on the heart and duodenum</li> <li>o Whitish diarrhea</li> </ul>	<ul style="list-style-type: none"> <li>o Control rodents</li> <li>o Proper management</li> <li>o Adequate ventilation</li> <li>o Stress-free conditions</li> </ul>
Chronic Respiratory Disease (CRD)	<ul style="list-style-type: none"> <li>o Respiratory distress</li> <li>o Sneezing</li> <li>o Poor weight gain</li> <li>o Nasal discharge</li> <li>o Infected chicks transmit the disease through water and feed</li> </ul>	<ul style="list-style-type: none"> <li>o Avoid overcrowding</li> <li>o Improve ventilation</li> <li>o Ensure hatchery sanitation and screening of parent stock</li> <li>o Antibiotic e.g. Tiamutin, tylosin, tylodox either in the feed or water</li> </ul>
Newcastle disease	<ul style="list-style-type: none"> <li>o A high mortality rates</li> <li>o Respiratory distress</li> <li>o Paralysis of legs and wings</li> <li>o Greenish diarrhea</li> <li>o Twisting of the neck</li> <li>o Soft eggshell and white in layers</li> </ul>	<ul style="list-style-type: none"> <li>o Proper pen fumigation</li> <li>o Allow infested to rest for at least 4 weeks and fumigate heavily</li> <li>o Adequate NCD (lazota) vaccination sourced from a reputable store</li> <li>o Administration of ND+HB2 clone at day old</li> </ul>
Infectious Bursal Disease (IBD or Gumboro)	<ul style="list-style-type: none"> <li>o Listlessness</li> <li>o Huddling,</li> <li>o Whitish and pasty diarrhea and pecking at vents</li> <li>o High mortality ranging from 40-60 percent</li> </ul>	<ul style="list-style-type: none"> <li>o Adhere strictly to vaccination program</li> <li>o Administration of iodine solution</li> <li>o Return heat and reduce spacing</li> </ul>
Marek's disease	<ul style="list-style-type: none"> <li>o Poor growth</li> <li>o Paralysis of one leg which is stretched backwards</li> <li>o Birds under 16 weeks are</li> <li>o Poor feed intake</li> <li>o High mortality</li> </ul>	<ul style="list-style-type: none"> <li>o Administration of Marek vaccine at day old affected</li> </ul>
Fowl pox	<ul style="list-style-type: none"> <li>o Raised skin lesions at the corners of the beak comb and wattle</li> <li>o Low mortality recovered birds perform poorly</li> </ul>	<ul style="list-style-type: none"> <li>o Vaccination at the appropriate age (6-8 weeks) is suggested</li> <li>o Use Streptomycin based antibiotic</li> </ul>
Brooder pneumonia	<ul style="list-style-type: none"> <li>o Young chicks of 1-2 weeks of age are affected</li> <li>o High mortality rate of 10-50%</li> <li>o Gasping, respiratory distress and strong thirst.</li> <li>o Yellowish white pinpoint filaments on lungs</li> </ul>	<ul style="list-style-type: none"> <li>o Avoid using moldy, fungus-infested litter material</li> <li>o Use well cleaned drinkers and feeders</li> </ul>
Coccidiosis	<ul style="list-style-type: none"> <li>o High mortality is higher in younger birds</li> <li>o Reddish (blood stain) diarrhea</li> <li>o Stunted growth and crouching</li> </ul>	<ul style="list-style-type: none"> <li>o Proper litter management by avoiding wet litter</li> <li>o Use Coccidiostats e.g. Superdot, clopidol, cycostat, tultrali, Amporium, etc.</li> </ul>

### General Disease Control Measures

- Provision of a comfortable, safe, disease-free environment for the birds since “prevention is better than cure”.
- Culling/isolation of infested birds
- Proper burying of dead birds
- Sourcing of chicks from a reputable hatchery
- Proper vaccination program
- Good nutrition
- Farm fumigation
- Rodent and Insect control
- Good water quality
- Training of farm staff on principle of farm biosecurity
- Proper litter management
- Consult a qualified veterinary doctor

### Suggested vaccination and medication schedule for broilers production within a cycle of 6 weeks (42 days)

Age (Day/ weeks)	Activities	Route	Remarks
Day 1 (week 1)	Lasota	Eye drop/spray/oral	To be given at hatchery
Day 1- 5	Antibiotic + Multivitamin	Water	
Day 7	Gumboro	Via drinking water	
Day 8-9	Multivitamin	Via drinking water	
Day 10	Lasota	Via drinking water	
Day 10 – 13	Multivitamin	Via drinking water	
Day 14	Gumboro	Via drinking water	
Day 15 – 18	Multivitamin	Via drinking water	
Day 21	Gumboro	Via drinking water	
Day 22 – 25	Multivitamin	Via drinking water	

### Some common drugs used in poultry

Antibiotics: Oxytect, Enrofloxacin, Keproceryl, Ciprofloxacin, Kenflox etc. These are used against bacterial.

Anticoccidia: (Against coccidiosis): Sulphanor, Sulphamix, Amprolium, Embazin forte, Keprocox, Tultranor etc.

Multivitamins: Vitranor, Vitalyte, Aminovitalyte, etc.

Dewormer: Albendazole, Kepromec, Piperazine, Levasole etc.



# MODULE 5

## Feeds and Nutrition

### **Module Objectives**

*Trainees are expected to*

- i. Understand basic feeding regime in broiler production*
- ii. Know basis feed formulation procedures*

### **Facts about Feeds and Feeding**

Feeding takes about 65-70% of the whole production cost in broiler production. Therefore, adequate feeding along with other management practices is very essential for maintenance of good flock health and productivity. Poultry feed rations are usually formulated to contain all the nutrients that are essential for their proper body functioning. Deficiency of any of these essential nutrients may result in some form of abnormalities and often disease conditions arise because of lack of certain ingredients in the feed. For maximum efficiency, all the nutrients required by the chickens must be supplied in a sufficient quantity.

An adequate feed must contain all the feed nutrients in adequate proportion, this is referred to as balanced ration. There are five basic feed nutrient which are: Energy, protein (plant and animal source), minerals, vitamins and water.

### **Feeding Regime in Broiler Production**

Broiler Feed Rations:

*Starter:* The Starter Mash are nutritionally complete poultry feeds in either crumbled, pelletized or mash form. The broiler starter is aimed at achieving a higher growth rate, higher feed utilization rate, and low disease incidences at the early stage of the life of a chicken. It is highly balanced in nutrition and normally given to birds from day old till transition to the finisher stage which is 4weeks.

*Finisher:* The broiler finisher is fed to the birds from the age of 28 days to the age of 42 days. Every bird will consume approximately 1kg of broiler finisher mash from 5weeks upward. The broiler finisher feed can be in form of pellets, mash or crumbled.

Feed can be self- compounded (this involves making feed rations for your birds having adequate knowledge of their nutritional requirements) or purchased from commercial feed millers or companies.

## Feed formulation

The act of combining different feed ingredient to produce a diet or ration.

### *Factors to consider in feed formulation*

- Age of the birds
- Type of bird (Broiler, Layer)
- Locally available feed ingredients
- Cost of feed ingredients/Least cost combination
- Quality of the feed ingredients

Change the feed formula based on the local availability, cost and quality of the feed ingredients. Never make drastic changes in the formula. Rather introduce changes gradually, since drastic changes may affect the feed intake and thereby the growth rate or egg production.

## Practical session

1. Feed Calculator
2. Pearson square

## Nutrient guides for broiler chicken

Nutrients	Units	Starter 0-10 days	**Grower 11-28 days	Finisher >28 days
Protein	%	21 – 24	18 – 23	20 – 22
Metabolizable energy	Kcal/kg	2900- 3100	3000 – 3300	3100 - 3300
Crude Fiber	%	5	8	8
Calcium	%	0.85 – 1.05	0.01 – 0.3	0.3 – 0.5
Methionine	%	0.37	0.33	0.30
Lysine	%	1.10	0.85	0.90
Sodium	%	0.01 – 0.3	0.01 – 0.3	0.01 – 0.3

*\*\*Optional, otherwise starter will be served till 28 days*

# MODULE 6

## Farm Records

### **Module Objectives**

*Trainees are expected to*

- i. Know the importance of keeping record*
- ii. Know how to records and types of records*

This entails keeping, filing, categorizing, and maintaining financial, production and operational activities of an enterprise.

### **Importance of farm Record**

Shows the financial position of the business.

Helps to make necessary management decision.

Used as collateral to secure loan from financial institution

### **Rules for keeping farm records**

- Record should be brief and concise
- Standard unit of measurement should be used
- Simple language should be used
- Simple format should be used
- Data should be accurate
- Entry should be timely

### **Types of records**

- o Inputs record
- o Purchase record
- o Sales record
- o Output record
- o Stock record
- o Health record
- o Cash flow (Financial Records)



# ACKNOWLEDGEMENT

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