

# Chicken 101

## -Basic Management of Poultry in Developing Communities



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# Modern Poultry

Chickens can be found throughout the world, and are efficient at converting feed stocks into high quality protein

High quality protein is important for normal development in children

Developing poultry production not only increases food security and nutrition but also improves financial stability

Because of its low cost to start and operate, along with its potential to improve lives, poultry production is one of the most common beginning farm ventures in the world

Modern genetics can improve local poultry production

Modern breeds can reach market weight in less than 3 months

Today's laying hens are capable of producing over 300 eggs per hen per year

Eggs shells can be many colors including: white, brown, blue, green and olive

The color of the egg shell does not affect the egg quality

Bird well-being (welfare) should always be considered when starting poultry project

Consider the Five Freedoms before you start

Freedom from Hunger and Thirst

Freedom from Discomfort

Freedom from Pain, Injury or Disease

Freedom to Express Normal Behavior

Freedom from Fear and Distress



# Common Types of Production and Breed Types in Developing Areas

## Scavenging

Birds are left to fend for themselves  
Local breeds work best



## Semi-intensive

Some control over housing and feed  
Local, modern breeds or a mixture of the two work best



## Small/medium scale intensive

Birds are confined  
Feed is controlled  
Modern or improved breeds work best



## Meat Breeds

Great at producing meat but  
not good for egg production



## Eggs Breeds

Good egg production but poor  
meat production  
Do not need males to lay eggs

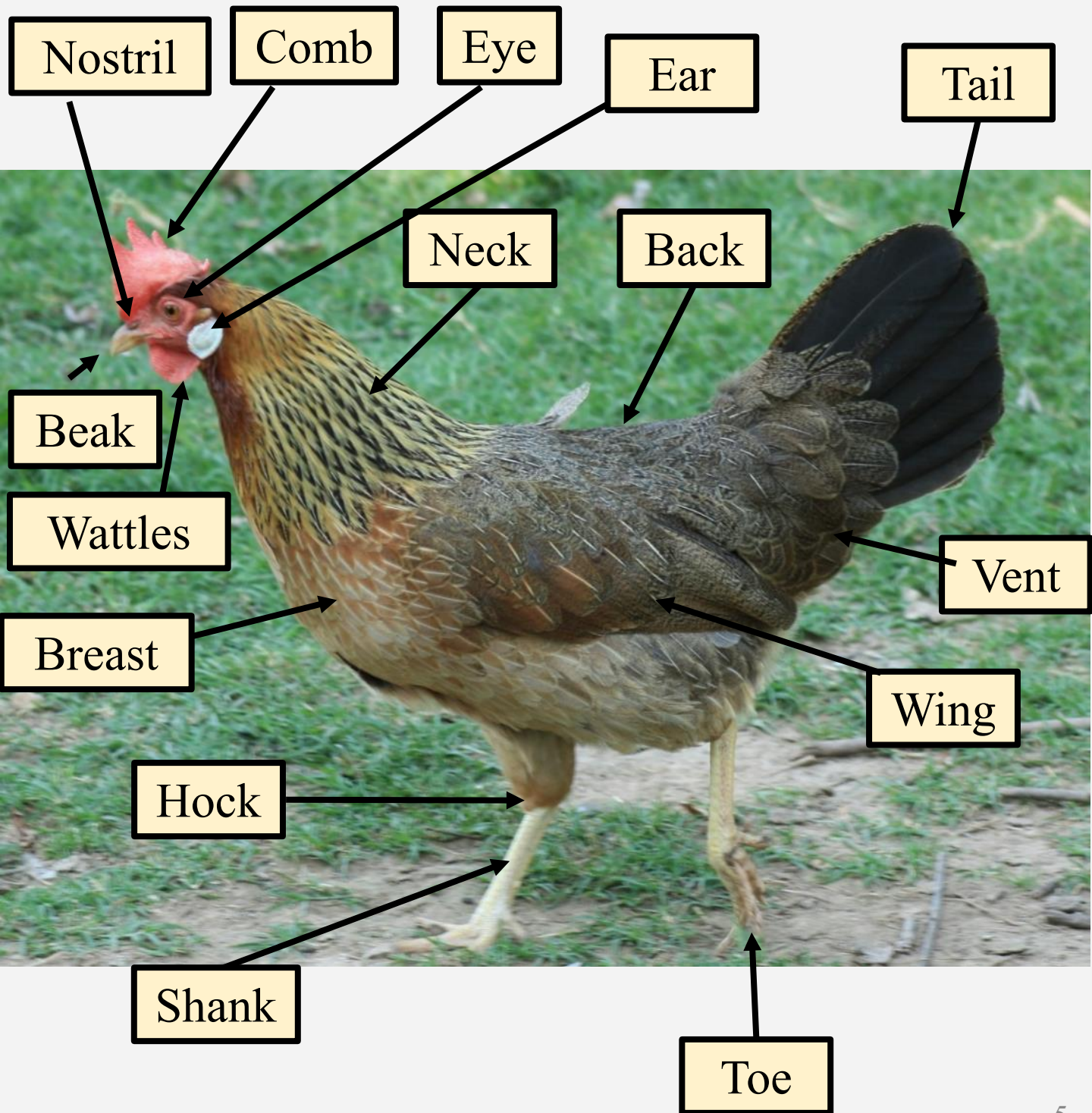


## Dual / Local Breeds

Produces both meat and eggs  
but at lower production rates



# Basic External Anatomy



# Getting Started



# The First Steps

## **Treat your birds like a business**

### Have a plan

Why are you increasing production?

Do you have a market?

Where is your market?

What do your customers want?

### Keep records

This will allow you to see if you make money

Helps identify the best birds so they can be used as breeders

Only keep productive birds

### Know the source of the birds

Buy from a good farmer that takes good care of their birds

Are birds vaccinated?

Avoid buying birds at the market

They can bring a lot of disease to your farm

Isolate any new birds for 2-3 weeks from the rest of your flock to make sure that they are healthy

Have everything ready before you buy your birds



# Getting Started

Chickens require three things to thrive

Protection (housing)

From the environment

From predators

Feed

Water



Chicks need more protection from the environment than adult birds





# The Chicken Barn

There is no one “perfect” chicken barn

As long as the birds needs are being met, then almost any kind of structure will work

Barns should be constructed to:

Meet the needs of the birds

Protect them from the environment and predators

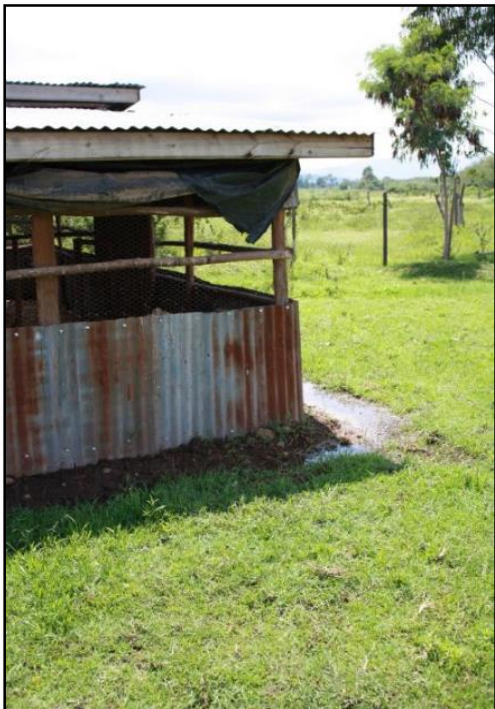
Allow the caretaker to provide for the birds

Drain well and don't flood

Allows air to flow through the building

Under tall trees that can provide shade in hot areas

Even free-range/scavaging chickens can benefit from housing, as the birds will be able to get out of bad weather and find safety from predators, particularly at night when most predation occurs



Poor storm water  
drainage



Good storm water  
drainage

# Housing

In warm areas:

Naturally ventilated barns need to be situated to take advantage of the prevailing winds

Try and run barns east-west to prevent direct sunshine on birds

Openings should allow for as much air as possible to enter the barn

Tall trees that can shade the barn but not block the prevailing winds can help reduce heat stress

Barns need to be far enough apart so that one barn does not block the wind from another

Barns need to have a high ceiling

Low ceilings are hard to work in

High ceilings also help keep birds cool by allowing hot air to rise

Use locally available materials, and keep surfaces as smooth as possible to make cleaning easier

For cooler weather, adjustable curtains on windows and air inlets will allow the barn to be closed when weather is bad, or too cool for the birds

Barns used to rear chicks need to be able to block the wind when they are young and then open up for older birds (use adjustable curtains)



# Housing

Extend the roof out from the barn so that rain does not enter during storms

Make sure that water drains rapidly away from the barn

Make sure barns are constructed so predators cannot get to the birds

## There are two main types of housing

1. Confinement – birds are kept in a barn at all times
2. Free Range – birds are allowed to roam outside part of the time

Disease concerns increase when birds have access to the outdoors

Encounter chickens and other species of poultry

They can interact with wild birds creating a disease risk

Birds can encounter more predators (including theft by neighbors) when they are outside

Birds can supplement part of their diet by scavenging for seeds and bugs

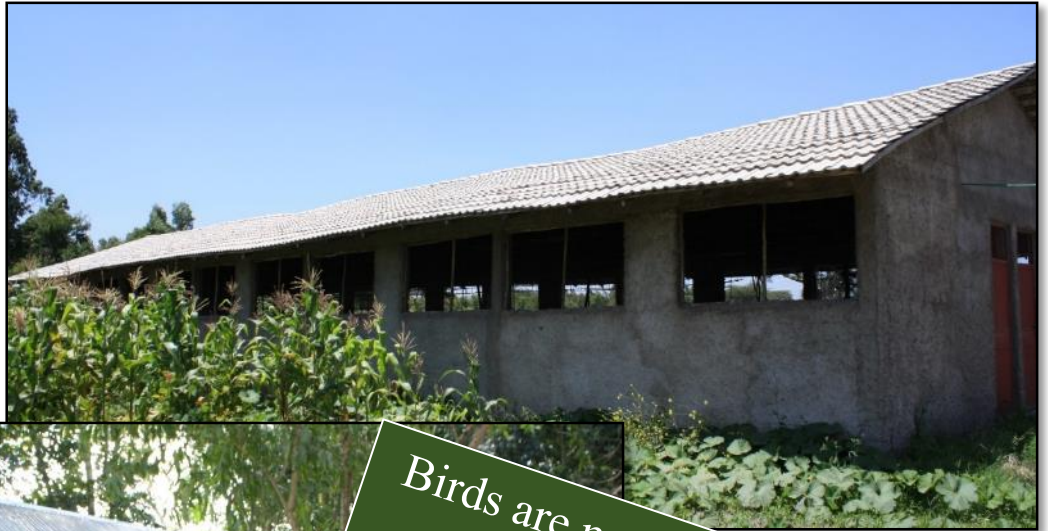
## Stocking densities (maximum)

(For birds raised with outdoor access, it is the same for the first 3 weeks)

Age (Weeks)	0 – 2 Weeks	2 – 5 Weeks	6 Weeks-Adult
Birds / m <sup>2</sup>	30	20	5*
Birds / f <sup>2</sup>	4	1-2	1/2

\*Larger birds will need more space than smaller ones

# Confined Housing



Birds are maintained indoors all the time



Placing a fence around your farm to keep village chickens far away from your birds, helps to prevent disease

# Confined Housing

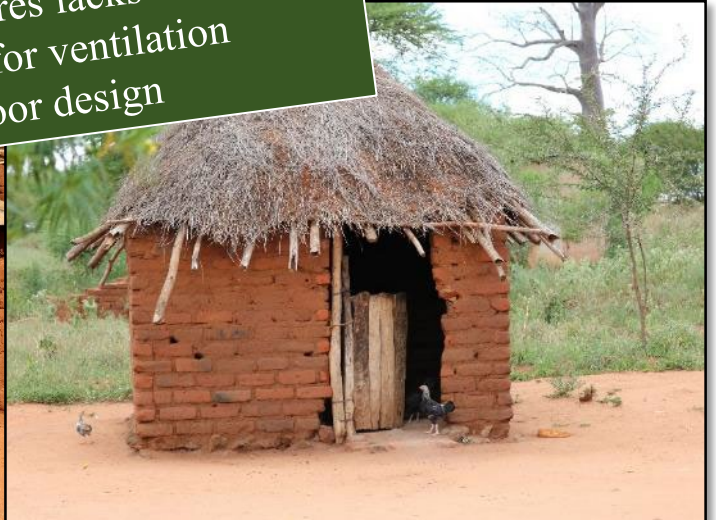
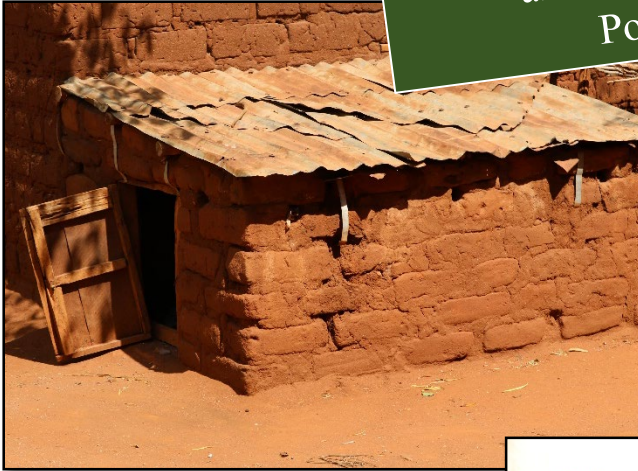


*Hope in the Harvest*



# Free Range Housing

These structures lacks window to allow for ventilation  
Poor design



Free range birds will need shade to protect them from the sun and to make them feel safe

# The Chicken Barn – Bedding

Bedding is helpful when birds are raised in a confined area, it absorbs moisture, acts as a cushion for the birds, and dilutes feces

Criteria:

- Must be absorbent

- Lightweight

- Inexpensive

- Non-toxic (free of mold)

- Should lend to post production applications: compost, fertilizer, fuel

Materials such as sawdust, wood shavings, straw, rice hulls and peanut hulls make good litter

Use the best bedding for brooding (young birds)

Use clean bedding in nests and then as it get dirty, move it to the floor

Try to keep the litter dry

- If an area gets wet, replace the wet litter with dry litter

- Stir the litter around waterers if it gets wet to help dry the litter

It will not be necessary to clean out and replace the litter until you are ready to start another flock of chicks, even if you start with laying-type chicks and keep the pullets until they are 18 months old or older

Maintain at least 7.5 cm (3 inches) of bedding in the barn

Old litter can be sold for fertilizer or composted and then used for fertilizer

Rice Hulls



Pine Shavings



Chopped Grass



# Fundamentals of Poultry Production





# Quality Chicks

Get the best genetics possible

Try different breeds to determine which works best for your area

Try different hatcheries/farmers. If the one you are using is not providing quality chicks find a new one

Quality chicks should be:

Dry with long fluffed down

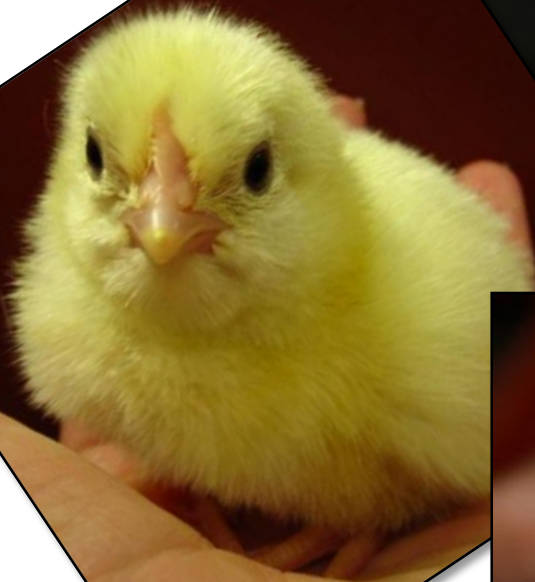
Eyes should be bright and active

Lively and alert

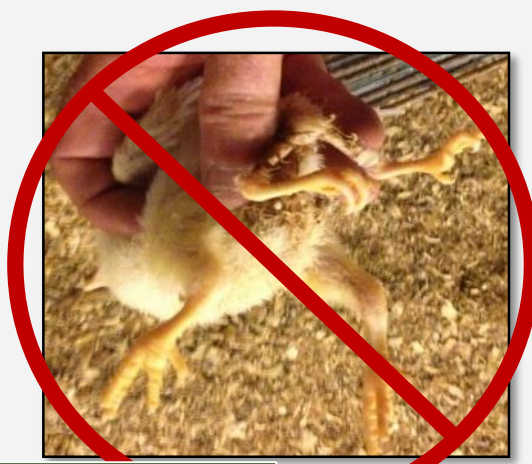
Navels should be completely healed

Legs should be bright and waxy to the touch

Free of deformities



Good Quality  
Chicks



Poor Quality Chicks

# Chick Transport

Make sure that chicks are transported properly

They should have plenty of fresh air

Not too hot or too cold

22 – 28 °C (70 – 82°F)

Don't let them sit in direct sunlight



Make sure that there is room for air to move between the stacks of boxes

Chick behavior is the best indicator of conditions during transport:

Under ideal conditions,

Day old chicks breathe quietly through their nostrils, losing only a little water

They spread evenly in the boxes, make little noise and are relatively inactive

When hot,

Chicks open their beaks and pant, which evaporates water from their lungs and air sacs to help cool them down

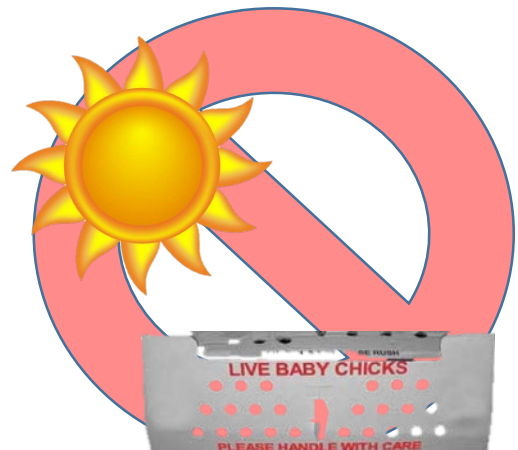
Leads to dehydrated chicks

Chicks will become noisy

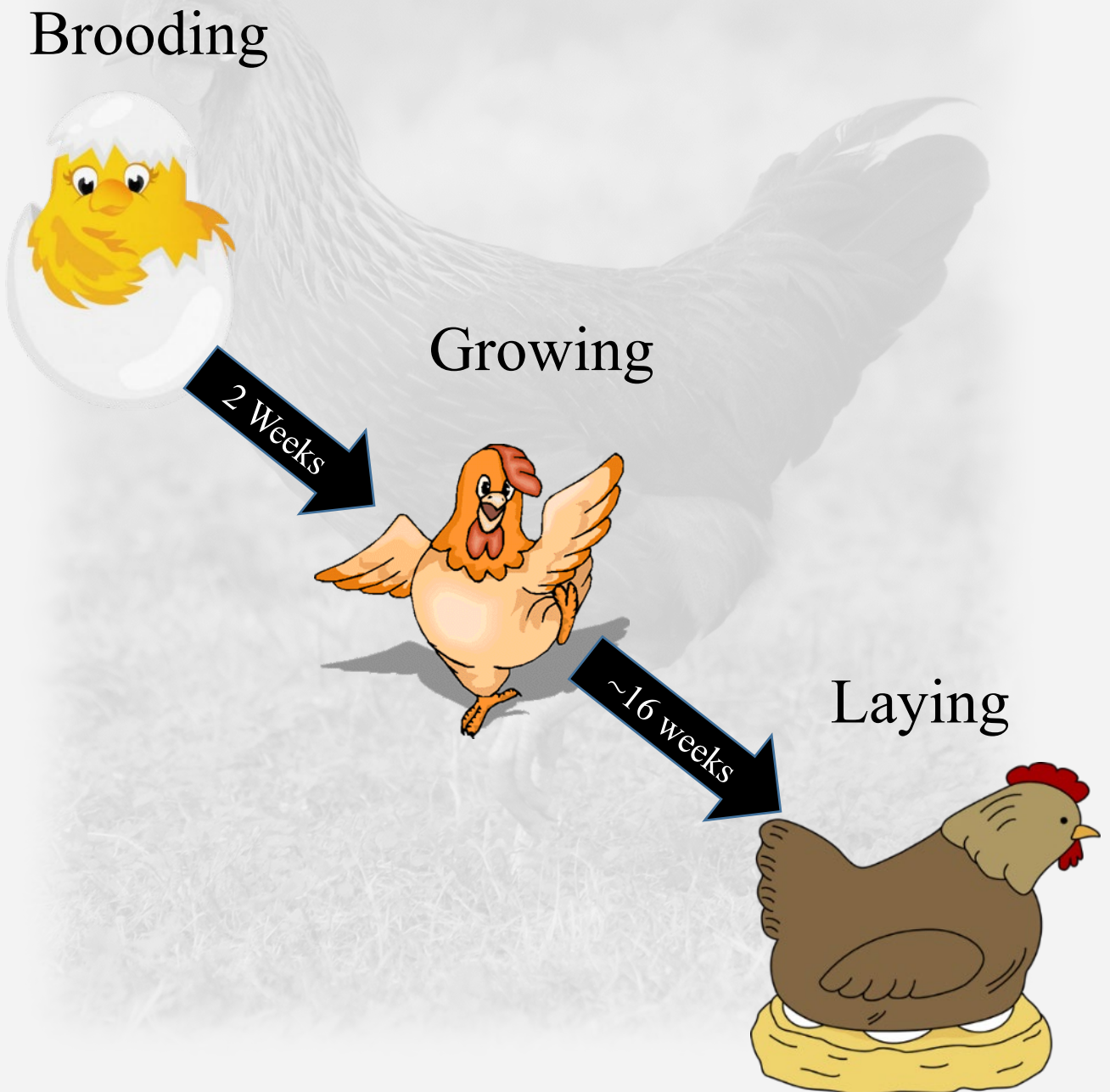
Unload the chicks immediately on arrival at the farm

Get them in the barn and out of the boxes

Don't leave old chick boxes laying around the farm



# Phases of Growth



# Brooding

The first two weeks of life

Chick survival is dependent on how quickly they adjust to the farm and this is the most important time for the flock, growers need to spend more time with their birds

Mistakes made during brooding may be irreversible and negatively impact performance for the life of the flock

Similar for all types of birds and types of production  
layers, breeders, and broilers

## 6 Basics of Brooding

1. Pre-Placement
2. Temperature Management (Heat)
3. Feed Management
4. Water Management
5. Light Management
6. Air Quality/Ventilation

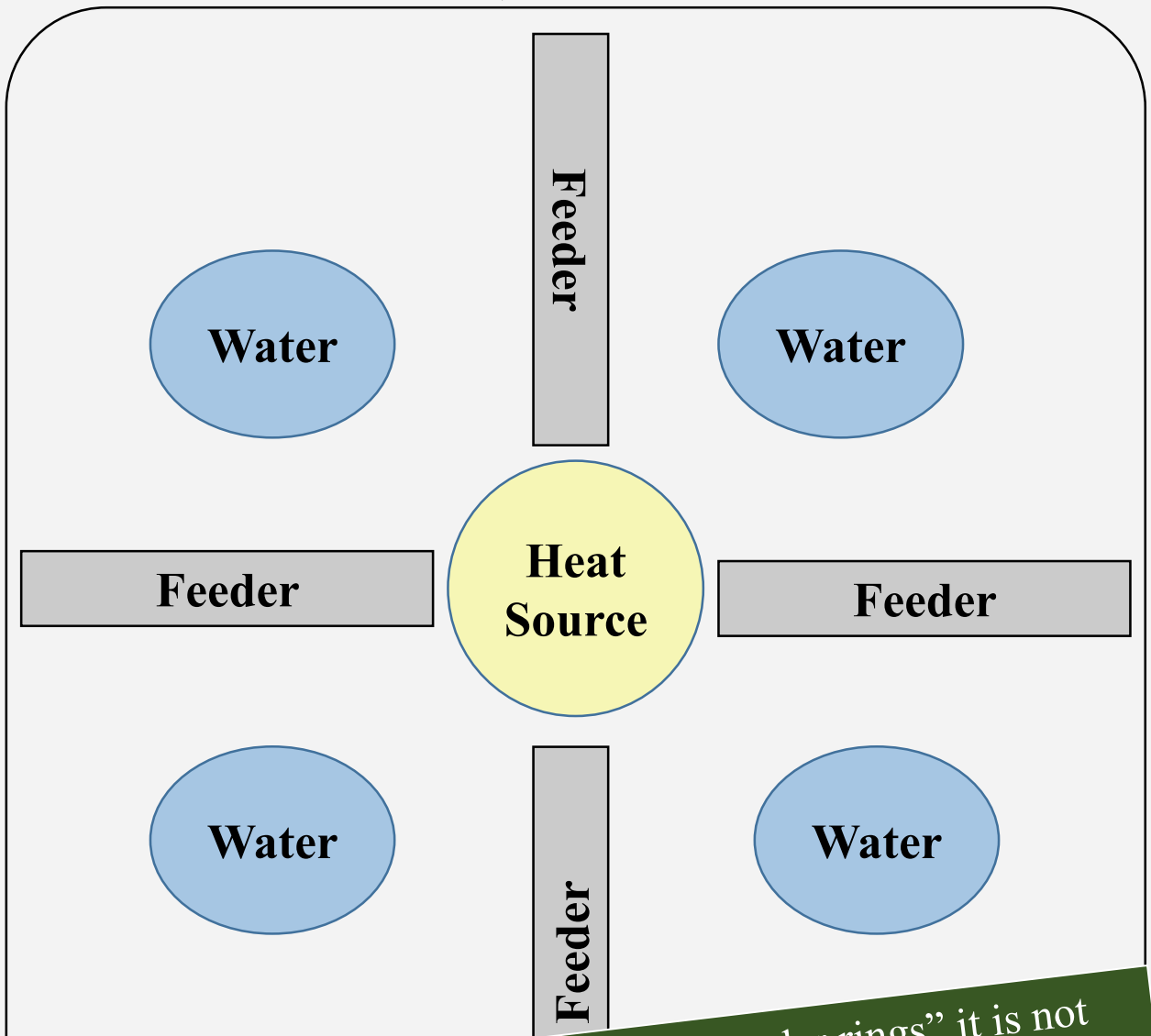


Pre-Placement means having everything ready for the birds when they arrive

- Barn is clean and warm
- Heaters are running
- Feed and water are ready and placed in the barn for the birds



Example of how to place feed and water (the important part is to have lots of feed and water)



While birds are often brooded in "brooder rings" it is not necessary to use perfect circles. Chickens can be brooded in almost any room (or shape) as long as they are protected from the environment and have access to heat, food and water, brooder rings are not necessary, whole rooms/barns can be used to brood as long as temperature is maintained and food and water are available.

# Heat

Before the chicks arrive, make sure everything is prepared  
Litter should be warm and dry  
(~33°C, 92°F)

A quality heat source is necessary in order to keep the chicks warm

Under a canopy or hover - keeps the heat down close to the chicks

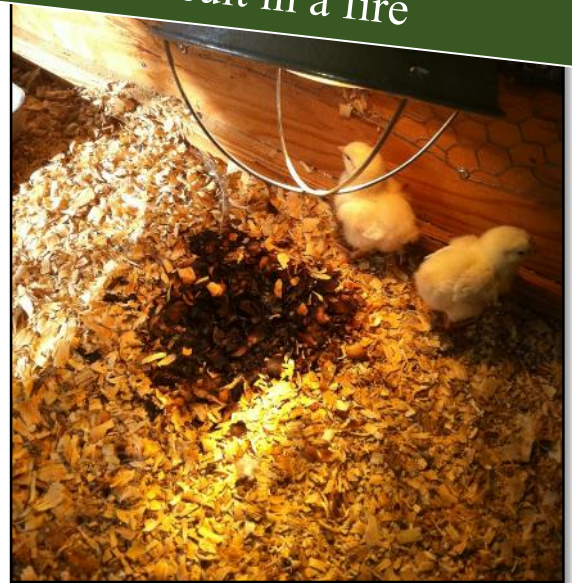
Use what you have available

Electric, oil, carbon, and gas brooders are the most common types

Radiation from an infrared lamp warms only the objects to which it is directed; it does not warm the air



Be careful not to let the litter/bedding under the heat source get too hot as it can result in a fire



# Heat

Temperature at the chick level needs to be around 34° C (94°F) near the heat source and cooler 1 meter (3feet) away

Prior to chick arrival – be sure that the heat source is working properly

Are they too hot or too cold?

Visually check often and check the temperature with a thermometer once in a while

Check it more frequently in extremely hot or cold weather

When placing the chicks – have the floor-level temperature at 33-34°C (90-92°F) for the first couple of days then slowly decrease the temp by around 2.5°C (5°F) per week

Once the chicks begin to feather out well, the temperature may be dropped rapidly, saving energy

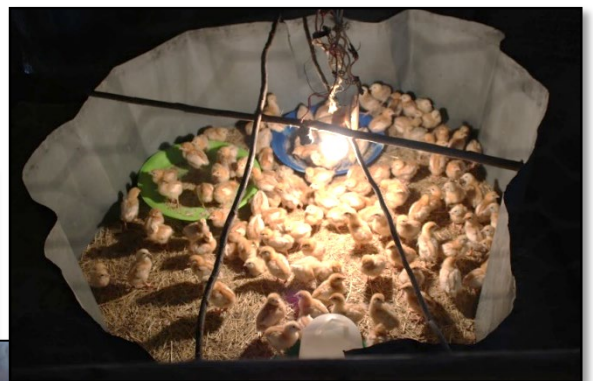
Good ventilation is important while maintaining the proper temperature

The area should be light and airy, without drafts

Free of strong smells of ammonia

Air should not be too moist

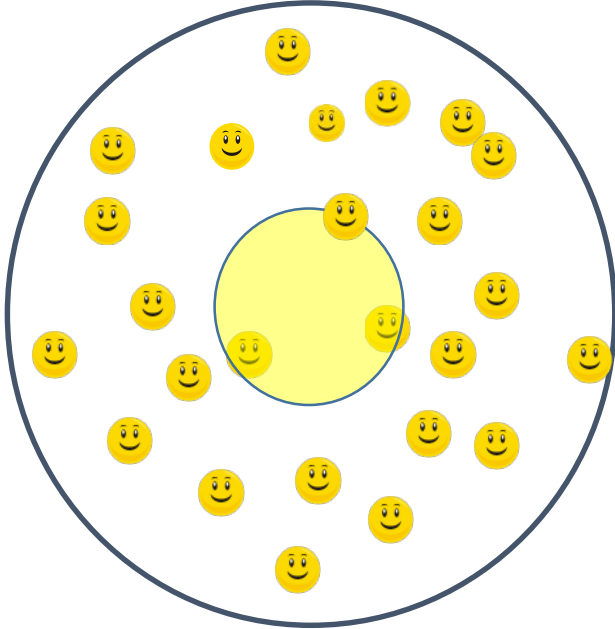
Air high in moisture can make the inside of the barn wet and lead to poor bird health



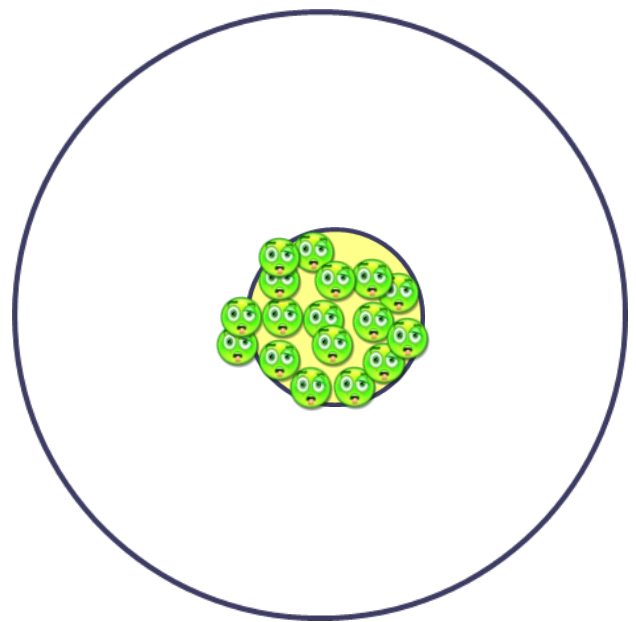


# Reference for Brooder Heat

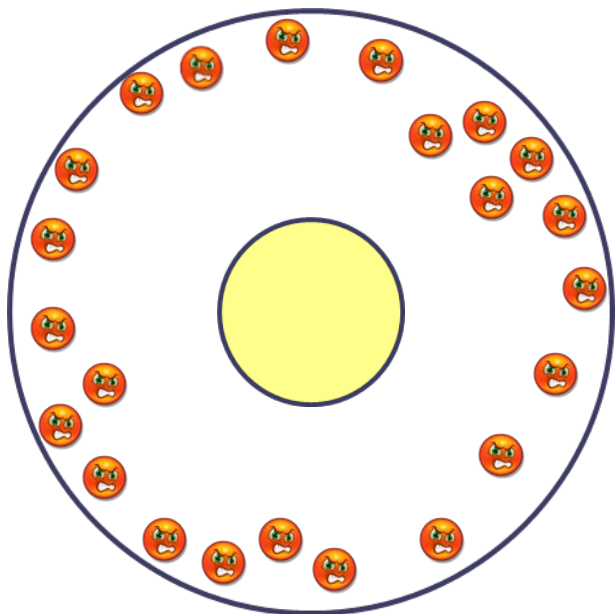
Good



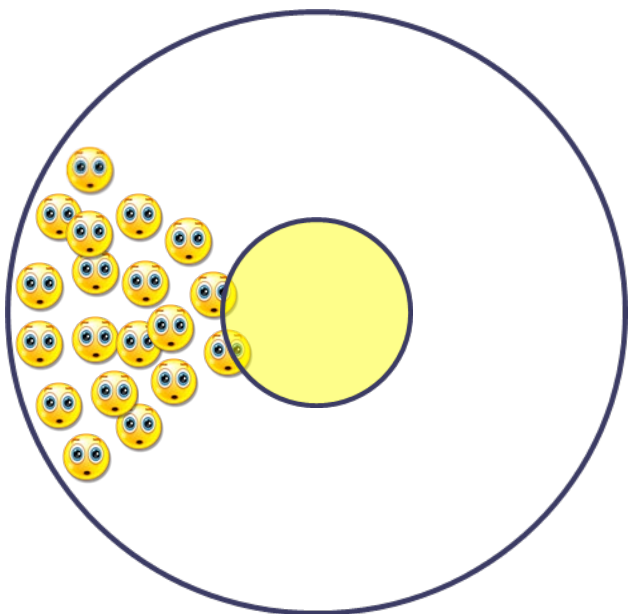
Cold



Hot



Draft/Breeze



# Feed and Water

Feed and water need to be readily available when chicks are placed

If available start the chicks on a “chick starter” mash or crumbles

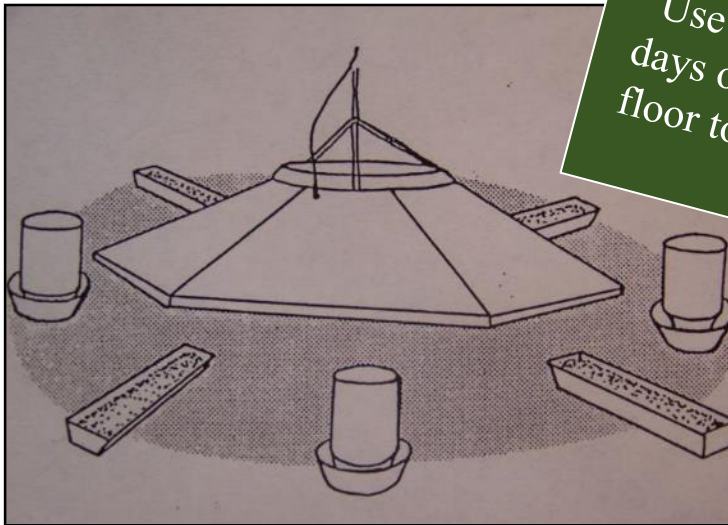
Make sure there are plenty of feeders and waterers so that chicks find them quickly and that there is space for all of them to eat

Place some of your feed near the heat source

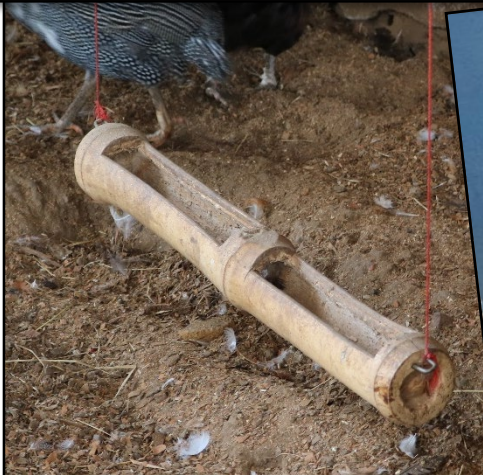
Use what is available, don't spend money on expensive equipment if you are poor

Bamboo can be used to make feeders and waterers

Cooking oil jugs can be cut and used as well



Use extra feeders for the first couple of days or place feed on paper spread on the floor to help chicks find feed quickly and get off to a good start



# Feed and Water

When placing chicks in the barn put them on the feed (making it easy for them to find it)

Place paper on the floor, cover with feed, then place birds on that  
Remove paper after a couple of days

For the first week, fill the feeders full

Second week  $\frac{3}{4}$  full and no more than half full thereafter

Keeps birds from wasting feed

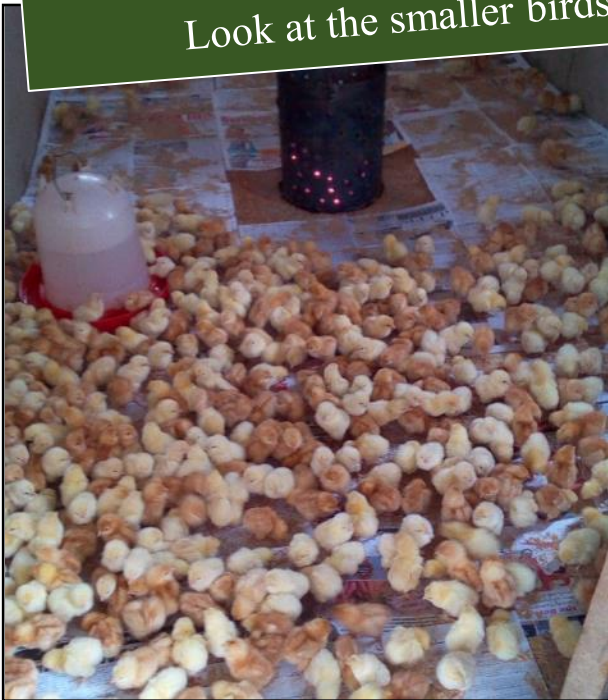
Ideally, multiple feeders in each pen is best

You don't want them to have to look for feed

Watch birds eat and make sure all of them have access to feed



When chicks are placed, the feeder needs to be low enough so the chicks can walk in it  
As they grow, raise the feeder so that the chicks can eat while standing (mid chest height)  
Look at the smaller birds when adjusting the feeder height



# Quick Reference Feeder Height

For First  
week



While  
Growing



Adult



# Feed and Water

For the first few weeks, chicks need a good quality starter feed with 18-22% protein (can be fed for the duration of the grow-out)

After that they can be fed a grower ration with ~18% protein until birds are grown

For layers a 16% protein diet should be sufficient

Don't let birds run out of feed!

- Slows growth

- Need more feed to grow (costs more)

Never let chicks run out of water!!!

Use only clean water that you would drink

Waterers need to be cleaned daily

It can be helpful to dip some of the chick's beaks in the water so they know where it is, especially after a hard trip

- If chicks spend more than a day traveling to the farm, provide water for a couple of hours prior to introducing feed

  - This allows the chicks to rehydrate

## Waterer Height

For baby chicks, place the waterer as low as you can until they learn to find and drink

Raise the waterers as soon as all birds have learned to drink and they are large enough to reach the water

Adjust height based on the smaller birds

The higher the waterers are, the less litter the birds will get in the water

### Hungry Birds



### Happy Birds



<http://www.familiesraisingchickens.com/C/hicken-Waterer.html>

# Quick Reference Water Height

For First  
week



While  
Growing



Adult



# Waterer Height

For growing birds the waterer should be at the same height as the chest of the birds



For adults the waterer should be at the same height as the back of the hens



# Good Examples of Feed and Water Placement





# Growing

Growing covers the time from the end of brooding until birds are harvested or are sexually mature



*~16 weeks*



# Growing



Management is not as intensive

- Birds can manage their body temperature

  - Still need some supplemental heat until they are fully feathered

    - Once grown they can handle cold weather without problems if they can stay dry and out of the wind

- It is best to keep them confined indoors until they are 4 weeks old

- Mortality is lower as the chicks know how to find food and water

For rapid growth, birds should not be allowed to run out of feed

- Feeder height needs to be adjusted periodically as the birds grow

  - If the feeder is too low they will waste feed

Make sure that there is sufficient feeder space for all the birds to eat at the same time

It is important that water be provided at all times

- On hot days, lack of water can quickly lead to death

- Water needs to be clean and fresh

- Birds consume about twice as much water as they do feed

This waterer is too low for adult birds, but good for young  
If you have both large and small birds together set feed and water at the correct height for the smallest birds



# Prevent Feed Wastage

When starting chicks, have feeders as low as possible

Then slowly raise them as they grow to help prevent debris from getting in feed

The level of feed in the feeder should be high when young and then low when old to prevent feed wastage



Feeders are too low, and birds are wasting feed



Fix broken or damaged feeders to prevent wasting feed



# Perches

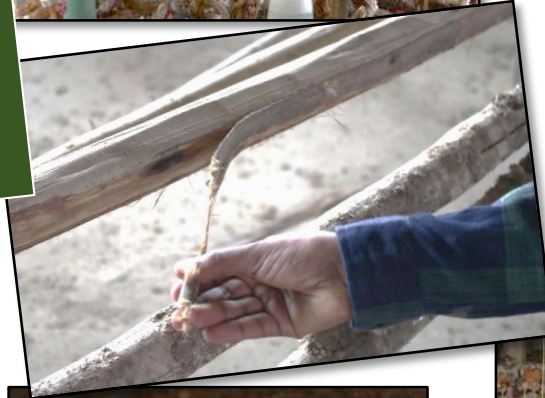
Help to keep birds from sitting on feeders and waterers

Helps keep poop out of the feed and water

Can help to improve bone strength

Perches can be made with locally available materials

If using branches, remove bark as it provides a place for parasites to hide



The lack of perches results in birds roosting on feeders and waterers and contaminating them with feces

# Predators



Little chicks are very vulnerable to predators

The list of predators is long but some to consider include

Cats and dogs, they may be pets but they can see chicks as food if not properly supervised

Rats

Owls and raptors

Wild animals

Weasels, mink, skunks, opossums, civets, bobcats, foxes, coyotes, snakes and even bears will kill and eat chickens

Most predation occurs at night so make sure your chicks are in their barn and that it is shut tight to keep them safe

Cover chicks in boxes or feed tanks with poultry wire to protect them



# Common Behavior Issues

Sometimes birds behave in abnormal ways

Egg eating

Once learned it can be hard to stop

Cannibalism

Can be a sign that something is wrong

Nutrition imbalance

Bored

Injured birds

Beak trimming can be done to help prevent and reduce the problem

Feather picking

Same as cannibalism



Some feather loss is the result of mating, (note feather loss on back as well as the back of the head at the base of the comb)  
May need to remove males at times to allow hens to recover, be sure to allow males access to females a couple of times a week to maintain fertility  
Reducing the number of males can also help lessen the damage to hens, again make sure there are sufficient males to maintain fertility if eggs are to be hatched



This hen needs her beak trimmed to allow her to eat properly  
It can be done with a pair of nail clippers

# Layers and Breeders



# Egg Production/Breeding

The amount of time it takes for chickens to sexually mature varies by the breed

Usually start laying between 18 and 22 weeks of age

Some breeds may start laying as early as 16 weeks

Lighter breeds usually mature faster than heavier breeds

Feed and water need to be provided at all times

Water is particularly important as it is a major component of the egg

If water is restricted or unavailable for long times during the day, egg production will drop

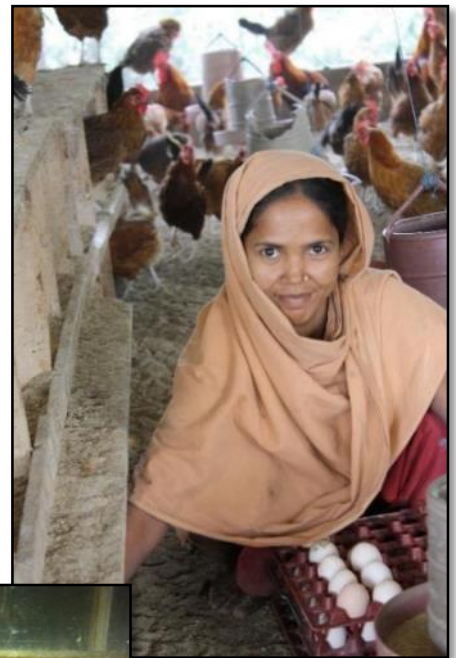
Housing is the same as growing with the exception of nest boxes

Need one nest box for every 4-6 hens

12x12x12 is a good size for average size hens

Make them a little bigger for large size breeds

Place in a shaded area to encourage the hens to lay eggs in them





# Egg Production

Males are not necessary for hens to lay eggs

Males are needed for fertile eggs to produce chicks (1 male to 10-12 females)

Takes about 24-27 hours for a hen to form and lay an egg

Hens use calcium from their bones to form the egg shell, this calcium must be replaced by calcium in the diet

Diets low in calcium reduce egg production and can lead to weak bones in hens

Calcium can also be supplied by allowing the hens to access oyster shell free choice

Can be used instead of grit in layers

Extended periods of hot weather can also cause bone problems in high producing layers



# Lighting Program

24 hours of light is recommended for the first 4 days

20 hours of light for days 4-7

For the second week 16 hours of light

After the second week natural light should be sufficient

Ideally, if light can be controlled birds would be grown on eight hours of light after the third week until they are 18 weeks old and at the proper weight

## Lighting Program (Where There is No Light Control)

Age (Days)	1-4 Days	4-7 Days	8-14 Days	15+ Days
Amount of Light	24 hours	20 hours	16 hours	Natural light

If possible increase day length by at least one hour when birds reach their 18-week body weight target  
Use artificial light to create a constant day length of 14-16 hours to encourage hens to lay the most eggs

# Housing Layers in Cages

Housing layers in cages allows for:

- More birds to be kept in a small area

- Less exposure to internal parasites

- Less egg loss due to dirty eggs or breakage

- Lower mortality of birds

- Improved biosecurity



*Bird welfare may be a concern, especially if birds are crowded*

# Housing Layers in Cages

A bi-level house made of wood and poultry net (wire) and covered with a tarp. Floors are cleaned and the litter is used to grow crops.

Use what you have/can afford



These pens are large and allow the birds more freedom to move and has perches for the birds



# Incubating Eggs



# Hatching Eggs

It takes 21 days for eggs to hatch, hens that set on eggs and care for young do not lay eggs during that time

Incubating eggs in an incubator allows hens to continue to lay eggs

Requirements for incubation (embryo growth) are

Correct temperature ~ 37.5°C (99.5°F)

Do not place incubators in direct sunlight as it can cause them to over heat during the day

Make sure the incubator is located in a well ventilated room that is protected from the environment

Correct humidity ~ 55%, or 28.5°C (83°F) wet bulb

Make sure water reservoirs are maintained at the appropriate level, in order to maintain the proper level of humidity

Regular turning of eggs ~ 4-8 x per day

After 16 days of incubation the eggs do not need to be turned anymore



# Hatching Eggs

While most incubators operate using electricity, there are some that run on paraffin lamps

When using this type of incubator it is important to ventilate the exhaust gasses out of the building

If not properly ventilated, the gasses can build up and kill the developing embryos and lower the number of chicks hatched

It can also cause health problems for the people living and working there



Example of a paraffin heated incubators

## Incubation Table

Species	Days	Temperature	Humidity
Chickens	21	27.5°C (99.5°F)	55-60
Ducks	28	27.5°C (99.5°F)	55-60
Quail	17-18	27.5°C (99.5°F)	55-60
Geese	30	27.5°C (99.5°F)	60
Turkey	28	27.5°C (99.5°F)	55-60

# Using Hens to Hatch Eggs





# Using Hens to Hatch Eggs



To identify which hens will set on eggs, look for hens that;

- Are always on the nest, refuse to get off eggs
- Fluff up and peck at you when you try and get eggs
- Have a bald patch on their chest



# Using Hens to Hatch Eggs

Provide a safe place for them that prevents predators from eating them

Keep food and water close by

Provide adequate ventilation



When chicks are small provide a safe place for them

Keep a fence around the area to keep them safe during the day from predators

At night, lock them in a safe place with their mothers to protect them

Make sure food and water are accessible to the chicks when they hatch



# Storing Hatching Eggs

Collect eggs 2-3 times a day

Store them with the big end up

Store eggs for hatching in a cool part of the farm

Not too dry or too wet

19-21°C is best temperature

Avoid temperature fluctuations, keep constant temp

Do not place in direct sunlight

Only store eggs for 7 days or less before placing them under a hen

Eggs from multiple hens can be placed under the same hen

This allows you to place eggs that were layed at the same time



## Why Some Eggs Don't Hatch

They were not fertile

They were stored too long or improperly

They were dirty, if an egg breaks and covers the other eggs it can prevent the egg from breathing, eggs that are covered in feces are less likely to hatch

They get broken

Eggs were stored in direct sunlight

If eggs don't hatch wait a couple of days and see if they are fertile

To see if they are fertile carefully open one end of the egg and look for an embryo





# CHICK EMBRYO DEVELOPMENT

<p><b>DAY 1</b> • Appearance of tissue development.</p>	<p><b>DAY 2</b> • Tissue development very visible. • Appearance of blood vessels.</p>	<p><b>DAY 3</b> • Heartbeats. • Blood vessels very visible.</p>	<p><b>DAY 4</b> • Eye pigmented.</p>	<p><b>DAY 5</b> • Appearance of elbows and knees.</p>	<p><b>DAY 6</b> • Appearance of beak. • Voluntary movements begin.</p>
<p><b>DAY 7</b> • Comb growth begins. • Egg tooth begins to appear.</p>	<p><b>DAY 8</b> • Feather tracts seen. • Upper and lower beak equal in length.</p>	<p><b>DAY 9</b> • Embryo starts to look bird-like. • Mouth opening appears.</p>	<p><b>DAY 10</b> • Egg tooth prominent. • Toe nails.</p>	<p><b>DAY 11</b> • Comb serrated. • Tail feathers apparent.</p>	<p><b>DAY 12</b> • Toes fully formed. • First few visible feathers.</p>
<p><b>DAY 13</b> • Appearance of scales. • Body covered lightly with feathers.</p>	<p><b>DAY 14</b> • Embryo turns head towards large end of egg.</p>	<p><b>DAY 15</b> • Gut is drawn into abdominal cavity.</p>	<p><b>DAY 16</b> • Feathers cover complete body. • Albumen nearly gone.</p>	<p><b>DAY 17</b> • Amniotic fluid decreases. • Head is between legs.</p>	<p><b>DAY 18</b> • Growth of embryo nearly complete. • Yolk sac is still on outside of embryo. • Head is under the right wing (not in the air cell).</p>
<p><b>DAY 19</b> • Yolk sac draws into body cavity. • Amniotic fluid gone. • Embryo occupies most of space within egg (not in the air cell).</p>	<p><b>DAY 20</b> • Yolk sac drawn completely into body. • Embryo becomes a chick (breathing in air cell). • Internal and external pip.</p>				

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# Selecting Breeders



# Genetics

Body size and rate of production are inherited traits

For layers – the smaller the hen the more efficient her production – less feed to produce eggs

For layers – Leghorn type hens and sex-link hens are best for producing lots of eggs using little feed

Modern meat birds are fast growing and very efficient

Egg laying breed,  
notice they don't have  
much muscle



Mixture of modern and local  
breeds,  
Birds are the same age and fed  
the same feed, but modern  
birds are much larger

# Poultry Production

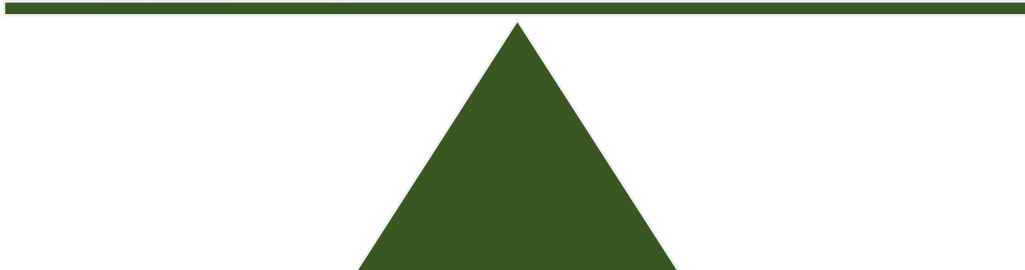
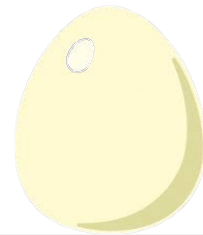
Birds are usually selected for either growth (meat) or for eggs

This is because selection for growth results in a reduction in egg numbers and in efficiency of lay

Also, if selected for efficient egg production, body size and muscle decrease



Comparison of a modern meat breed to an egg laying breed at about three weeks of age, they are fed the same diet and reared in the same facility



# Basics

Establish long term goals

Make deliberate matings that lead to your goal

Keep good records

- Keep track of birds

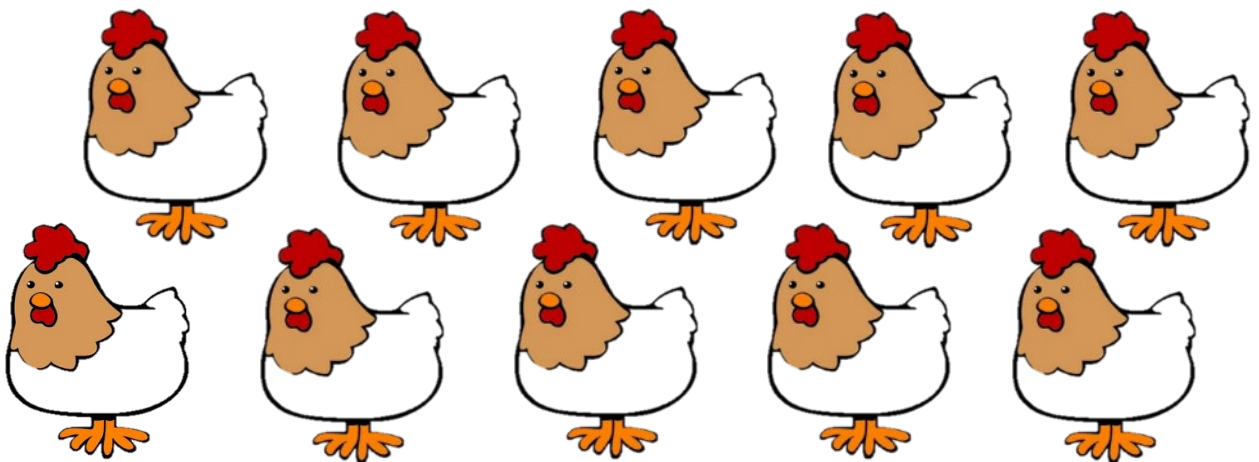
- Keep the best and remove the rest

Select only healthy birds

- Don't select birds with physical abnormalities

You will only need a few males compared to females

- 1 male for every 10 females



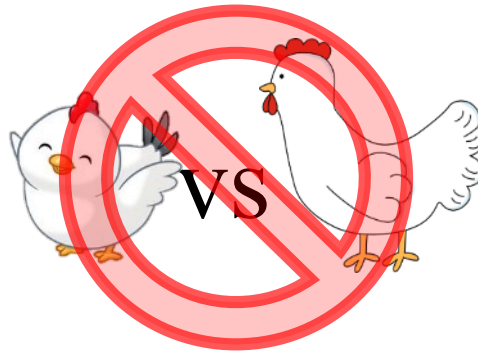


# Basics

Always evaluate birds at the same age

Don't compare older birds to younger ones

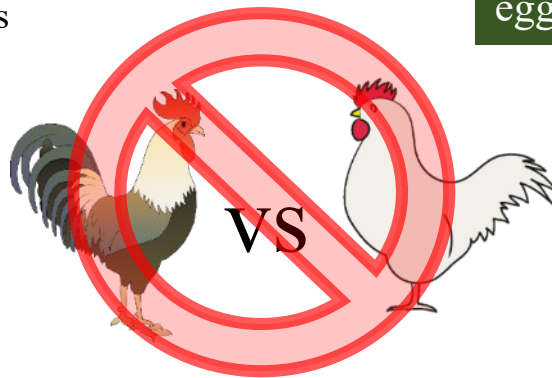
Age at selection depends on the breed and production trait you are selecting for



For example, you may want to select meat birds at 12 weeks of age but for egg layers you may want to wait until they start laying eggs

Don't compare birds of different breeds

Meat breeds vs egg breeds



Select only birds that are in good health

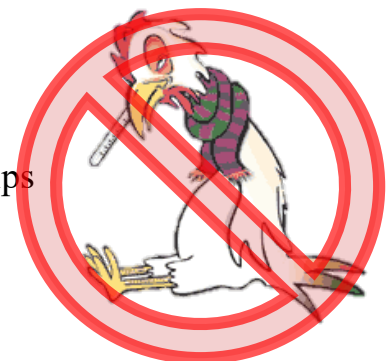
Cull (remove) birds that get sick

Cull birds that are not physically sound

Select birds that have bright red combs without dark tips

Dark tips can be an indicator of heart trouble

Make sure that they have bright clean eyes



# Selecting for Meat



# Criteria to Measure

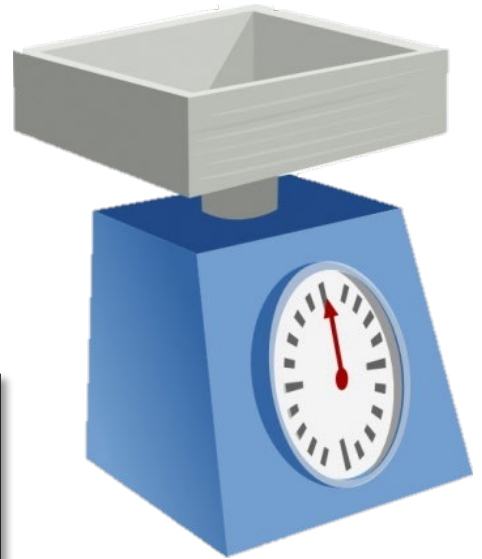
Growth rate – weight

Feed conversion

Conformation

Health

Adult size



# Growth Rate – Weight

Weight is easy to measure and not subjective

Faster growing birds tend to be more efficient

Check fleshing to make sure growth contains muscle

Always measure at the same age

Example – 14 and 35 days of age

## Feed Conversion

This is a measure of how much feed they eat compared to how much weight they gain

3kg of feed to get a 1kg bird = 3 to 1 feed conversion

Can be done on individuals (very labor consuming) or on groups of birds (usually chicks are grouped by who their parents are, and how old they are)

## Conformation

Meat birds need to have a strong frame and large capacity

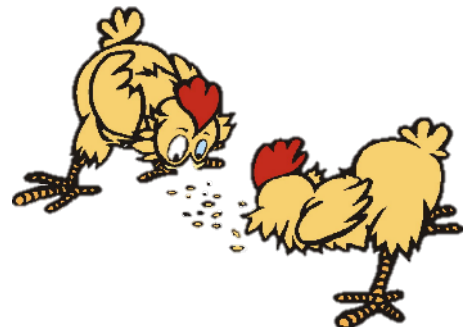
Look for birds which have

Long backs

Deep through the chest

Thick body

Look for large feet and thick shanks



# Selecting Layers



# Criteria to Measure

Egg production

Conformation

Health

Adult size

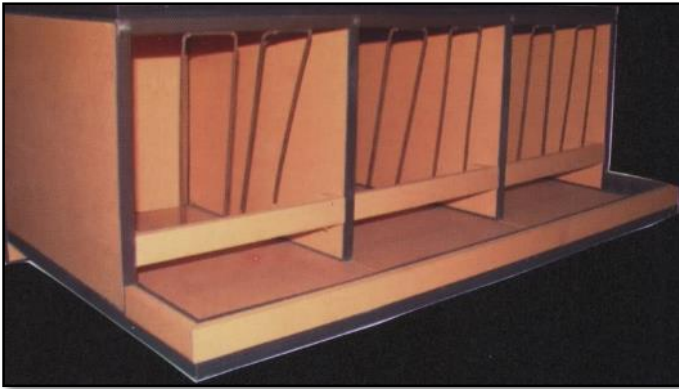


# Egg Production

Use your best layers for breeders

Measure egg production

Number of eggs laid – use trap nests to monitor each hens production



Trap nests work by preventing the hen from leaving until she is removed by a worker so they can identify which eggs she lays

Select hens that start producing early

Select hens that have long laying cycles, that is, lay eggs many days before they skip a day

Cull hens that molt early

Molt – when hens stop laying and lose their feathers

Select hens that lay good sized eggs

Cull hens that lay misshapen eggs



# Egg Production

Select hens that don't go broody

Hens don't lay eggs when broody

Do this only if you have an incubator to incubate eggs, or will be using other hens to hatch the eggs for you

# Conformation

Layers need sufficient capacity to maintain high egg production

Look for birds which are

Long

Deep

Thick

Good abdominal capacity

Measure between the keel and pubic bones



# Health

Select only birds that are in good health

Cull birds that get sick

Make sure they have bright clean eyes





# Identifying Good Laying Hens



# What to Look For in a Good Laying Hen



Poor Layer



Good Layer

# What to Look For in a Good Laying Hen



Poor Layer



Good Layer

# What to Look For in a Good Laying Hen



Poor Layer



Good Layer

Note; this only works for older birds with yellow legs

# What to Look For in a Good Laying Hen



**Good Layer**



**Poor Layer**

Note; this only works for older birds with yellow legs

# What to Look For in a Good Laying Hen

Measure how many fingers fit between the pubic bones

If you can't fit 3 or more then she is not laying

More is better



Good Layer



Poor Layer

# What to Look For in a Good Laying Hen

Measure how many fingers fit between the keel and the pubic bones

If you can't fit 3 or more then she is not laying

More is better, should also be soft not firm



Good Layer



Poor Layer

# Feeding Poultry





# Water

Water is the most important part of poultry nutrition

Birds need a constant supply of fresh clean water

Birds cannot lay eggs if they lack water

Use water that you would drink

Dirty water can make birds sick

Clean waterers regularly



Good

Birds can access water but not make it dirty



Bad

Water is contaminated with feces and litter, waterer is too low and the birds can roost on top of waterer  
Ok if chicks are present (clean often)

# Why Good Quality Feed?

Better health

More eggs

Birds grow faster



A chalkboard with a handwritten feed recipe in French. The title is 'Equilibrer une' (partially visible). The ingredients and their percentages are listed as follows:

Ingredient	Percentage
Maïs	50
F. Poisson	20
T. Soja	5
T. D'arachide	5
T. Palmiste	10
Coquillage	10
Sel	0,5
Methionine	1
Premisc	2,5

Good quality feed has five nutrients

1. Protein
  2. Carbohydrates
  3. Fats
  4. Minerals
  5. Vitamins
- } Energy

# Protein

Protein is one of the most important parts of poultry feed

It is important for muscle and feather development

Protein can be found in

Beans – Soy beans, cow-peas, mung beans

Ground nut

Fish meal

Meat and bone meal

Oil seed cakes – sesame cake, soya cake, cottonseed cake

Insects

Moringa leaf

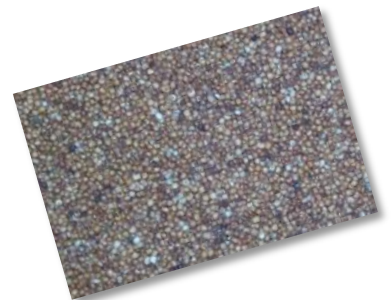
Leaves of legumes – Leucaena, Cassava (up to 5%), Beans

## Protein and Energy Requirement for Meat Birds

Age (weeks)	0-3	3-6	6-8
Crude protein %*	22-23	20-21	18-20
Energy kcal/kg	3,200	3,200	3,200

\*Depends on the quality of the protein

Protein levels need to be higher when using low quality protein



# Protein and Energy Requirement for Layers

Age (weeks)	0-6	6-12	12-18	18 to First Egg	In Egg Production
Crude protein %*	18-20	16-18	15-17	17-18	16-18
Energy kcal/kg	2,850	2,850	2,900	2,900	2,900

\*Depends on the quality of the protein

## For Layers

3% to 4% Calcium

0.5% Phosphorus

Remember that feed intake decreases as temperatures rise above 32°C (90°F)

May have to increase CP% if outside temps stay above 37°C (98°F)



# Vitamins and Minerals

Vitamins and minerals are important for proper bone growth and egg production

Sources of vitamins include

Fresh plant leaves, seeds, and fruits

Sources of minerals include

Shells – eggshells, oyster shells, snail shells (heat treat and crush before using)

Bone meal – made by heating bones then crushing them

Limestone products – limestone is a good source of calcium

# Energy

Chickens need energy to live, grow and lay eggs

Energy helps birds stay active

Energy comes from two sources

- Carbohydrates (starch)

- Fats & oils



# Carbohydrates (starches)

Carbohydrates (starches) are the largest source of energy for chickens

- Maize

- Millet

- Sorghum

- Rice

- Sweet potatoes

- Root crops and starchy fruits

- Seeds



# Fats and Oils

Oils are important source of energy and essential fatty acids

They also improve feed taste and function as a carrier for fat soluble vitamins

Most grains have some fats and oils in them

Other sources include oil seed meals such as

- Soybean meal

- Palm kernel meal

- Groundnut meal



## Approximate daily water consumption (ml) per bird

Age (week)	Layer	Modern Broiler
1		65
2		120
3		180
4	100	245
5		300
6		330
7		400
8		
9		
10		
11		
12	160	
13		
14		
15		
16		
17		
18	200	
19	220	
20	250	
21 and up	270	

\*Hot weather will increase water consumption

## Approximate daily feed consumption (grams) per bird

Age (week)	Layer	Modern Broiler
1	10	21
2	15	50
3	20	95
4	25	135
5	30	170
6	40	190
7	45	200
8	50	
9	55	
10	60	
11	65	
12	70	
13	75	
14	80	
15	85	
16	90	
17	100	
18	105	
19	110	
20	120	
21 and up	130	

# Store Feed Properly

Keep it dry

Keep rodents out

Elevate it off the floor



# Mixing Feeds

Make your own feed

The most difficult

Buy feed from supplier

The easiest way but not always the cheapest

Mix homemade feed with purchased feed

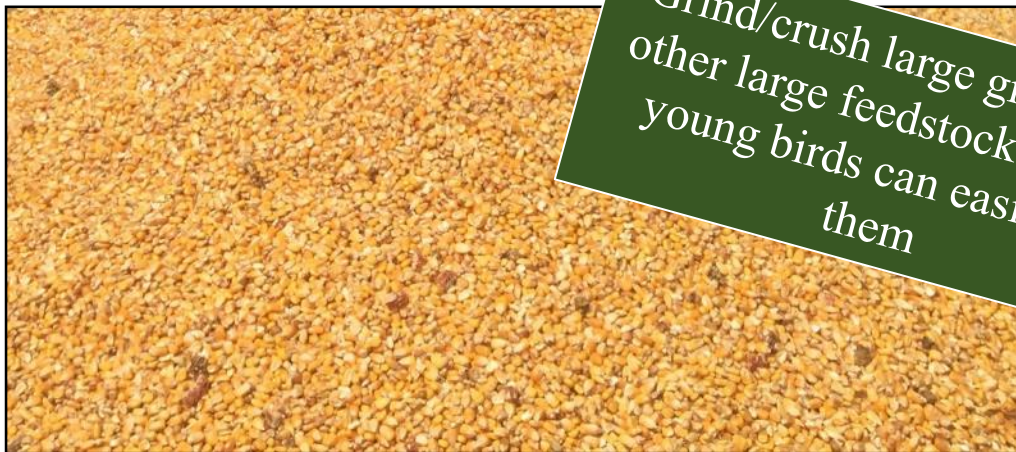
Buy a concentrate and then add your own grains or other energy feedstocks

Buy feed and make a similar type feed and blend them together to make sure birds are getting all the nutrients that they need

Need to know what you have available and what nutrients they have

Ingredients will need to be processed properly for use

Remove anti-nutritional properties (cooked, dried, cleaned)



Grind/crush large grains and other large feedstocks so that young birds can easily eat them

# Mixing Feeds

All of the different nutrients need to be included in the diet or birds will not perform

By using more than one source for each nutrient you get a better feed

Helps to make sure all nutrients are available in an adequate amount

Use simple containers to measure and mix feeds

A very basic feed can be made using 40% proteins and 60% grains  
Use multiple sources of each to get a more balanced diet and then add some fresh greens such as kale and a source of minerals like bone meal



## Cafeteria Feeding

This type of feeding allows the birds to select what they need

Proteins and grains are fed separately and birds eat what they need

Bone meal can be made at home by baking/roasting bones (any animal bones) until they are easy to crush and then crushing them into a powder/small pieces (bones can be cooked over a fire, on a grill or in an oven)



# Use What You Have



## Energy

Corn, sorghum and millet are the best grains to use

Wheat bran has about 17% protein

- Can make up 1/3 of the ration

- High in fiber, which may help with cannibalism

Rice and rice bran can also be used

- Lower in protein

- Polished rice has less vitamins

Bananas can be used but need to be ripe and they are low in protein limit to 10% of diet

Sweet potatoes can replace up to 50% of grains in a diet

Moringa leaf (up to 5%)

Cassava

- Needs to be dried first

- Both leaves (up to 5%) and root (up to 40%) can be used

- Not much protein but provides energy



# Use What You Have

## Proteins

### Legumes (beans)

Must be treated first (heat, sprout)

Ground nut cake is a good protein but make sure it is free of mold

Field peas and some green grams (mung beans), can be used without having to treat them first (up to 1/3 of diet)

### Fish Meal

Feed a maximum of 10%

High levels make eggs taste “fishy”

### Meat and bone meal

### Insects

### Palm kernel meal

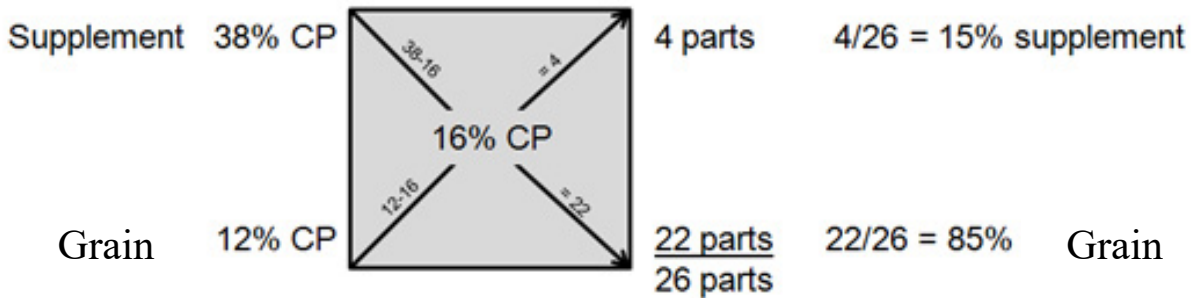
Can be fed up to 25% or ration

Mix with other source of protein



# How to Mix Feeds

Use the Pearson's Square to determine how much of each feed to combine when blending commercial feed with homemade feed



*Hope in the Harvest Mission International in Liberia uses the following ration to feed their chickens:*

- 50%-Corn
- 10%-Peanut
- 6%-fish meal
- 15%-Wheat Bran
- 19%-Palm Kernel Cake

*\*this is their base feed and they add the following supplements:*

- eggshells/snail shells
- moringa/sweet potato greens
- salt

Basic Layer Diet (1 kilo)			
Ingredient	<8 weeks	8-17 weeks	18+ weeks
Ground corn	500 g	575 g	600 g
Toasted ground soy	440 g	360 g	325 g
Bone meal	55 g	60 g	70 g
Salt	5 g	5 g	5 g

Basic Meat Bird Diet (1 kilo)		
Ingredient	<4 weeks	>4 weeks
Ground Corn	485 g	565 g
Toasted ground soy	480 g	400 g
Bone meal	30 g	30 g
salt	5 g	5 g

# Poultry Diseases

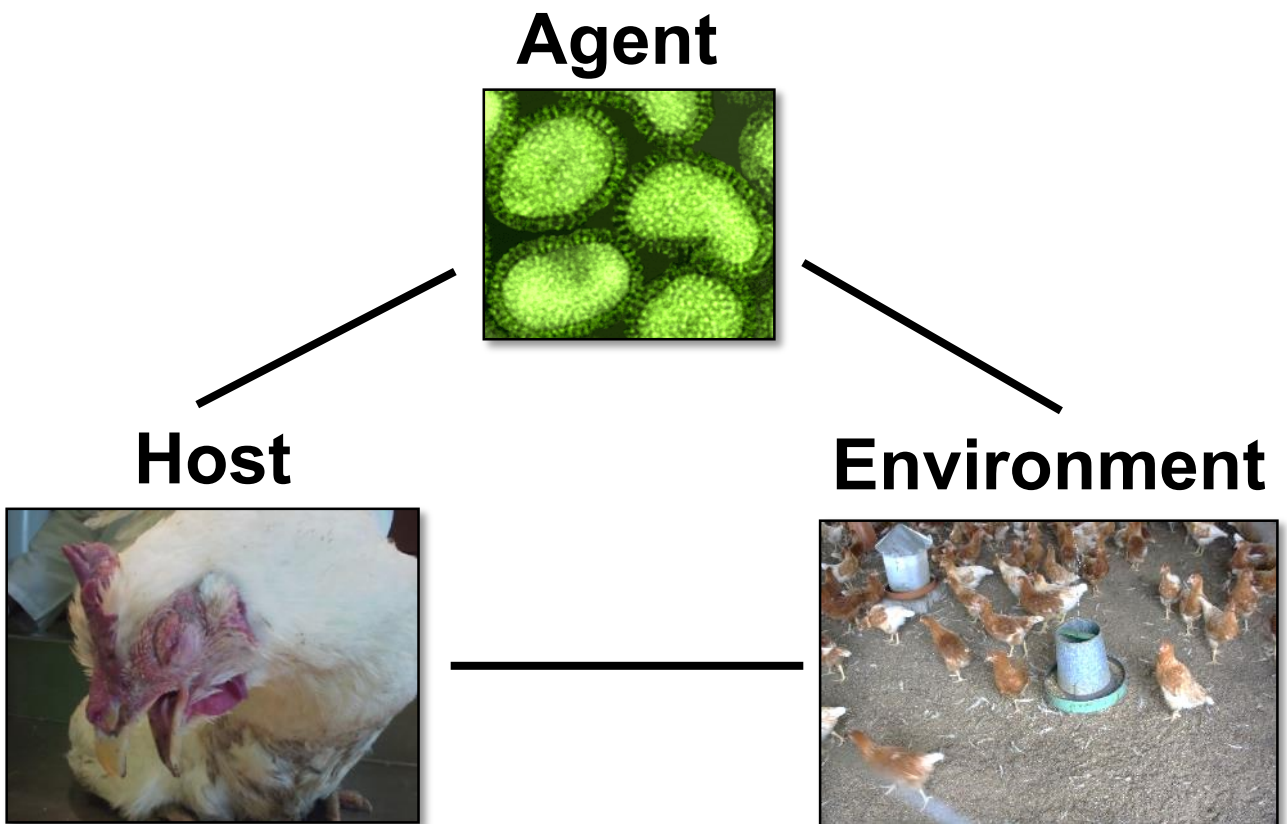


With assistance from  
Dr. Nathaniel Tablante, Professor and Extension Poultry  
Veterinarian, University of Maryland  
and  
Dr. Daniel Bautista, University of Delaware, Lasher Lab

# Diseases

Disease is any condition that results in deviation from normal function

Diseases occur due to the interaction between 3 main factors:



Not all poultry health and production problems are caused by infectious agents

Many problems can be traced to management factors

# Infectious Agents



## Bacterial

Bacteria cause many diseases, but can usually be treated with antibiotics

## Viruses

Viruses cause diseases that can not be treated, therefore, prevention is the only way of protecting your birds

Vaccines are available to help protect your flock

## Parasites

Most parasites can be treated with conventional medicine (anthelmintics) as well as traditional remedies

## Fungus

No good way to treat fungal infections

Antibiotics may help

**Antibiotics only  
work against  
bacteria!**

# Non-infectious Agents

## Chemical

Birds can come in contact with poisons when farms are not kept clean

- Poisons used to kill rodents
- Do not use the chicken barn to store farm chemicals

## Physical

Injury to the bird

## Dietary deficiency

Improper feed formulation or mixing

## Toxins

- Molds create toxins that the birds can consume in the feed



# Management and Environmental Factors

Weather

Temperature

Humidity

Wind

Season

Geographic location

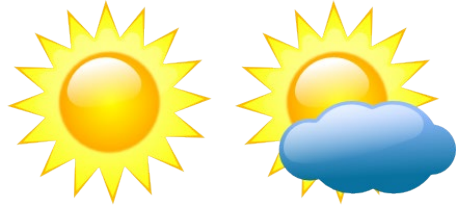
Housing

All birds (and feed) need protected from;

Wind

Rain

Direct sunshine (in hot weather)



**Do Not feed moldy feed to your birds!!**



# Management and Environmental Factors

For best management check for **FLAW**

Feed quality

Lighting program

Air quality and ventilation

Water quality

Space requirements

Sanitation

Vaccination and medication



Use good biosecurity to keep birds healthy

Biosecurity = Any and all procedures used to help protect humans or animals against disease or other harmful biological agents





# What To Look For

Some symptoms of disease are:

Weakness, muscular tremors, drooping wings, twisting of the head and neck, or complete paralysis

Lameness and tumors

Swelling around the eyes and in the neck

Bluish comb and wattles

Sudden death or an unusual number of birds dying in a flock



Know what a normal bird looks like, so you can identify sick birds



## Other Symptoms Include

Loss of production

Poor appetite

Huddling

Depression

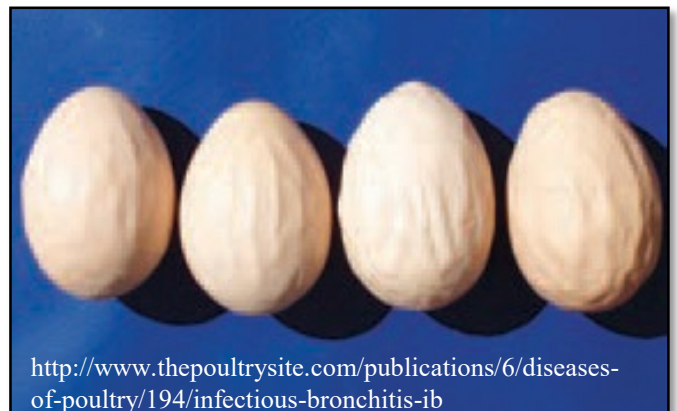
Runting/stunting; poor uniformity

Ruffled feathers

Coughing, sneezing, eye-nose discharge, difficulty breathing

Bloody or wet litter

Increased mortality



# What To Look For



# What To Look For

## Normal



## Something is wrong



# Biosecurity



# What is Biosecurity

“Bio” means life and “security” means protection

“Life protection”

Any and all practices and protocols used for the prevention of disease

Why is it important?

To prevent the spread of disease

Maintain healthy flocks

Profitability

## So what can we do?

Keep people out

Keep birds out

Keep animals out

Remove dead and sick birds quickly

Know what sick birds look like



## Elements of Biosecurity

### Isolation

Confine your birds within a controlled environment

Keeping other birds out

Locking doors to prevent others entering

Separating birds by age

### Traffic Control

Control traffic on and around your farm

### Sanitation

Disinfect material, equipment, and people that work or enter the farm



# Keep people out!

If people need to come on the farm make sure that they have not been around any other birds!

Have a fence around your farm

- Keeps people and animals out

- Put up signs

Keep a record of who enters the farm, why they are entering and where they are coming from

Have visitors wash their shoes

Better yet, have them wear plastic covers over their shoes after washing them

Particularly those that own poultry



Post signs to keep people out. Make sure that there is a place to wash hands on entering the farm.

# Clean Shoes

## Why Clean Shoes?

- People spread disease
- Footwear goes with you – everywhere!
- You can not see germs on shoes
- Easier than you think!

## Used foot baths to clean and disinfect shoes

- Foot baths need to be cleaned often
- If they have dirt in them they are not effective
- Use something that is easy to clean
- Make sure permanent foot baths can be drained and cleaned
- Use disinfectants
- Use signs

## Everyone needs to use footbaths!

This means owners and those in charge

Use the footbath when you enter the chicken barn and then again when you leave it

If you can, have a pair of shoes for each barn and only use them in that barn

**PLEASE STEP  
INTO FOOT  
BATH BEFORE  
PROCEEDING**



# Use Shoe Covers

Get shoe covers on hand to provide to visitors to the farm

Shoe covers can be purchased from many different companies

If shoe covers are not available then you can use plastic bags to cover their shoes

Use bags that have thick plastic to prevent them from ripping

Can also use two or more bags so that if one rips the other still protects the shoe from contact with the ground



Use shoe covers when visiting farms so you don't spread disease





# Wash Hands and Clothes

Simple washing your hands often will help stop the spread of disease

Make sure to wash when you return to the farm from a trip to town or a visit to a neighbor

Use signs



Clean clothes help stop the spread of disease  
If you can, have a set of clothes to wear only in the chicken barn  
Drying clothes in the sun can help disinfectant clothing



# Prevent wild birds from entering barns

Use wire or other materials to fill holes in housing to prevent birds from entering

Fix any holes in wire promptly

Put feed and water inside so it is hard for wild birds to get it



Don't mix different species of birds and keep "wild" chickens away from your birds



# Biosecurity

Once a bird leaves the farm DO NOT let it come back on the farm

Do not bring birds onto the farm unless you quarantine them first

If you must buy birds know the source

Buy them from a local farmer who has good stock

Make sure that they are healthy

Go and look at the birds,

If possible, go and look at birds they have sold to other farmers (practice biosecurity)

Separate new birds for at least 3 weeks to make sure that they are free of disease



## Move Sick Birds Away From Healthy Birds



Keep them isolated until they are healthy again

Locate the sick pen as far from other birds as possible

Visit them last and wash your shoes and hands after taking care of them

If possible, have a veterinarian or other trained specialist look at them

Disinfect the pen after sick birds are removed



# All in All Out

One of the best ways to get birds disease free is to only have birds of the same age on the farm

Separating production to multiple location allows production to continue even in the event that birds at one location are lost due to disease or natural disaster

Have only one age of birds on the farm

Sell all birds

Clean and Disinfect the buildings

Leave farm empty for a week or two

Longer times between flocks reduces disease

Place next flock

## If You Have Birds of Multiple Ages

Maintain them in separate areas away from each other to help prevent the spread of disease

Take care of the younger birds before visiting the older birds

Always clean shoes and hands before checking each flock of birds and between flocks

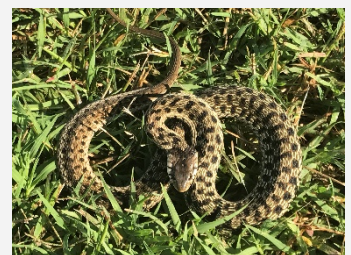
Better yet have different shoes that you wear only to check that flock



# Store feed properly



Store feed off the ground. If feed is set on the ground, moisture can enter the feed and make it mold. Store feed so rodents can not access it. Placing feed in barrels can help.



Storing feed properly can reduce rodent problems

# Control Rodents and Insects

Rodents can cause damage to buildings and equipment as well as spread disease

If you are using poisons to control rodents, make sure that they are protected so that the birds (or children) cannot eat them

Rotate poisons so that the rodents do not become resistant

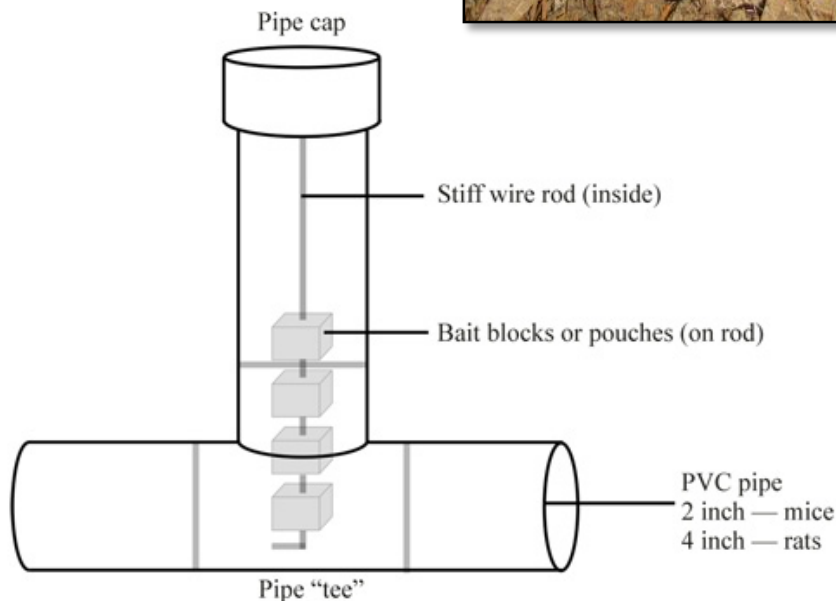
Follow all safety warnings for the control method you are using

Insects can also damage buildings, eat insulation and spread diseases

Use caution if you use insecticide to control insects

Follow all safety rules

Store in a location away from birds and people, and keep locked so that children cannot access them



# Cleaning and Disinfection

Simple physical removal of contaminated material reduces the pathogens

Surfaces need to be cleaned before disinfectants are used

Disinfectants do not work if there are large amounts of organic material (manure, dirt, litter) present

Application of an appropriate disinfectant can further reduce the risk of pathogens in a clean environment

Follow the directions for the product you are using

One of the best things we can do to reduce disease is let the chicken barns sit empty

Most agents that cause disease need a place to live so if the barn is empty their numbers will go down over time

The longer the time between flocks of birds the lower the chance of disease remaining from the previous flock

## Types of disinfectants



### Natural

Sunlight (UV)

Heat

Cold

Desiccation

pH

Antibiosis

Organic Acids



### Chemical

Oxidizing agents

Alcohols

Halogens

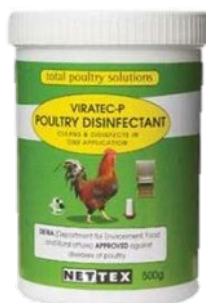
Coal Tar Products

Phenolics

Quats

Aldehydes

Ammonia



# Clean Your Farm

Remove garbage and debris

Cut the grass and weeds

Don't leave dead birds laying around

Clean up feed spills



# When Disease Strikes

Call your veterinarian

Get a diagnosis of the disease and then try and determine how it happened

Work with the Animal Extension group

Don't visit other farms

Get the sick and dying birds away from the healthy birds

Move them as far away as possible

Euthanize the birds humanely

Dispose of dead quickly to prevent further diseases

Keep people away from your farm

Don't visit neighboring farms

## Remember Diseases are Spread by;

Wild birds

Other poultry (chickens, ducks etc.)

Humans

Cats

Pigeons

Rodents

Insects

In order to protect your chickens you must limit contact with all of these things





# Some Common Poultry Diseases



With assistance from  
Dr. Nathaniel Tablante, Professor and Extension Poultry  
Veterinarian, University of Maryland  
and  
Dr. Daniel Bautista, University of Delaware, Lasher Lab

# Newcastle Disease (Ranikhet)



Caused by – Paramyxoviridae virus (RNA virus)

Signs can be identical to AI

Facial swellings

Red Shanks

Respiratory Signs

Nasal/Mouth Discharges

Eye/Nasal Discharge

Swollen crusty eyes

Coughing/gaping, gasping

Tracheitis

Can be zoonotic to humans

Can cause conjunctivitis



# Prevention and Control

Biosecurity

Vaccination

Quarantine of infected premises/areas

Destruction of infected birds/flocks

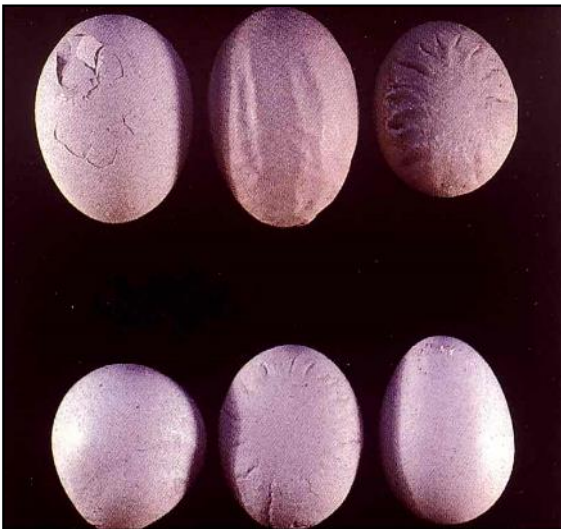
Proper disposal of infected carcasses

Composting

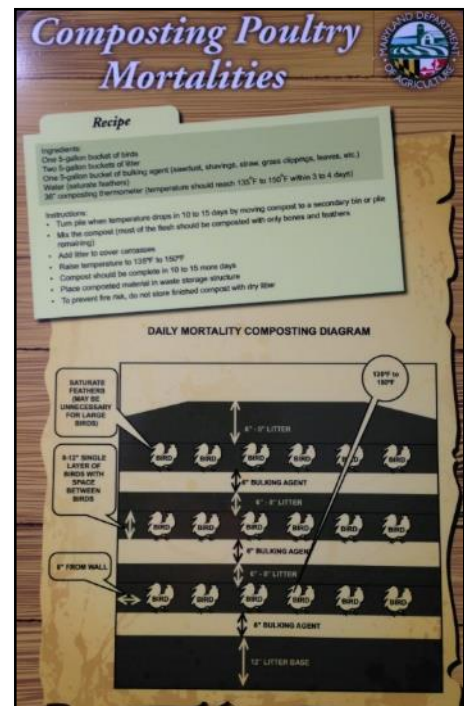
Burial

Incineration

Cleaning and disinfection



Misshapen and abnormal eggs can be a sign of Newcastle disease



# Avian Influenza



Caused by Orthomyxovirus

Type A Avian Influenza virus

Various serotypes (H5 and H7 strains are the most common in poultry)

Infects most birds

Can be zoonotic to humans

## Highly Pathogenic AI

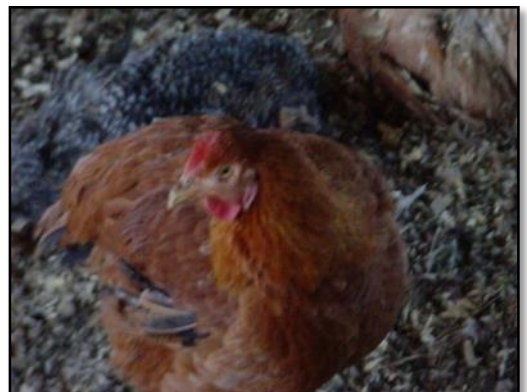
Severe clinical signs

High mortality

## Low Pathogenic AI

Mild respiratory signs

Minimal mortality



# What to look for

Some symptoms of disease are:

Sneezing, coughing, gasping for air

Greenish watery diarrhea

Depression, weakness, and lack of appetite

Any unusual decrease in egg laying, or abnormal eggs

Weight loss



# Prevention and Control

Biosecurity

Quarantine of infected premises/areas

Destruction of infected birds/flocks

Proper disposal of infected carcasses

Composting

Burial

Incineration

Rendering

Landfill

Cleaning and disinfection

If you bury dead birds make sure  
that they do not contaminate  
ground water  
Also make sure to bury them  
deep enough to prevent  
scavengers from digging them up

Note: wild waterfowl (ducks and geese) are natural reservoirs  
of AI virus

# Marek's Disease (Range Paralysis)

Caused by a herpes virus called *Alphaherpesvirinae*

Seen only in birds older than 16 weeks of age

Initially the birds may show paralysis of one or both wings or the paralysis may be in the legs

Less common forms of the disease include

- Enlarged feather follicles that redden and can sometimes lead to brown crusty scabs

- Lymphoid tumors in various organs

- The ocular form causes a graying of the eye and or a change in the shape of the iris and can result in blindness



## Prevention and Control

Biosecurity

Vaccination

Quarantine of infected premises/areas

Destruction of infected birds/flocks

Proper disposal of infected carcasses

- Composting

- Burial

- Incineration

Cleaning and disinfection

Tumors associated with Marek's Disease



# Mycoplasmosis (Chronic Respiratory Disease)



Caused by *Mycoplasma gallisepticum*

Secondary *E. coli* infection is common

Transmitted through the egg, airborne droplets, or from bird to bird



# Mycoplasmosis (Chronic Respiratory Disease)

## Signs

- Coughing, sneezing, facial swelling, nasal discharge, cloudy air sacs
- Deformed eggs, drop in egg production
- Pericarditis and perihepatitis (with secondary *E. coli* infection)

## Prevention and Control

Purchase chicks only from MG-negative sources

Provide medicated feed (containing Tylan® or Gallimycin®)

- Can reduce clinical symptoms but will not completely eliminate MG

- Be careful some antibiotics cannot be used for birds raised for meat and eggs

Even if birds have been treated with antibiotics, they can still spread MG to other birds

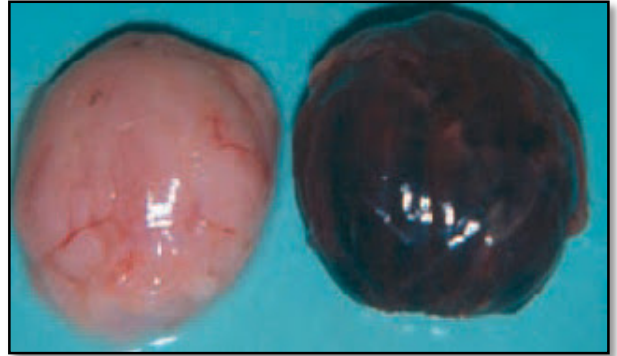
Harvesting (or culling??) meat birds may be better than treating them because treatment can be expensive

Don't mix birds of different species and age





# Infectious Bursal Disease (Gumboro)



Caused by *Birnavirus*

Affects young birds, not older ones

Adults are immune compromised

Virus is very resistant, persisting for months in barns

Insects can harbor the virus for up to 2 months

## Signs and Lesions

Depression

Diarrhea

Vent picking

Unsteady gait

Swollen bursa

Necrotic bursa

Bursal atrophy

## Prevention and Control

There is no treatment

Vaccination programs are used to prevent

Needs to be for the strain you

have

Need good biosecurity



# Fowl Pox



Wet form of Fowl Pox, often results in higher mortality

Caused by *Avipox* virus

There are two forms

Dry pox

Cutaneous lesions on the feather-less skin

Some are ulcerated

Wet pox

Skin lesions and/or plaques in mouth, pharynx, larynx, and sometimes the trachea

## Prevention and Control

There is no treatment

Vaccination programs are used to prevent

Wing web

Controlling mosquitos

Need good biosecurity – Sanitation



# Internal Parasites

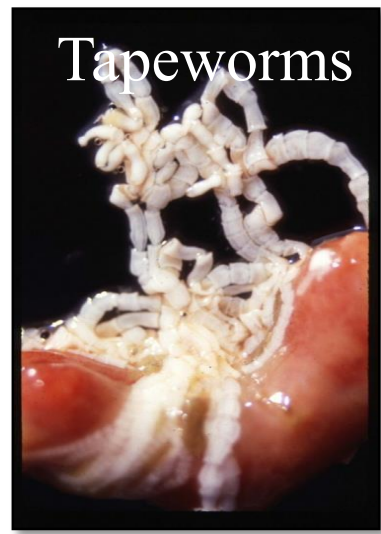


Roundworms (Ascarids)

Hairworms (Capillaria)

Cecal worms (Heterakis)

Tapeworms (Cestodes)



## Signs and Lesions

Unthriftiness, stunted growth, emaciation, enteritis, anemia and decreased egg production

## Prevention and Control

Rotate birds in yards or pens

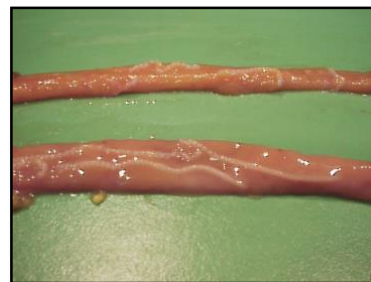
Deworm flocks regularly, particularly those raised on the ground or in floor pens

Provide medicated feed (containing broad-spectrum dewormer)

Treat infected birds with the proper dewormer

*Piperazine* is effective only against roundworms and cecal worms

*Fenbendazole* is effective against roundworms, cecal worms, and hairworms



## Hairworms

# Coccidiosis



Caused by *Eimeria sp.*

9 species in chickens

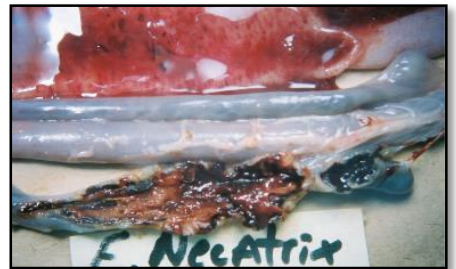
The main problem in broilers are caused by:

*acervulina*

*maxima*

*tenella*

7 species in turkeys



Transmitted through infected droppings (containing oocysts)

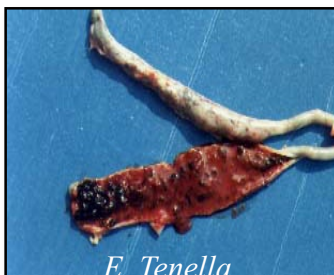
Intestinal coccidiosis (caused by *E. acervulina*, *brunetti*, *maxima*, and *necatrix*)

Loss of weight

Shriveled combs

Drop in egg prod.

Pale shanks



# Coccidiosis

Cecal coccidiosis (caused mainly by *E. tenella* in chickens)

- High mortality
- Bloody feces
- Pale combs
- Ruffled feathers
- Lack of appetite
- Coagulated blood in ceca



## Prevention and Control

Good management

Provide medicated feed (with coccidiostats)

Treat infected flocks promptly

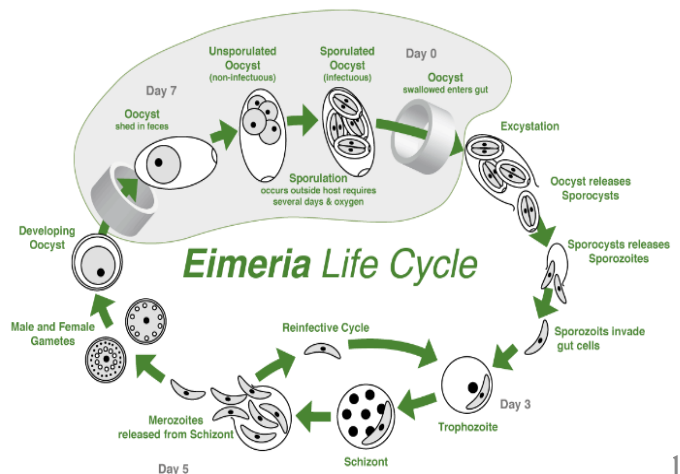
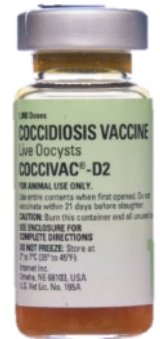
There are two types of medications used, coccidiostatic and coccidiocidal

Coccidiostatic medications stop the development of coccidia in the middle of the lifecycle

Coccidiocidal medications kill the coccidian

These medications are usually used in the feed.

A coccidia vaccine is available commercially in some parts of the world and can be given to chicks at one day of age



# Other Diseases

## Fowl cholera (pasteurellosis)

Caused by the bacterium *Pasteurella multocida*

Can affect birds of all ages

Symptoms are similar to AI:

Diarrhea, respiratory symptoms, loss of appetite, blue combs and wattles

No treatment

Vaccine is usually available

## Infectious coryza

Caused by the bacterium *Haemophilus paragallinarum*

Seen in all ages of birds

Symptoms:

Runny nose, swellings under the eyes, closed eyes, drop in egg production

Treatment with antibiotics

Prevent by biosecurity

## Pullorum disease (Bacillary white diarrhea)

Caused by the bacterium *Salmonella Gallinarum* and *Salmonella pullorum*

Most commonly seen in young birds

Symptoms:

Difficulty walking, big bellies, wing dragging, anorexia, weakness, and white runny feces,

High Mortality

Can be passed from the hen to the chick through the egg

No treatment

Prevent by biosecurity

# External Parasites

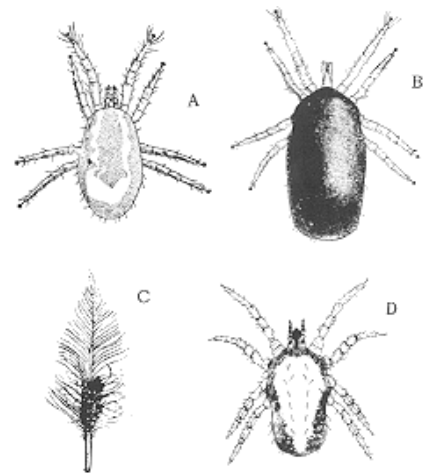
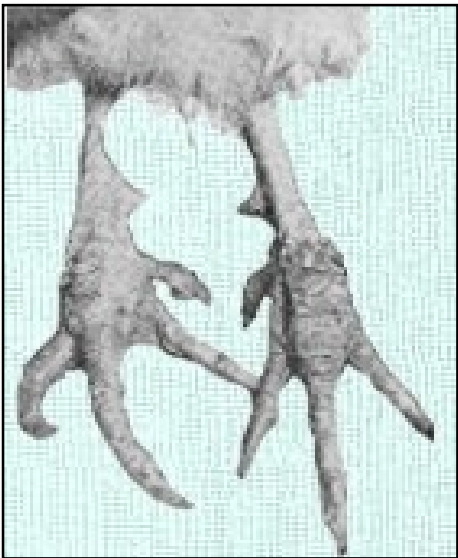
## Mites



Scaly leg mite (*Knemidocoptes mutans*)

Chicken mite (*Dermanyssus gallinae*)

Northern fowl mite (*Ornithonyssus sylviarum*)



Northern fowl mite. A, Female before feeding. B, Engorged female. C, Egg mass on feather. D, Nymph.

# Signs and Lesions

Scaly leg mite: scales and crusts in legs, combs, and wattles



Northern fowl mite: blackened feathers, scabby skin around vent



Stay-Fast Fleas, fleas attach around the eyes and on the comb and wattles

Poultry ticks, when present, can be found hiding in debris or cracks in the chicken barn





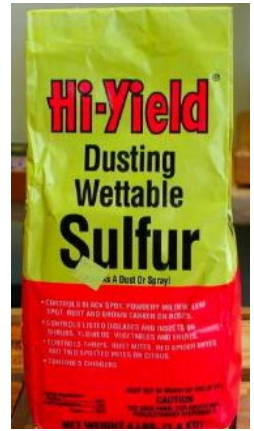
# Prevention and Control

## Scaly leg mite

Cull or isolate affected birds

Dip legs in warm acaricidal solution (consult veterinarian)

Can coat legs in oil to smother the mites



## Mites, Ticks and Fleas



Monitor all birds and facilities for infestation; check egg flats and cases for mites

Treat birds with approved insecticide (e.g. permethrin)

Sulfur powder and wood ashes can also be used

Fill any cracks or crevices in the chicken barn to eliminate hiding places for parasites



# FINAL THOUGHTS on Disease

Work with local animal health officials to design a vaccine program for your birds

Make changes with help from animal health officials whenever disease challenges change

Be vigilant – continuous flock health monitoring is a **MUST**

Use all available senses (sight, touch, smell, hearing) as well as **COMMON SENSE**

Look for all possible causes and/or predisposing factors, i.e. do not “leave any stone unturned”

Initiate corrective or preventive measures promptly, **Don't put off repairs!**

When in doubt, seek expert advice

Practicing strict biosecurity, and provide adequate high quality feed, water, ventilation, heat, etc. (keeping birds comfortable and happy) will help prevent disease

Keep your farm clean!

# Vaccines



# Vaccines

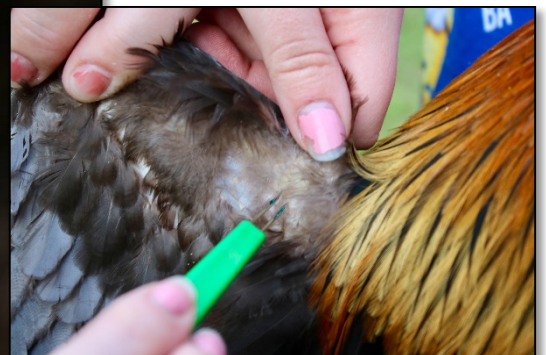
Vaccines are used to protect birds from diseases, usually viral diseases

Vaccines are used to prevent:

- Newcastle disease
- Marek's
- Gumboro (Ranikhet)
- Fowl Pox
- Fowl cholera

Methods of Vaccinations

1. Eye drops
2. Injections – under the skin (subcutaneous) and in the muscle
3. Skin piercing
4. Orally (in feed or water)



# Vaccine Basics

1. All vaccines should be stored in a refrigerator before use
2. Some vaccines are so-called heat stable, which means that the vaccine can tolerate high temperatures (However, heat stable vaccines should also be stored in a cold place to keep them viable)
3. Always keep vaccines out of direct sunlight.
4. When using vaccines in the field, you should transport them in a cool box with ice
5. Do not use any chemical disinfectants to clean syringes, needles or other equipment used for vaccination, as these may destroy the vaccine (instead use boiling water and let cool before using)
6. The vaccines must be mixed or diluted in cold distilled water
7. Make sure any water used for vaccination is free of chlorine
8. It is best to vaccinate birds during the cool hours of the day, either in the morning or evening
9. Some mixed vaccines should be used within a short time frame, otherwise they will be useless and should be thrown away (check instructions for how long vaccine is viable after mixing)
10. Always read and follow the manufactures instructions
11. Don't vaccinate sick birds, wait until they are healthy



# Examples of Vaccine Schedules

These are only examples of programs and not suggestions

Age	Disease	Vaccination route
1 day	Marek's Disease (HVT/SB1 or HVT/Rispens)	Injection
18 days	Infectious Bursal Disease	Drinking water
24 days	Infectious Bursal Disease Newcastle Bronchitis	Drinking water Drinking water Drinking water
30 days	Infectious Bursal Disease	Drinking water
6 weeks	Newcastle Bronchitis	Spray Spray
10 weeks	Avian Encephalomyelitis <sup>2</sup> Newcastle Bronchitis	Spray Spray Spray
13 weeks	Avian Encephalomyelitis <sup>2</sup> Pox Newcastle Bronchitis Salmonella	Wing-web Wing-web Injection Injection Injection
15 weeks	Newcastle Bronchitis	Spray Spray

## COMMERCIAL LAYERS -

AGE	DISEASE	VACCINE	METHOD	DOSE
DAY OLD	MAREKS ND ✓ IB ✓	RISMAVAC HITCHNER B1 IB H120	SC/IM SPRAY SPRAY	0.2cc FULL ¼ dose FULL
15 DAYS OLD	IBD ✓	228E (Avipro Precise)	DRINKING WATER	FULL
21 DAYS OLD	IB + ND ✓	MA5 + CLONE 30	DRINKING WATER	FULL
6 WEEKS	FOWL POX ✓ IB + ND ✓ MG ✓	NOBILIS OVO-DIPH or TAD Pox IB/ND MG Bac	WING WEB EYE DROP SC NECK	FULL FULL 0.5cc
8 WEEKS	IB + ND ✓	MA5 + CLONE 30	DRINKING WATER	FULL
9 WEEKS	ILT ✓ CORYZA	MLT (/ LT IVAX T/C) AVIVA®	NASAL DROP SC NECK	FULL 0.5cc
12 WEEKS	AE ✓ MG ✓	AE MG Bac	DRINKING WATER SC NECK	FULL 0.5cc
14 WEEKS	IB + ND EDS	NOBILIS IB + ND NOBIVAC EDS	IM BREAST (L) IM THIGH (R)	0.5cc 0.5cc
16 WEEKS	SALMONELLOSIS IB + ND CORYZA	NOBIVAC SG9R IB/ND AVIVAC	IM BREAST (L) EYE DROPS SC NECK	0.2cc 0.5cc

IB and Newcastle : MA5 + Clone 30 at 19 weeks, 35 weeks and 50 weeks (drinking water).  
CORYZA vaccination is at 6 weeks (0.5cc), 9 weeks (0.5cc), and 16 weeks (0.5cc).

De-worming : At 9-10 and 15-6, 21-22 & 28-30 Weeks. Use either a Levamisole (Ripercol) or Piperazine (Faiworm) based De-wormer and rotate every 2 to 3 treatments.

At 14 weeks, a vaccine that combines NOBILIS IB + ND & NOBIVAC EDS in one shot is preferable and more economical.

Note: Day 1 vaccinations are done at the hatchery.



Date of Hatching: \_\_\_\_\_

## INDIGENOUS CHICKEN VACCINATION PROGRAM

AGE	VACCINE	MODE OF ADMINISTRATION	REMARKS
Day old	Mareks	Subcutaneous	Mainly for commercial hatcheries
Day 10	Gumboro (1 <sup>st</sup> dose)	Drinking water	
Day 18	Gumboro (2 <sup>nd</sup> dose)	Drinking water	
3 Weeks	Newcastle disease (1 <sup>st</sup> dose)	Eye drop or Drinking water	
3 Weeks (in hot spot areas)	Fowl pox	Wing web stab	
6 Weeks (Other areas)			
8 Weeks	Newcastle disease (2 <sup>nd</sup> dose)	Eye drop or Drinking water	
	Fowl typhoid	Intramuscular injection	
18 Weeks	Newcastle disease (3 <sup>rd</sup> dose at point of lay)	Eye drop or Drinking water	Repeat every 3 months
19 Weeks	De-worming	Drinking water	Repeat every 3 months

Notes:

- NEVER vaccinate sick chicken
- Consult your veterinary/livestock staff for detailed vaccination programs in your area



# Record Keeping (Basic Business)



# Basic Business

Every farm needs a business plan - a written document

Describes what you are going to produce

Eggs

Meat

Feathers

How you are going to produce it

Confined housing

Free range

Where will you get your birds

States your marketing strategies

Where will you sell your product?

How will it be different from other products?

Start small and only purchase what you need

Make your own waterers and feeders to save money

Use what you have

Expand when you can afford to

Sets a budget for production and marketing activities



# Record Keeping

Records are needed in order to evaluate business methods

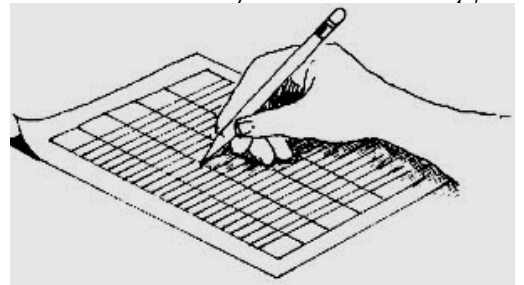
Need to keep

Financial records

Production records

Bird health records

You can't correct problems if you don't know what you are doing and what you have done in the past



## Financial Records

Important in order to know if you are making money

Helps to determine what production methods work

Date	Description	How Many	Total Cost	Income
10/Jan/2013	feed	400kg	\$200	
10/Jan/2013	fuel	20 liters	\$20	
12/Jan/2013	chicks	100	\$100	
01/Feb/2013	labor		\$30	
01/Mar/2013	labor		\$30	
09/Mar/2013	birds	90		\$450
Total			\$380	\$450
<b>Net Income</b>				<b>\$70</b>



# Production Records (Meat Birds)

## Number of birds

Source of the birds, number of birds

Start of grow-out, end of grow-out

Mortality

Why did they die

## Weight of birds

Weekly

Final

## Keep field records with the birds

Amount of feed used

Total

Weekly

## Disease

Type (symptoms)

Number affected (age of birds)

## Anything else that happens different

Weather

Feed change

Mechanical problems

Date	Feed Added	# Dead	Comments
June 1			
June 2			
June 3			
June 4			
June 5			
June 6			
June 7			

# Production Records (layers)

Source of hens

Type, number

Number of eggs

Daily (compare weekly)

Age of hens is also important

Age affects production rate

Egg size

Mortality

Diseases

Feed consumption

Number of Hens		
Date	Mortality	# eggs
9/1/2011		
9/2/2011		
9/3/2011		
9/4/2011		
9/5/2011		
9/6/2011		
9/7/2011		
9/8/2011		
9/9/2011		
9/10/2011		
9/11/2011		
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10/24/2011		
10/25/2011		
10/26/2011		
10/27/2011		
10/28/2011		
10/29/2011		
10/30/2011		
10/31/2011		

# Records of Flock Health

Acceptable parameters

Measurable data

Past History

Current Information

What are the birds doing ?

How long?

How many affected?

When did it first happen?

Has it happened before?

What has been done? (Changes)

Tests

Treatments

Organic Farm Documentation Series

Provided courtesy of NCAT's ATTRA Project, 1-800-346-9140

### Organic Poultry Flock Health Record

Permissible health care practices must be used, including appropriate uses of vaccines, organic feed ration, good housing, routine access, exercise, sound physical abilities, and vaccines. Synthetic medications must be on the National List. You must not withhold medical treatment to produce organic status, all poultry treated with prohibited substances must be clearly identified. (See 9/16, 9/20, 9/21/2011)

Farm Name or Unit: \_\_\_\_\_ Date Chicks / Poultry Placed: \_\_\_\_\_ Production Year: \_\_\_\_\_

Flock # or Flock ID: \_\_\_\_\_ Total Number of Chicks / Poultry Placed: \_\_\_\_\_

Date of Slaughter or Date Egg Production Begins: \_\_\_\_\_

In columns for Day 1 through Day 7, record the number of birds that died each day.

Week	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Identified Problem & Cause	Action Taken
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

Poultry flock health records.xls

May be copied and distributed as needed.

# Records

It is important to keep accurate records and use them

Look at your records when you have a problem to see if it is something new or a repeat problem that you need to address differently

Don't make the system so hard it does not get done properly

The more data you collect the more you can learn about the business

Keeping records allows for a way to compare

Flocks

Farms

Breeds of birds

Suppliers

In poultry flocks where records are kept, diseases and problems are noticed and therefore, they can be fixed quickly preventing losses and increasing profits

The sooner you start treating a problem the better,

Less loss of production

Less chance of it spreading

Keep the records for several years  
Maintain an organized system  
That way you can find them



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<http://extension.umd.edu/poultry>



UNIVERSITY OF  
MARYLAND  
EXTENSION

The latest version of this book can be found at:

[https://extension.umd.edu/poultry/publications/  
international](https://extension.umd.edu/poultry/publications/international)

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