Family Poultry Training Course

Trainee's Manual
FAMILY POULTRY TRAINING COURSE

TRAINEE’S MANUAL

**Purpose:** to provide both women and men with sufficient information and knowledge to allow them to farm poultry in a commercial and semi-commercial way, and to decide if they can make money out of the venture.

**Objectives:** to learn about all aspects of raising poultry for their meat and eggs. Then to develop a business plan which will show them if they can make money out of a poultry farming enterprise operation in their country or region under the present conditions.

**Course:** there will be trainers who will guide the participants through all aspects of producing poultry. There will be ‘hands on’ practical work, visual demonstrations and a manual that will have diagrams, photographs and illustrations. Towards the end of the course, commercial poultry production will be dealt with in two specialised areas: 1. For meat (broiler) production and 2. For egg production.

![Small scale commercial broiler enterprise](image)
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UNIT I

1. INTRODUCTION

There is no point in setting up a farming venture unless it can be sustained; that is, it can survive over the long term. Therefore it is essential to make a survey in which key questions must first be answered honestly before the farmer decides to launch into a poultry enterprise in which he or she will have to invest time and precious money.

It is assumed that all trainees have a particular interest, but little information, in setting up a poultry enterprise on a commercial or semi-commercial scale and are here to learn some basic management skills. It is only from practice and experience that the farmer will become an efficient poultry producer and this course forms the foundations of a successful poultry enterprise.

The other important aspect is that the farming of poultry must not harm the environment by polluting water ways with plastic bags, poultry waste or chemicals used in the farming industry for example. Each one of us has the responsibility to protect and improve the land we farm.

Any poultry farm will usually be part of a farming system (vegetables, plantation crops, gardens, special crops, trees, other livestock) and all parts must be catered for and must not be compromised. In other words a new poultry venture will likely be part of the existing system.
(a) Your first task is to introduce yourself and give us some information on your background. We would like to know what you do, why you are here and a little about your village and family.

(b) Now that we know a little about you I will tell you a bit about myself.

(c) I am sure that you may have some questions to ask. These may relate to the course or to any other matter. So please ask them.

1.1 What will I learn from this course?

At the end of the course you should understand the basic facts about keeping poultry for egg production and meat production.

You should have a good knowledge of
- their housing
- the different systems of how chickens are kept
- their feeding and management
- health and hygiene
- poultry farming is a business. It is essential to have a business plan
- the importance of forming a poultry cooperative or forming an association of producers with the same interests in poultry production
1.2 Why keep chickens?

Can you make a list of reasons why people keep chickens? There are at least 6 reasons although not all of them apply to your particular situation. Write down what you think here and we will discuss them.

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I will add some of the most important reasons that relate particularly to the health of your children.

Chicken meat and eggs contain special proteins that:

- Allow your children to grow strong
- Allow their brain to develop so that they will be clever at school
- Allow pregnant mothers to produce healthy babies and to breastfeed them
- Allow children to be healthy and not to catch cold and coughs

- Eggs and meat also contain vitamins and minerals that are essential in your diet
- If you decide to raise poultry always remember to keep some meat and eggs for your own family to eat
1.3 The business of poultry farming

There are many small farmers that are making money out of raising meat birds (broilers) in developing countries. They buy day-old chicks from chick breeders who may be far away and usually sell them live after 7-8 weeks. They also buy their feed in from the nearest feed mill. This may be a long way away and this will mean that feed is expensive. They will need to sell their broilers at a high price.

Because of long distances, and because of unreliable transport, sometimes some chicks arrive sick or dead. If there are enough producers, they can form a co-operative and may be able to establish a small poultry hatchery (see section 14). This will help to make chicken meat production sustainable. A depot can be set up to purchase and store large amounts of feed to sell to the poultry keepers at a cheaper price. Egg producers may also benefit from such an arrangement.

Producing eggs is more difficult than broilers. The day-old chicks are very expensive and you have to wait more than 18 weeks before the hen will lay an egg. They are not easy to rear as they must be grown slowly and according to a plan. They also need to have good housing and nest boxes so there is a higher initial capital cost than growing meat birds. There is usually a shortage of eggs in villages and they may have to be transported long distances to customers so there is often great opportunity to farm commercial hens starting with a few and then expanding. The customer can purchase a few eggs at a time so the financial outlay is less than buying a broiler chicken.
There may be opportunity for commercial egg production by starting in a small way. We will talk about this later.

When you finish this course, we plan to be able to help you with your chicks, their feed supply and the trainers will be able to give you advice. You will see during the course that there are different ways to keep laying hens and broiler chickens.
1.4 Background information

- You will need to look at all aspects of commercial poultry production before you decide to become a poultry farmer.
- This means that you will have to seek out information in a survey.
- On the basis of this information you will make a business plan. This will tell you how much money you can expect to make (or lose) each year.
- A good business plan will allow you to go to the bank to borrow money to get your commercial poultry farm started.

You will not start with a feasibility study now but towards the end of the course when you will know more about poultry and what farming poultry entails. But you should look at this from time to time throughout the course at the questions that need to be answered so that you can gather the necessary information.

End of Unit I
UNIT II

2. POULTRY BREEDS

There are many different breeds of chickens. We will only mention here those that have commercial potential (meat and/or eggs).

**Dual Purpose.** These are used to produce both meat and eggs such as Rhode Island Reds or Plymouth Rock.
- Today, for large-scale commercial production they do not produce enough eggs
- nor do they grow fast enough for meat production
- they eat too much feed
- they are not very efficient in converting feed to eggs and meat
- Dual purpose breeds may have a role to play where it is not possible to get better breeds or conditions are not ideal or feed is not of the best quality

**Special Breeds.** These have been selected for egg production
- the White Leghorn was very popular for many years
- it has a small body (1.5 kg) and lays many white eggs
- the Black Australorp is another popular breed
- it is very docile (quiet) and lays a tinted (light brown) egg
- it is medium-heavy body weight (2.2 kg) and therefore eats quite a lot of feed
- it is good for free-range (out doors) conditions as it is not flighty
**Hybrids.** In the commercial world today only hybrids (cross-breeds) selected for either meat or egg production (*not both*) are used. Because of *hybrid vigour*

- they lay *more eggs* than special and dual purpose breeds
- they lay *large, brown or white* eggs
- they eat less *feed* per kg of weight gain for meat or per kg of eggs
- the male chicks from hybrid layers grow *very slowly* and normally have to be killed. They are usually too expensive to rear but it depends on feed costs and circumstances
- the hybrid broilers *grow faster* than pure breeds
- they produce *more meat* especially *breast meat* than the pure breeds

Hybrid chicks are only *available* to the small farmer through a *breeding* company. The farmer will not have the parent breeding stock and therefore can not *breed* these chicks himself. Replacement pullets must be bought in but are not always available in remote areas.

**EXERCISE**

In a few words list all the characteristics (e.g. many brown/white eggs) that you would like to see in 1. a laying hen, and 2. a broiler chicken.

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3. POULTRY HOUSING

There are many reasons why poultry should have a well-constructed house
- to protect them from floods, rain and the sun
- to protect them from predators - dogs, cats, snakes, birds of prey, rats and thieves
- to prevent mice, rats and other birds from eating their feed and transmitting disease
- to give hens a safe place to lay their eggs

You must protect your chickens from predators

What are the basic requirements for a poultry house?
It must be
- rain proof
- protect the birds from direct sunlight and keep them cool
- must have good drainage around the house
- easy to clean
- have a strong door with a secure lock

Housing will likely be your biggest investment and to cut costs, local material can be used. Positioning of the house is important to conform to some of the basic requirements (mentioned above). High ground will stop flooding in rain storms.
Sketches of a simple poultry house for keeping about 250 broiler chickens or 120 laying hens on the floor (barn system)
3.1 Floor

The floor must be:
- flat and smooth and easy to clean
- have a good depth of litter cover (sawdust, shavings, dried grass, leaves, chopped straw, rice hulls, crushed coffee hulls, peanut hulls)

3.1.1 Litter
- should be raked weekly
- changed every two batches of meat birds or every batch of layers
- makes excellent fertiliser for your garden
- makes an excellent compost when mixed with leaves, grass, vegetable waste etc

Fresh poultry manure must be stored for a few months, otherwise it might burn plants. Adequate floor space for birds is most important particularly in regions where it is always hot. If they are too crowded broilers will not grow well.

Remove manure from empty house and replace with clean litter
EXERCISE
Do you have a suitable place to build a chicken house? If so describe the site. Are there suitable materials to construct the house from? What are they? Will you have to purchase some of these materials? What are they and their approximate cost?
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4. EQUIPMENT

4.1 Drinkers

Give your birds, clean, fresh water. You can make your own drinkers or buy them. They must be *adjusted* to the correct height so that birds can drink easily.

4.2 Feeders

Poultry must have *continual* access to feed in properly-adjusted feeders, otherwise they will not *grow* or *lay* well. These can also be made from *local* material, or purchased. Feeders must always have a *lid* to stop birds from entering the feeder. An inexpensive *spring balance* for weighing birds, feed, eggs and *other things*, you will find to be very useful.
EXERCISE
Make a list of the important features of a poultry house

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Make a list of the equipment that must be available in the house

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[Unit II. Trainees will now visit the demonstration site to discuss the poultry house and how much a similarly equipped house will cost and what improvements/changes could be made. Use of old litter to make compost or to spread on the garden will also be discussed]

End of Unit II
5. BROODING

This is a term which means, keeping chicks warm and comfortable.

When your baby chicks arrive they will need special care. This is the time when you can expect a few chicks to die. In tropical countries it may not be necessary to provide extra heat during the day but only at night and then only for the first 10 days.

Dead chicks should be removed and buried in a hole in the ground. Sick and weak chicks should be kept separately and given special care.
Chicks should be given water immediately and some may need to be shown how to drink.

Electricity may be unreliable or unavailable and a small kerosene lamp can provide heat.

- Weak chicks need to be watched carefully. They rarely survive. Often it is better to get rid of them.
- The chicks are placed in a brooder made from cardboard or woven bamboo, leaves or grass.
- It may be necessary to provide extra heat only during the night.

Chicken brooder
A *cold-box brooder* can be used but only for up to 50 chicks. It needs no heat source. The chicks keep each other warm in an insulated box. This box will be especially useful in warm countries for brooding at night. The brooding compartment is surrounded with straw or dried grass for insulation. The other compartment is for a feeder and drinker and a lid of wire mesh to let in the light and protect the chicks. The lid over the brooding area is insulated (e.g. polystyrene).

**EXERCISE**

Make a list of what you will need to do to prepare your chicken house for the arrival of a batch of day-old chicks

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6. FEEDING

- Feed is *60-70% of the costs* of producing commercial poultry.
- Feed is the major *constraint* (difficulty) to producing poultry in developing countries.
- Compounded (mixed) feed is *expensive*. There may be no *feed mill* and mixed feed is not readily available in many regions.
- Feed may have to come a long distance and probably will be very expensive and unreliable so you have to order well in advance.

Feed is 70% of costs of Raising Meat Chickens

Often, only *very few suitable ingredients* (feedstuffs) are produced in the country and most are imported. Fish meal (rarely) or fish waste, also palm kernel meal, brewery waste, copra meal, wheat bran and rice bran, broken rice may be available. But these are largely inadequate for formulating a high – quality, commercial poultry diet especially for broilers.

Feed ingredients are mixed according to a *special recipe* to provide a *balanced* diet.
- Baby chicks need a feed of the highest quality. That is one that is especially high in good quality protein (e.g. soybean meal, fishmeal) to match the protein found in meat and eggs.
- Chicks also need a source of feed energy (wheat bran, cassava, cereal grains) to make them grow well.
- Chicks also need other nutrients (minerals and vitamins) but only in small amounts.
- A specialist person formulates (puts together) diets suitable for chickens. That person should also give you good advice on what to and how to feed your poultry.

If some feedstuffs are available locally, farmers who receive the right advice may want to mix their own ingredients. First there is a need to get in a stock of the raw materials (ingredients). You will need to weigh out the ingredients or have containers which will hold known weights of different feedstuffs.
The feedstuffs must be thoroughly *mixed* with a shovel or in a home-made mixer. It can be made from a drum. Also a cement mixer can be used.

Do not store your feed for too long
Weevils will quickly destroy your feed

Ingredients and the mixed feed must be *stored* in a *dry place* and safe from *birds* and *rats*

6.1 Choice feeding

Sometimes it is better to let the birds *select* their own feed and *balance* their diet themselves. This is called *choice feeding* or *self-selection*. Feed ingredients are *not mixed* together but are placed in separate feeders (about 3) and the chickens in this way make a choice. There are only certain situations where this can be done, usually when the birds are on the *ground* or the *floor*.

Sometimes a grain *balancer* ration is available from the feed mill. This special feed (high in protein) will allow local ingredients to be used and the *balancer* meets those
nutrients that are still deficient in the locally available ingredients. This allows the birds to select a complete diet.

EXERCISE

What are those things that are most important in feeds for feeding chickens?

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Make a list of suitable poultry feeds that may be available in your village

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7. HEALTH AND DISEASE PREVENTION

Chickens are fragile and can get sick very easily especially when young.

There are two major sources of disease.

*Diet* if not correctly formulated can result in the bird getting a *metabolic disease* due to a nutrient deficiency (vitamins or minerals) in the diet.

Other diseases are caused by minute organisms called *bacteria* and *viruses*. It is often necessary to treat the chicks as soon as they hatch with a *vaccine* which allows them to resist the disease if it occurs. This is normally done at the hatchery. Newcastle disease is present in many countries and chickens need to be vaccinated more than once (see section 7.1).
Remember that “prevention is better than cure!”

- Many diseases can be prevented by keeping your poultry house very clean
- Overcrowding of birds can cause disease
- Do not allow other poultry on to your farm (e.g. neighbour’s scavenging chickens)
- Do not allow other poultry farmers to enter your shed
- Place a foot bath with a disinfectant in it or limestone outside the door of your poultry house
- Have a special pair of boots/shoes that you will use only when you are working in your poultry house
- Leave sufficient time between batches of birds to clean the house and get rid of diseases that need to have a bird (host) to survive

Remove old litter, dirty bags and contaminated rubbish and dump them far away but in a responsible place that will not contaminate the environment

- Discard damp, old feed. It can grow mould which can produce toxins. They can kill or make your chickens sick
- All in-all out systems in which all birds are the same age help to reduce disease out breaks
External parasites such as mites, lice and fleas can make your poultry feel uncomfortable. This will affect their growth rate and egg production.

- *Insecticides* are used to treat the infected birds. A *dust bath* will also help to reduce these external parasites.
- Internal parasites such as different worms and minute protozoa causing coccidiosis can be prevented by medication.
- This is done routinely by adding a *coccidiostat* to the mixed feed for broilers.

*Remove* immediately sick birds and *bury* dead birds.
*Never* eat or sell sick birds; they will make your family and others ill.

### 7.1 Newcastle disease

There are two diseases that are particularly dangerous in many low-income countries. Newcastle disease (ND) is endemic (always there) in many countries and becomes active particularly at the start of the wet season. It can wipe out entire village flocks although a few individual birds often do survive. There are now ND vaccines that will withstand the heat for a short period (thermostable) of time. Vaccination is most effective by eye drop and birds should be vaccinated a month before expected outbreaks by a trained person. There is also a need to treat the birds at intervals throughout their life. This is a specialised area and the poultry keeper will need help from experts but it is well worth the effort and the vaccine is not expensive.


7.2 Avian influenza

The H5N1 strain of highly pathogenic avian influenza (bird ‘flu) is particularly dangerous not only because it can infect different poultry species and wild birds but it can also kill humans. Village poultry are especially at risk because they are outside and may be in contact with wild birds and other poultry species (ducks, geese). The disease spreads rapidly through the poultry flock.

The virus can be spread by eating infected birds and can kill the consumer particularly if she/he is young. Household poultry keepers should keep themselves informed about the situation in relation to bird ‘flu as it often appears at particular times in the year.

**EXERCISE**

What will you do to stop your chickens from getting sick? Make a short statement.

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What will you do if they do get sick? Make a short statement.

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We will now discuss the two *specialised areas* of commercial (intensive) poultry production: broiler (meat) production first and then egg production.

[END OF UNIT III]
8. COMMERCIAL BROILER MEAT PRODUCTION

Chicken meat is very popular throughout the world. It is seen as a healthy meat low in fat and rich in protein (lean meat). It is a meal for a family so you don't need a refrigerator.

To prepare for the chicks' arrival it is best that you have a time plan or schedule:

- the house will be thoroughly cleaned and disinfected
- shavings or litter on the floor
- the brooder surrounds in place
- the brooder heater checked and adjusted (if there is one)
- feeders and drinkers in place. Chicks usually look for water first.
- a supply of a small amount of starter feed is scattered on paper on the floor of the brooder so that the chicks can start to eat
• For the first 7-10 days the chicks will be brooded (see section 5.) Broiler chickens can grow very fast but only when well looked after and given good feed.

• After 3 weeks of age when the house temperature is less than 28–30 °C they grow best. In the tropics, the temperature is normally above 30 °C in the day time so they will grow a bit slower than usual.

Some chickens will die in the first week particularly those that are small and weak. You must remove and bury them immediately.

You can expect to lose at least 4 - 5 chicks out of 100 in the first 3 weeks. Another 2 may die later. Mortality can be much higher especially if management and housing conditions are poor. Some broilers, as they get older, may become lame and are unable to walk and get to the feeders. This is partly a breeding problem but may be reduced by slowing growth in the second week for about a week by limiting feed intake.
• Ideally, chicks should be given a bought formulated diet. A commercial starter diet should be purchased and fed for at least the first 10 days because they need to get off to a good start.
• They will have eaten only about 250 g of feed during this time. This will cost you less than 25 c/bird.
• A grower diet will then be introduced by mixing what remains of the starter diet with the same amount of the grower diet. This will mean that they can adjust easily to the new feed.
• When the mixture is finished, chicks will be on the grower feed only.
• Check chicks several times a day to see that they are comfortable and have feed and water.

Check your chickens frequently. They do not like it too warm.

It will be helpful if you have weighing scales so that you can weigh feed given to the chickens and get the live weight of a sample of 10 birds every 2 weeks caught with a simple leg catcher. This will tell you how well your chickens are performing.
Do your birds reach targets at 3 weeks and 6-7 weeks? This should be your marketing age range for best growth and feed consumption?

- Weight gain is weight of bird divided by age in days then divided by the total number of birds to obtain the average weight gain of one bird
- Feed efficiency is feed consumed (kg) during a fixed number of days divided by the total weight of all birds (kg) consuming that amount of feed
- As a guide, the average weight of your chickens at 6 weeks should be 1600 g and at 7 weeks 1750 g
- Feed efficiency should be under 2.5 kg feed for 1 kg of weight gain at 7 weeks of age [a worked example of these calculation is given at the back of the manual]

Although your chickens look healthy you must still inspect them several times a day. You do not want to lose any. They are now becoming valuable and attractive to a thief.

8.1 Marketing
Selling your chickens profitably is essential. You can sell them
- alive on a bird or on a weight basis
- through a middle man who will take some of your profit for himself
- dressed, plucked, eviscerated (guts) and organs (lungs, liver, heart) removed. This is time-consuming
- sell to an abattoir for processing

In some regions you will not have all of these choices.
8.2 Manure

Chicken litter will produce very valuable manure rich in nutrients. You can:
- use it on your garden
- make it into a compost
- sell it

You are encouraged to grow your own vegetables and fruits as they are important for your family and cheap. Manure not only provides plant nutrients but importantly organic matter for the soil. This allows the soil to breathe.

8.3 Record keeping

It is essential that you keep good records of feed used, dead birds, weight of birds at the end. These records will then be used to determine if you made a profit or a loss.

[A broiler record sheet is given at the end of this manual. The trainer will work through an example with you]

Little mention has been made here of vaccination of chicks. This is normally done at the hatchery.

[END OF UNIT IV]
There are several choices of how you house your hens for egg production:

- in group battery cages (expensive but saves floor space)
- indoors on the floor (barn hens or deep litter)
- free-range out-of-doors during the day
- large groups or colony cages indoors (see later)

For replacement or point-of-lay pullets (young hens not yet in lay) there are two options

- the farmer can purchase hybrids or pure bred chicks from a hatchery (expensive) or
- the farmer can hatch and raise his own chicks

9.1 Hatching chicks

The farmer:

- can have a flock of breeder hens with one rooster for about 8 hens.
- will need nest boxes with litter and placed in a secure, dry place
will store the fertile eggs in a cool place for no more than 8 days
will allow a broody hen to incubate the eggs or your own small incubator (expensive and needs a reliable power supply although there are kerosene or paraffin heated incubators. (See section 9.2)
water and feed should be placed close to the broody hen in an isolated place
the nest should have a 2 cm layer of sand then 2 - 3 cm of litter on top at day 21 eggs will hatch out

Half will be females. The farmer must decide what to do with the males. They will grow much slower than broiler chickens but can be given a lower - quality feed than broilers after 3 - 4 weeks of age. It still may not be profitable to grow and sell them. Mother and chicks must be kept separate from the main flock of adult hens until about 4-5 weeks old.

9.2 Artificial incubation

A reliable power supply is essential for satisfactory egg incubation. A thermostat is needed to control the temperature at 39.5 °C and the relative humidity needs to be > 50%. Small-scale poultry breeders have successfully built small incubators to hatch 50 - 100 fertile eggs. A light bulb (s), controlled by a thermostat, provides heat although heating coils are also used. A tray of water on the floor of the brooder keeps the humidity above 50%. The eggs are turned 3 - 4 times a day. Ideally this should be done by marking the egg so that one complete turn is achieved each day but the eggs should not be rotated end to end.
A homemade incubator

Paraffin or kerosene incubators used to be common many years ago. Heating is provided by a burning wick in a lamp similar to a conventional kerosene lamp for lighting purposes. The warm air is flowing constantly into and out of the incubator chamber. A damper controls the amount of warm air that enters or escapes from the chamber to outside is set manually once the temperature has stabilised at 39.5 °C at egg level so there is always need for an accurate thermometer.
9.3 Pullets

They are usually raised indoors in the same way as broilers. They grow slowly and may need brooding until 4-6 weeks old. They are then given more space than broiler chickens. If there is an outdoors fenced area, they can go there during the day.

They should be given 500 g of broiler starter feed for the first 4-6 weeks. When this feed is used up it is replaced with a lower-quality pullet-rearing diet until 17 weeks of age. They are then given a layer diet which is high in calcium (3%) and phosphorous (0.5%). This is needed so that they can lay eggs with hard shells. Pullets will now be transferred to their layer house as they will shortly come into lay.

9.4 Battery cages

- can hold 1-5 hens per cage (50 x 40 cm x 45 cm high for each hen)
- are expensive but can be made from local material
- hens may peck one another and may need to have their beaks trimmed (a specialized job)
- can scratch one another if claws are long with loss of feathers from the back
- must be given a high-quality layer diet
- will lay more eggs and eat less feed than hens in any other housed system
- may be in future welfare issues as birds have little space. This worries the public
9.4.1 Small scale semi-commercial cage unit

This is designed for a household wanting to keep only a few hens and have eggs for their family and to sell

- a single cage unit of 3 compartments holding 12 layers. See trainer’s manual (10.3.1)
- cage on legs or on a stand or legs constructed cheaply from bamboo
- can be moved easily out of rain and bad weather to a safe place
- thatched roof or without a roof if kept under cover
- bamboo feeders and home-made drinkers (see illustrations 4.1, 4.2)
- hens must receive high-quality feed to lay 9 - 10 eggs /day
- system sustainable if 5 eggs sold and 4 - 5 eggs consumed by the household
- money from egg sales is used to buy more feed
- hens sold after 12 months for eating or force moulted (see section 9.7)
- money from egg and hen sales used to buy replacement birds or layer chicks and grown to pullets but starting these 20 weeks before selling old hens

9.5 Barn hens

- hens kept indoors and on the floor with adequate floor space
- house must be well constructed and safe from thieves
- feeders, drinkers, perches and nest boxes must be provided
- floor litter is necessary and later used for fertilizer or compost on gardens
- some eggs will be laid on the floor and some of these will get dirty (should be cleaned)
- green feed (grass, cassava, sweet potato tops) can be given to hens
9.6 Free range

- similar to the barn system except allowed outside
- need a *docile* (quiet) breed who will not fly over the surrounding fence
- hens are allowed to *scavenge* in a *secure* outdoor enclosure during the day
- allowed to go *indoor* s at any time. Floor space 7 - 8 hens per square metre
- locked up at night
- house similar to that for *barn* hens with nest boxes, drinkers and feeders

Drinkers are also provided in the *outside* enclosed area. Space per bird in the house is a little *less* than for barn hens

*Advantage*: free range system is that hens can *scavenge* for some of their feed and pick up some *essential* nutrients. Hens need green feed and there should be *two separate* outdoor pens which can be *rotated*. One will be rested to allow the grass to grow back. Sunlight provides birds with vitamin D.

*Disadvantage*: hens will eat a little *more* feed and lay *fewer* eggs than a battery (caged) hen. They are more likely to pick up a *disease* (*parasites*) outside. The hens will not get much nourishment from the pasture and if raining will stay indoors

**EXERCISE**

Do you understand the different systems of housing poultry? If not write down what you do not understand about them and what you do understand about them

_____________________________________________________________________________________________________________________________________________________
_____________________________________________________________________________________________________________________________________________________
_____________________________________________________________________________________________________________________________________________________

What *system* of keeping hens do you prefer. Why, and why will it suit you best?

_____________________________________________________________________________________________________________________________________________________
_____________________________________________________________________________________________________________________________________________________
_____________________________________________________________________________________________________________________________________________________
Do you have the skills available in your village and the building *materials locally* to build a layer house and layer cages. Explain?

_____________________________________________________________
_____________________________________________________________

Are you interested in the small-scale 12 hen unit? Do you have space and the money to get started? What do you not have?

-----------------------------------------------------------------------------------------------------------------------------
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-----------------------------------------------------------------------------------------------------------------------------
9.7 Force moulting

This is to stop old hens from laying for about 4 weeks.

Reasons:
- replacement pullets are expensive
- egg production drops when hens get old (i.e. production is less than 1 egg/2days) (uneconomical)
- egg shells will get thin and break when birds get old
- may be economical to put hens through a second laying cycle
- hens are put out of lay by feeding a poor-quality diet for 3 - 4 weeks when about 60-70 weeks old but must always have water
- very few hens will be now be laying. They are then put back on a layer diet and will come into lay 2-3 weeks later
- eggs will now have sound, hard shells
- hens will lay more eggs than before and for at least the next 20 weeks
- will lay large eggs

Disadvantage: hens are out of lay for about 3 - 4 weeks during moulting and come into full lay over the next 3 - 4 weeks so there will be loss of income
9.8 EGG QUALITY

9.8.1 Internal

- eggs get _stale_ quickly in hot weather
- store eggs in a cool place

- when the egg yolk _spreads_ into the white the egg is stale
- a stale egg may not taste _different_ from a fresh egg
- some people like eggs with a deep _orange-yellow_ yolk
- others like the yolk a _pale yellow_ colour
- colour can be _measured_ with a yolk colour _fan_
- there are sometimes _blood spots_ in the egg yolk but we are not sure why
9.8.2 External quality

- eggs can be misshapen, soft-shelled, with pimples and rough surfaces
- egg *breakage* occurs easily especially if the hens are old
- these eggs are classified as *seconds* and fetch a much lower price in the market
- dirty eggs, blood stained eggs and fly marks on the shell make the eggs *unattractive* to the customer should be cleaned before selling or eating
- consumers prefer eggs that are either *white* or *brown* shelled but both have the same nutritional value

[END OF UNIT V]
UNIT VI

10. RECORD KEEPING

It is essential that you keep good records of feed consumed, eggs produced, bird deaths and removal of sick hens and non layers. A sample record sheet is given so that you can know accurately how your flock is performing. [Example of a layer record sheet at the end of this manual]

11. CONCLUSION

Keeping poultry is not easy. It is a learning process. You should start slowly and expand as you gain experience. You may have set backs but you must persevere and seek advice when you have problems and need help. If you are kind to your birds and treat them well they will respond.

12. FEASIBILITY STUDY

Before you decide that you want to become a poultry farmer you must undertake a feasibility study that is researched thoroughly into all aspects of meat production or egg production to determine if you are going to make a profit. Otherwise you may be wasting time and money. When you have done your research you can then make a business plan. Your business plan will allow you a better chance of borrowing money from the bank to get your enterprise started. The most important question is, do you have a market for your produce?

Some of the questions you need to ask are given below.
Chick costs

How much are day old layer chicks or point of lay pullets?
How much are day old broiler chicks?
Where can you buy them from?
How far away is the supplier from you?
Does the supplier deliver?
If the chicks are delivered, how much will it cost?
If no delivery, how will you collect them and what will it cost?

Broiler costs
It may be possible to buy young chicks from a farmer who broods chicks for sale. This is also an opportunity for an enterprising farmer who has an incubator
Can you buy 3-week-old or 5-week old broilers? If so where?
How much do 3-week-old or 5-week old broilers cost?
Do they deliver and charge. Is there a minimum number?
How much will it cost me to transport them if they don’t deliver?

Layer costs
What is the cost of point-of-lay (16-18 weeks) pullets?
Do they deliver free or charge?
How much do they charge?
If no delivery, how much will it cost me to pick them up?
Feed costs
Where is there a supplier close to me?
How much per bag and size (kg) for broiler starter?
How much per bag and size (kg) for broiler finisher?
How much per bag and size (kg) for pullet finisher?
How much per bag and size (kg) for layer feed?
Does the supplier deliver. If so at what charge?
If not, how will I get the feed and cost?

Equipment and water
Where can I get medical supplies and vaccines?
Where can I get medical advice?
Where can I get floor litter?
How much will it cost?
Where will I get water from?
Do I have sufficient for drinking water and cleaning equipment and my own house?

Market survey questions
Where will I sell my broilers?
Who will I sell them to? (neighbours, schools, local market, local shop, processing plant, middle man)
Who else is selling chickens in your area?
How much are they charging per bird or per kg?
What age are they selling them at?
Why will people buy from you?
What will you charge per bird/kg?
How many birds can you sell per week or month?
How do you know that you can sell that many?

Egg sales
Where will you sell your eggs?
Who will you sell them to? (neighbours, schools, local market, shop)
How much will transport be?
How much will you charge for 12 eggs mixed size?
Who else is selling eggs and as mixed or graded?
How much do they charge for 12?
How many can you sell per week?
How do you know that you can sell that many?
Is there a market for boiled eggs?
## Budget

A statement of expected expenses, income and profit or loss is then calculated.

### Expenses and Direct Costs

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chickens (_____ Birds x $_____ per bird)</td>
<td>$</td>
</tr>
<tr>
<td>Feed (_____ bags of each kind x $_____ per bag)</td>
<td>$</td>
</tr>
<tr>
<td>Heating (cost of fuel)</td>
<td>$</td>
</tr>
<tr>
<td>Medicine, vaccines, disinfectants</td>
<td>$</td>
</tr>
<tr>
<td>Transport for everything</td>
<td>$</td>
</tr>
<tr>
<td>Litter</td>
<td>$</td>
</tr>
<tr>
<td>Other costs (5%)</td>
<td>$</td>
</tr>
<tr>
<td><strong>A. TOTAL DIRECT COSTS</strong></td>
<td>$</td>
</tr>
</tbody>
</table>

### Indirect costs

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>$</td>
</tr>
<tr>
<td>Electricity</td>
<td>$</td>
</tr>
<tr>
<td>Telephone</td>
<td>$</td>
</tr>
<tr>
<td>Rent</td>
<td>$</td>
</tr>
<tr>
<td>Bank loan interest</td>
<td>$</td>
</tr>
<tr>
<td><strong>B. TOTAL INDIRECT COSTS</strong></td>
<td>$</td>
</tr>
</tbody>
</table>

### Monthly income

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>____ broilers sold at $_____ per bird</td>
<td>$</td>
</tr>
<tr>
<td>or</td>
<td></td>
</tr>
<tr>
<td>____ dozen eggs sold at ____ $</td>
<td>$</td>
</tr>
<tr>
<td><strong>C. TOTAL INCOME</strong></td>
<td>$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROFIT (C-A+B)</td>
<td>$</td>
</tr>
</tbody>
</table>
**Broiler record sheet**  
(PHOTOCOPY THIS PAGE FOR RECORD KEEPING.)

<table>
<thead>
<tr>
<th>Batch No.</th>
<th>Shed No.</th>
<th>Breed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Hatch date:  
Starting No.:  

### Feed given (bags)

<table>
<thead>
<tr>
<th>Day</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
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<td></td>
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<tr>
<td>Week 2</td>
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<td></td>
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<tr>
<td>Week 3</td>
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<td>Week 4</td>
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<td>Week 5</td>
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<td>Week 6</td>
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<td>Week 7</td>
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<tr>
<td>Week 8</td>
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<td>Total</td>
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<td></td>
</tr>
</tbody>
</table>

### Live body weight at 42 days:

<table>
<thead>
<tr>
<th>No. of birds weighed:</th>
<th>FCR:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Mortality: %  

<table>
<thead>
<tr>
<th>Total weight of birds:</th>
<th>kg</th>
<th>Total feed intake:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>kg/bird</td>
</tr>
</tbody>
</table>

Average weight of one bird: kg  

### Remarks:


Example of calculation for 100 broiler chickens to determine performance

**Starter period (1-20 days)**
- Weight at 1 day old: 4.5 kg
- Weight at 3 weeks old: 62.0 kg
- Weight gain (21 days): 57.5 kg
- Feed at start: 100 kg
- Feed at finish: 13.75 kg
- Feed eaten (0-21 days): 86.25 kg
- Feed conversion ratio (0-21 days): 86.25 \div 1.50 = 57.50

**Finisher period (21-49 days)**
- Weight at 21 days: 62.0 kg
- Weight at 49 days: 180.0 kg
- Weight gain: 118.0 kg
- Feed at 21 days: 300.0 kg
- Feed at 49 days: 5.0 kg
- Feed eaten (21-49 days): 295.0 kg
- Feed conversion ratio (21-49 days): 295 \div 2.50 = 118

Whole period (1-49 days)
- Weight gain: 175.5 kg
- Feed eaten: 381.25 kg
- Feed conversion ratio (1-49 days): 381.25 \div 2.17 = 175.5
**Layer record sheet** PHOTOCOPY THIS PAGE FOR RECORD KEEPING

<table>
<thead>
<tr>
<th>Batch:</th>
<th>No:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hatch:</td>
<td>Date:</td>
</tr>
<tr>
<td>No. at begging of period:</td>
<td>Age at beginning of period:</td>
</tr>
</tbody>
</table>

### Feed given (bags)

<table>
<thead>
<tr>
<th>Day</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
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<td>Week 3</td>
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<td>Week 4</td>
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<td>Total</td>
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</table>

### Death and culls

<table>
<thead>
<tr>
<th>Day</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Total</th>
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<tbody>
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<td>Week 1</td>
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</tbody>
</table>

### Eggs laid (saleable = G and non saleable = B)

<table>
<thead>
<tr>
<th>Day</th>
<th>1</th>
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<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>G</td>
<td>B</td>
<td>G</td>
<td>B</td>
<td>G</td>
<td>B</td>
<td>G</td>
<td>B</td>
</tr>
<tr>
<td>Week 2</td>
<td>G</td>
<td>B</td>
<td>G</td>
<td>B</td>
<td>G</td>
<td>B</td>
<td>G</td>
<td>B</td>
</tr>
<tr>
<td>Week 3</td>
<td>G</td>
<td>B</td>
<td>G</td>
<td>B</td>
<td>G</td>
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<td>G</td>
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<tr>
<td>Week 4</td>
<td>G</td>
<td>B</td>
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<td>B</td>
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<td>Total</td>
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</table>

Mortality %__________ Feed intake_______g/hen/day________ Rate of lay____________%
Remarks________________________________________________________________________________________
There is often strength in numbers and the concept of community farming, in several different forms, has great appeal. It allows the very poor and often landless farmers, to derive income from keeping poultry by pooling resources. Examples are the well established organisation of cooperatives and the concept of community ownership

13. COOPERATIVES

A cooperative is an organised group of like-minded producers who combine to form a farmers’ group or partnership. Members share responsibilities and any profit or loss. They speak with a single voice and can purchase feed, equipment, chicks, building material and other supplies more cheaply. Eventually storage facilities can be established and a supply shop set up. The group can also have a strategic plan to reduce competition between individuals, set prices for poultry products and generally work to help one another to establish an industry on a firm footing. Trainers should provide as much assistance as possible to the farmers in establishing a working group that will spearhead the formation of a cooperative. The cooperative may eventually expand into other areas of commerce where the farmers can trade other farm produce in addition to poultry.

14. COMMUNITY OWNERSHIP

This is similar to, but less rigid than a cooperative and is run by a committee representing a district or village community. For example, the committee may be responsible for raising point - of - lay pullets. These they sell at 17 - 18 weeks to individual egg producers and the profits are distributed amongst the community. The committee might purchase and run an incubator, and sell the chicks for meat or egg production at different ages. Or the committee may manage a small broiler or egg farm along commercial lines.

In both cases there is opportunity to buy large numbers of chicks and bags of feed. This is usually attractive to the supplier and cheaper for the community. The concept of community farming is to empower people, mainly women, who have no opportunity as individual poultry keepers, to improve their circumstances and to alleviate poverty. Once formed, It can be extended to bio-security programs, vaccination programs against diseases, purchase of medical and other supplies, marketing of meat birds and eggs, dissemination of information, training programs and exchanging information, and greater opportunity to obtain micro-credit. This is critical to allow expansion of the family enterprise. There is a key role here for the poultry trainer who can assist in orchestrating the group by providing advice and guidance.
END OF POULTRY TRAINING MODULE