

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

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UNIT I

1. INTRODUCTION

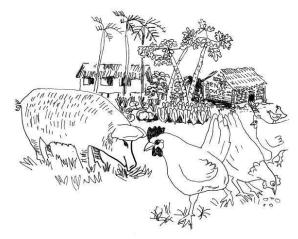
There is no point in setting up a farming venture unless it can be *sustained*; that is, it can *survive over the long term*. Therefore it is essential to make a *survey* in which key questions must first be answered honestly *before* the farmer decides to launch into a poultry enterprise in which he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

reasons although not all of them apply to your particular situation. Write down what think here and we will discuss them.			

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 breast feed them





Allow children to be healthy and not to catch cold and coughs

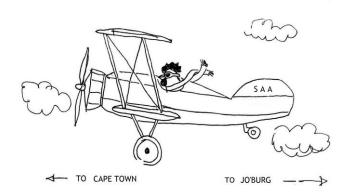


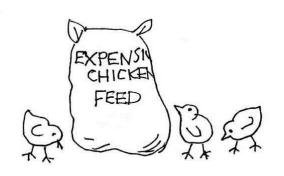
- Eggs and meat also contain vitamins and minerals that are essential in your diet
- If you decide to raise poultry always remember to keep some meat and eggs for your own family to eat

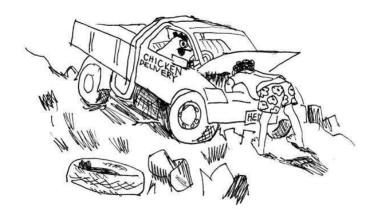


1.3 The business of poultry farming

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.

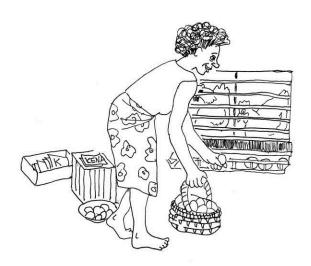






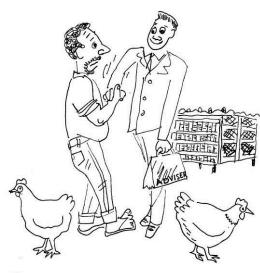
Because of long distances, and because of unreliable transport, sometimes some chicks arrive sick or dead. If there are enough producers, they can form a co-operative and may be able to establish a small poultry hatchery (see section 14). This will help to make chicken meat production *sustainable*. 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

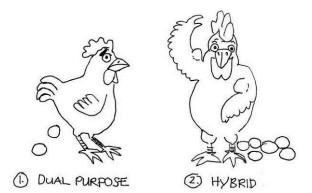
UNIT II

2. POULTRY BREEDS

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

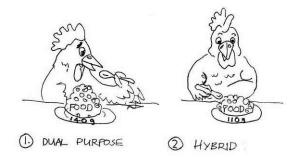
Dual Purpose. These are used to produce both meat and eggs such as Rhode Island Reds or Plymouth Rock.

- 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



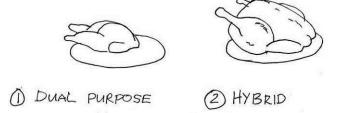
Special Breeds. These have been selected for *egg* production

- 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.

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

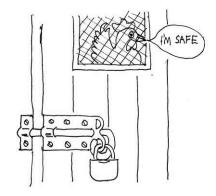


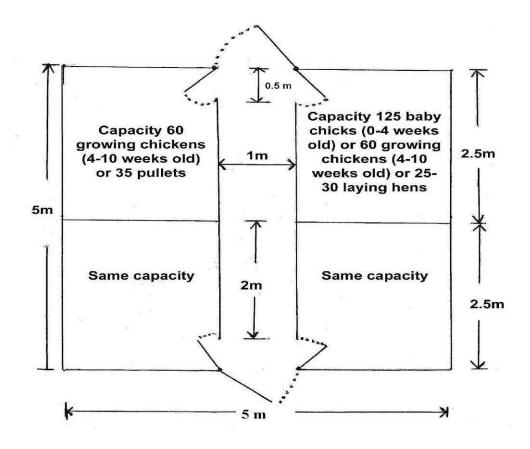
Chickens must be protected from the weather

What are the basic *requirements* for a poultry house? It must be

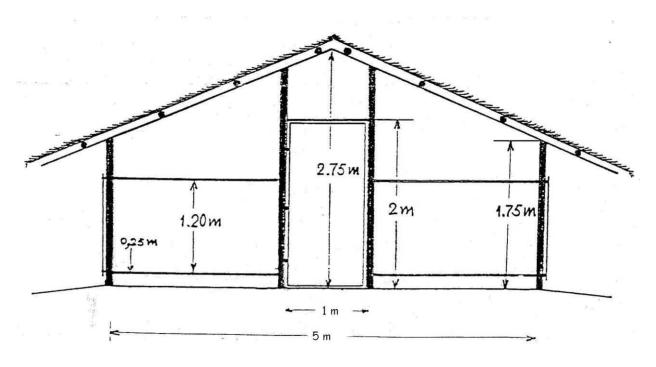
- rain proof
- protect the birds from direct sunlight and keep them cool
- must have good drainage around the house
- easy to clean
- have a strong door with a secure lock

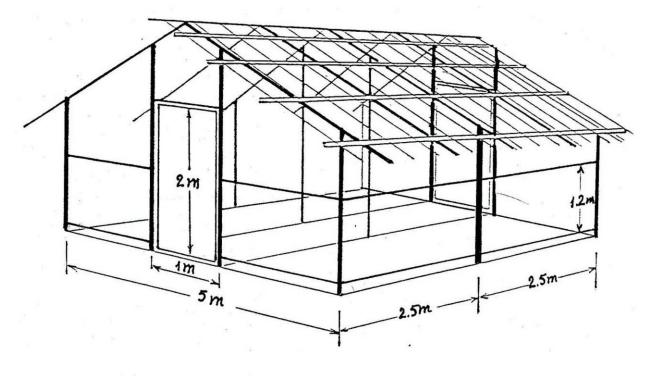
Housing will likely be your biggest *investment* and to cut Costs, *local* material can be used. Positioning of the house is *important* to conform to some of the basic requirements (mentioned above). High ground will stop *flooding* in rain storms

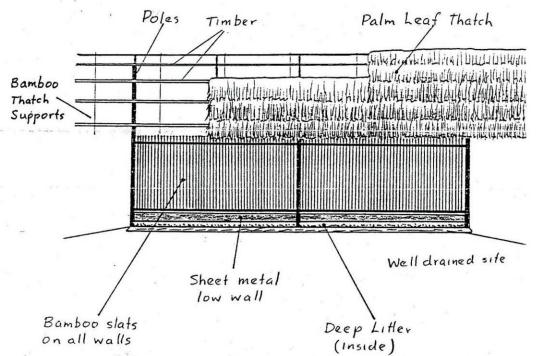




Sketches of a simple poultry house for keeping about 250 broiler chickens or 120 laying hens on the floor (barn system)







3.1 Floor

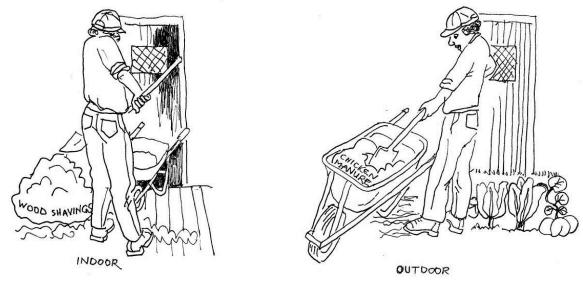
The floor must be:

- 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)

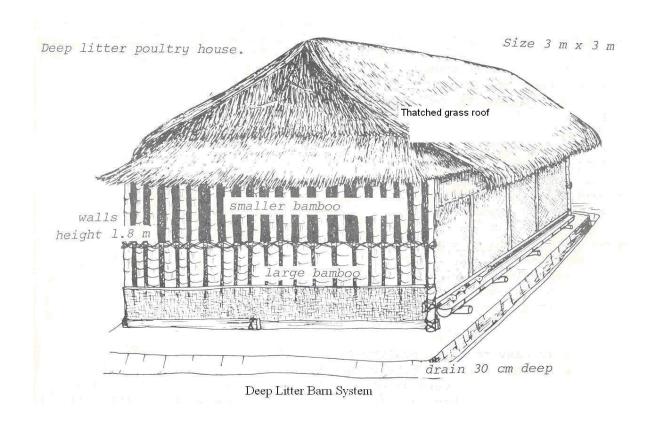
3.1.1 Litter

- 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



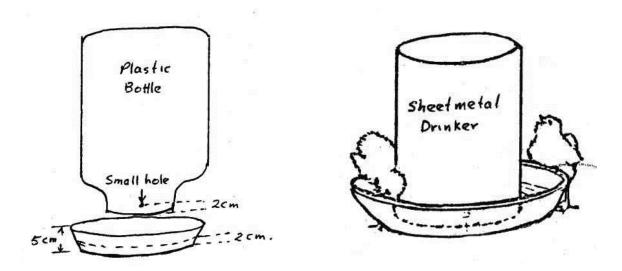
EXERCISE

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?

4. EQUIPMENT

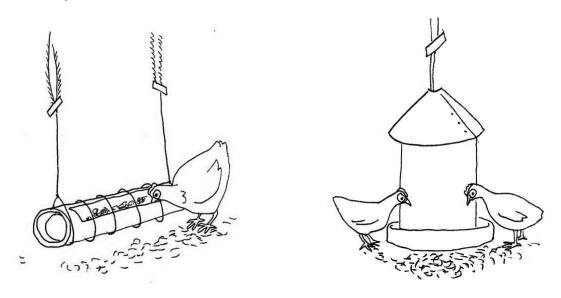
4.1 Drinkers

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.



Make a list of the important features of a poultry house			
Make a list of the equ	uipment that must be a	vailable in the house	
Make a list of the equ	uipment that must be a	vailable in the house	

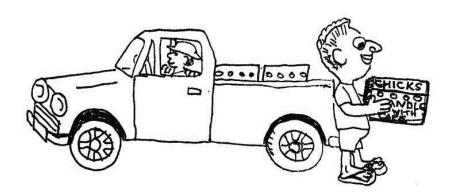
[Unit II. Trainees will now visit the demonstration site to discuss the poultry house and how much a similarly equipped house will cost and what improvements/changes could be made. Use of old litter to make compost or to spread on the garden will also be discussed]

End of Unit II

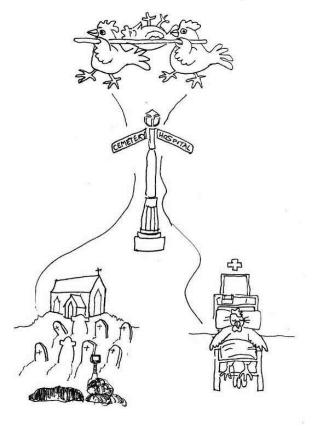
UNIT III

5. BROODING

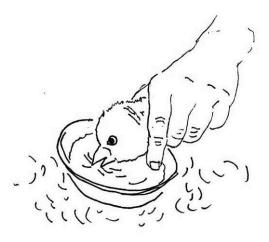
This is a term which means, keeping chicks warm and comfortable.

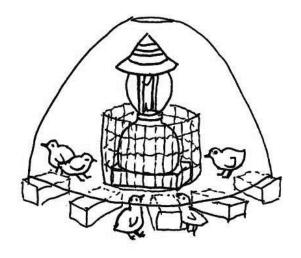


When your baby chicks arrive they will need *special care*. This is the time when you can expect a few chicks *to die*. In tropical countries it may not be necessary to provide extra heat during the day but only at night and then only for the first 10 days.



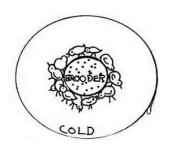
Dead chicks should be removed and buried in a hole in the ground. Sick and weak chicks should be kept separately and given special care





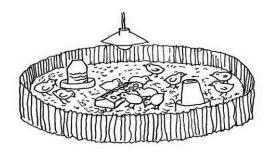
Chicks should be given water immediately and some may need to be shown how to drink

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

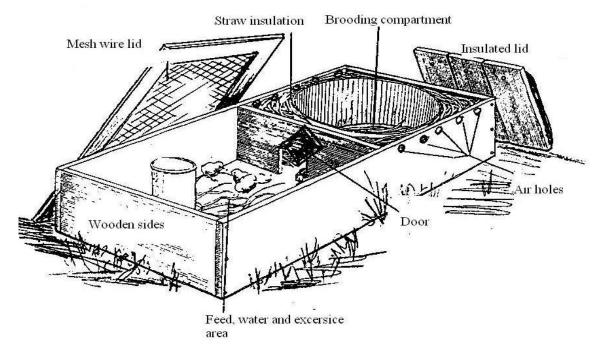


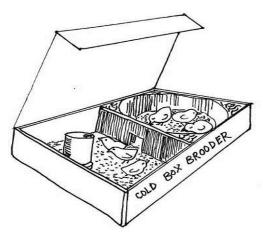


Chicken brooder

CONTROL OF THE PROPERTY OF THE







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

batch of day-old chic	o prepare your cn	icken nouse for tr	ne arrivai ot a
<u> </u>	 		

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

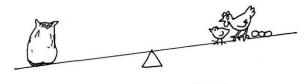
Often, only *very few suitable ingredients* (feedstuffs) are produced in the country and most are imported.

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



WELL BALANCED FEED



POORLY BALANCED FEED



PALM KERNEL MEAL COPRA MEAL FISH MEAL WHEAT BRAN RICE BRAN

- 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

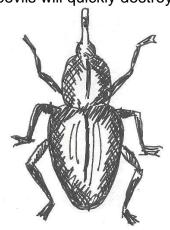


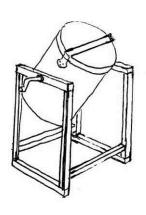
First there is a need to get in a stock of the *raw materials* (ingredients). You will need to *weigh* out the ingredients or have *containers* which will hold known *weights* of different feedstuffs



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

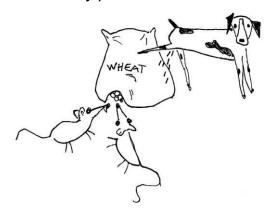






Ingredients and the mixed feed must be stored in a dry place and safe from birds and rats



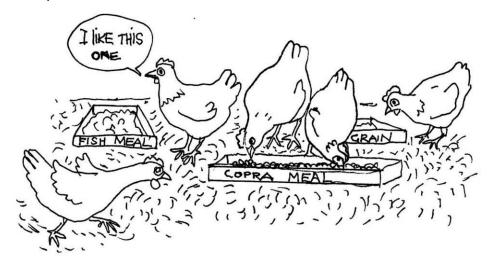


6.1 Choice feeding

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 a	re those things tha	t are most impo	ortant in feed	ds for feeding	chickens?	
Make a	list of suitable pou	ltry feeds that r	may be avai	able in your v	rillage	

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

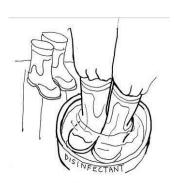
Other diseases are caused by minute organisms called *bacteria* and *viruses*. It is often necessary to treat the chicks as soon as they hatch with a *vaccine* which allows them to resist the disease if it occurs. This is normally done at the hatchery. Newcastle disease is present in many countries and 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





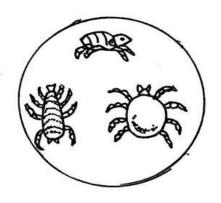
- Place a *foot bath* with a disinfectant in it or limestone outside the door of your poultry house
- Have a special pair of boots/shoes that you will use only when you are working in your poultry house
- Leave sufficient time between batches of birds to clean the house and get rid of diseases that need 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 through out 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

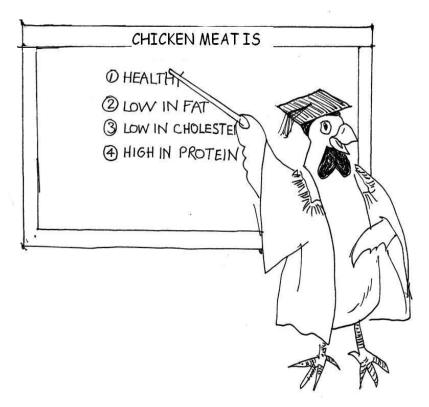
What will y	ou do if they do get sick? Make a short statement.	
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We will now discuss the two *specialised* areas of commercial (intensive) poultry production: broiler (meat) production first and then egg production.

[END OF UNIT III]

UNIT IV

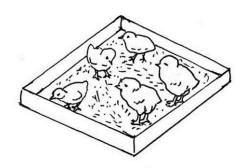
8. COMMERCIAL BROILER MEAT PRODUCTION



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

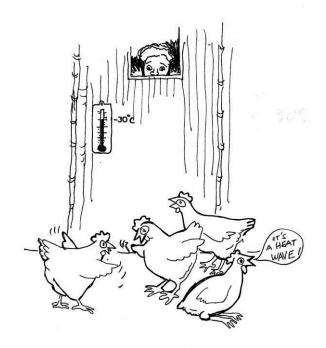




Some chickens will *die* in the first week particularly those that are small and weak. You must remove and *bury* them immediately

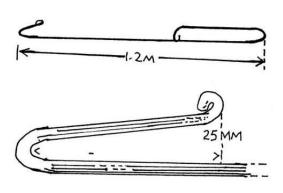
You can expect to lose at least 4 - 5 chicks out of 100 in the first 3 weeks. Another 2 may die later. Mortality can be much higher especially if management and housing conditions are poor. Some broilers, as they get older, may become lame and are unable to walk and get to the feeders. This is partly 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 ¢/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

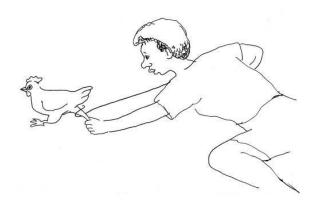


Check your chickens frequently. They do not like it too warm.





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 timeconsuming
- sell to an abattoir for processing

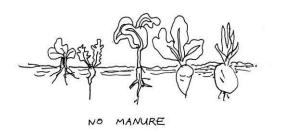
In some regions you will not have all of these choices



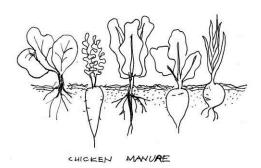
8.2 Manure

Chicken litter will produce very valuable manure rich in *nutrient*s

- 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]

UNIT V

9. COMMERCIAL EGG PRODUCTION



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)

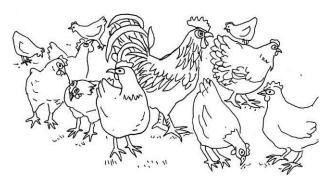
For *replacement* or point-of-lay pullets (young hens not yet in lay) there are two options

- 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.

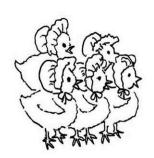


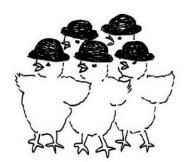
 will need nest boxes with litter and placed in a secure, dry place



- 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

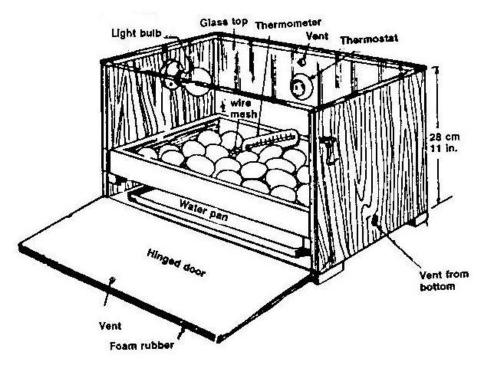
Half will be *females*. The farmer must decide what to do with the *males*. They will grow much slower than broiler chickens but can be given a *lower - quality* feed than broilers after 3 - 4 weeks of age. It still may not be *profitable* to grow and sell them. Mother and chicks must be kept separate 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 stabalised at 39.5 °C at egg level so there is always need for an accurate thermometer.

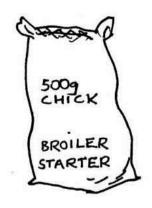
9.3 Pullets

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 out doors fenced area, they can go there during the day.

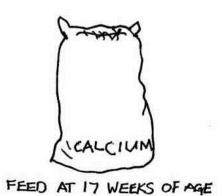
They should be given 500 g of broiler starter feed for the first 4-6 weeks. When this feed is used up it is replaced with a lower-quality pullet-rearing diet until 17 weeks of age. They are then given a layer diet which is high in calcium (3%) and phosphorous (0.5%). This is needed so that they can lay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





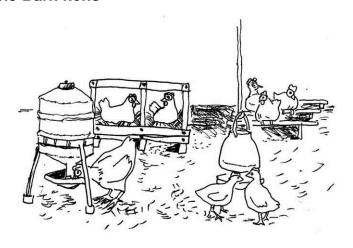


9.4.1 Small scale semi-commercial cage unit

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

Do you have the <i>skills</i> available in your village and the building <i>materials locally</i> 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?

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 poorquality 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





FRESH EGG

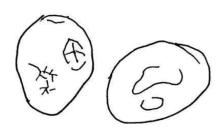
9.8.2 External quality

- eggs can be misshapen, softshelled, 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

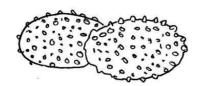
SHELL DEFECTS



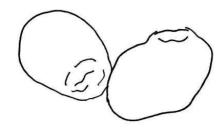
GROSS CRACKS



THIN - SHELLED



ROUGH SHELLS



MISSHAPEN

[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	
Chickens (Birds x \$ per bird)	\$
Feed (bags of each kind x \$ per bag)	\$
Heating (cost of fuel)	\$
Medicine, vaccines, disinfectants	\$
Transport for everything	\$
Litter	\$
Other costs (5%)	\$
A. TOTAL DIRECT COSTS	\$
Indirect costs	
Water	\$
Electricity	\$
Telephone	\$
Rent	\$
Bank loan interest	\$
B. TOTAL INDIRECT COSTS	\$
Monthly income	
broilers sold at \$ per bird	\$
or	
dozen eggs sold at \$	\$
C. TOTAL INCOME	\$
PROFIT (C-A+B)	\$

Broiler record sheet

(PHOTOCOPY THIS PAGE FOR RECORD KEEPING.)

Batch No.: Hatch date				ned No.: arting N		Bre	Breed:				
				Feed g	iven (ba	ags)					
Day	1	2	3		4	5	6	7	Total		
Week 1											
Week 2											
Week 3											
Week 4											
Week 5											
Week 6											
Week 7											
Week 8											
Total											
							1		T		
Live body days:	weight at 42				FCR:						
No. of birds weighed:					Mortal	ity:		%			
_	ht of birds:			kg	Total f	eed intake:		kg/bird			
Average w	eight of one	bird:		kg							

Remarks:

Example of calculation for 100 broiler chickens to determine performance

Starter period (1-20 days) Weight at 1day old Weight at 3 weeks old Weight gain (21 days)	4.5 kg 62.0 kg 57.5 kg
Feed at start Feed at finish Feed eaten (0-21 days)	100 kg 13.75 kg 86.25 kg
Feed conversion ratio (0-21 days)	86.25 = 1.50 57.50
Finisher period (21-49 days) Weight at 21 days Weight at 49 days Weight gain	62.0 kg 180.0 kg 118.0 kg
Feed at 21 days Feed at 49 days Feed eaten (21-49 days)	300.0 kg 5.0 kg 295.0 kg
Feed conversion ratio (21-49 days)	<u>295 </u> 2.50 118
Whole period (1-49 days)	110
Weight gain Feed eaten	175.5 kg 381.25 kg
Feed conversion ratio (1-49 days) Feed eaten Weight gain	381.25 = 2.17 175.5

							Fee	ed giv	en (b	oags)					
Day	1		2	2		3	4	4	5	5	6	6	7	7	Total
Week 1															
Week 2															
Week 3															
Week 4															
Total															
								Death	and	culls	;				
Day	1		2		3		4		5		6		7		Total
Week 1															
Week 2															
Week 3															
Week 4															
Total															
			E	Eaas	laid	(sale	able	= G a	nd n	on sa	aleabl	le = B	3)		
Day 1			Eggs laid (sale			4		5		6		7		Total	
	G	В	G	В	G	В	G	В	G	В	G	В	G	В	
Week 1															
Week 2															
Week 3															

Layer record sheet PHOTOCOPY THIS PAGE FOR RECORD KEEPING

No:

Date:

period:

Age at beginning of

Batch:

Hatch:

period:

Week 4

Remarks____

Total

No. at begging of

Rate of lay_____%

Mortality %_____ Feed intake____ g/hen/day

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

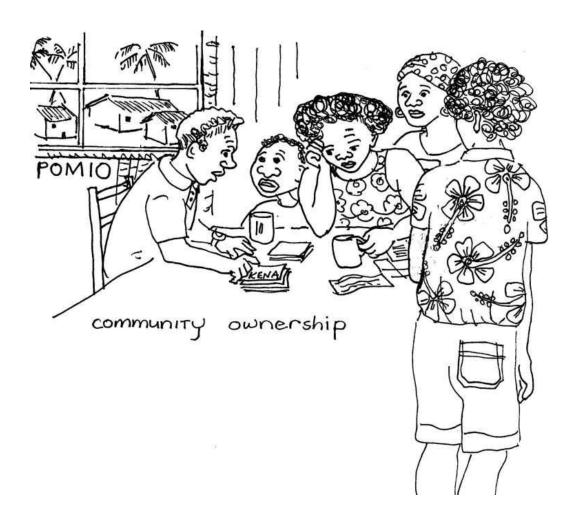
13. COOPERATIVES

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