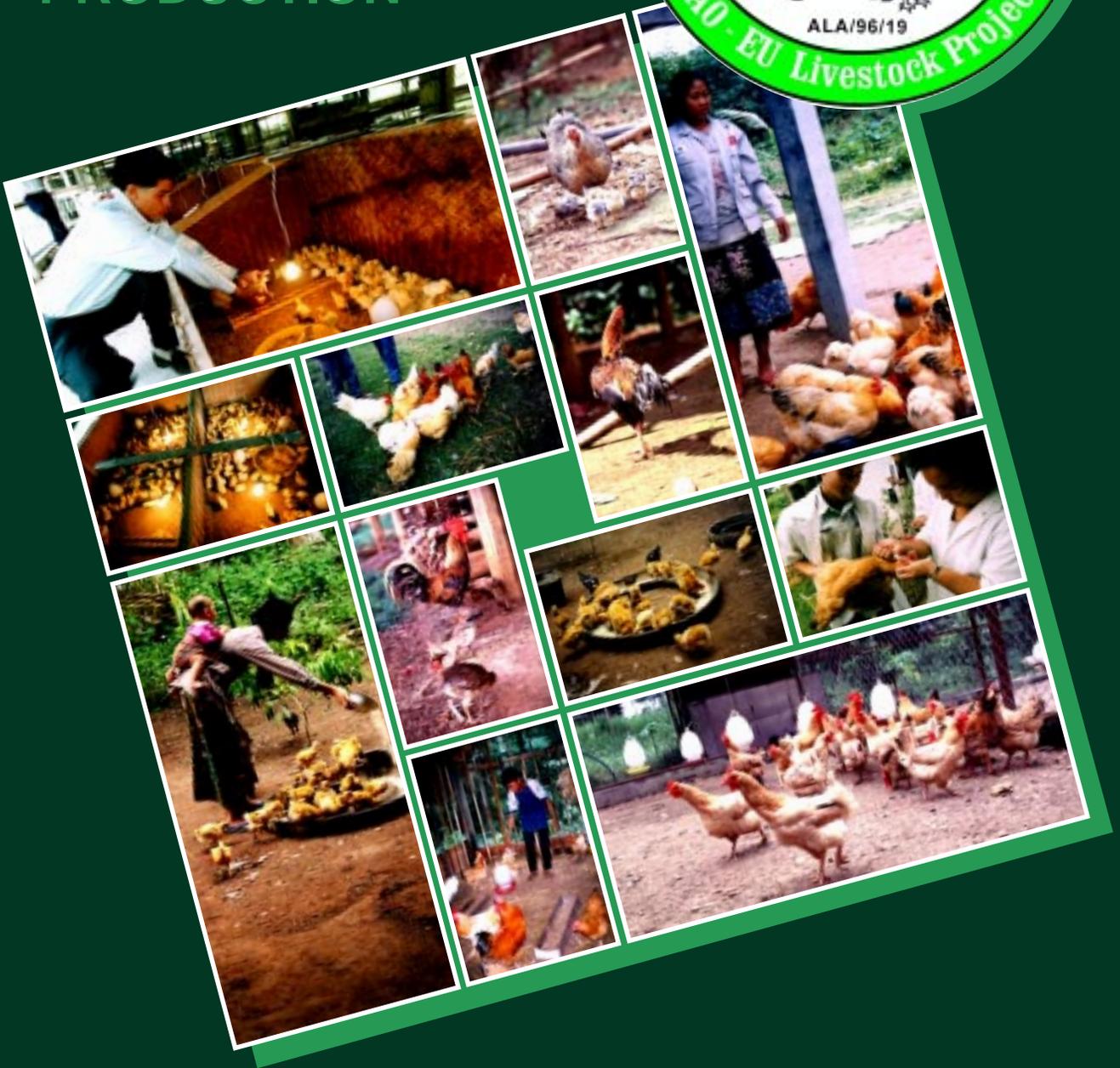
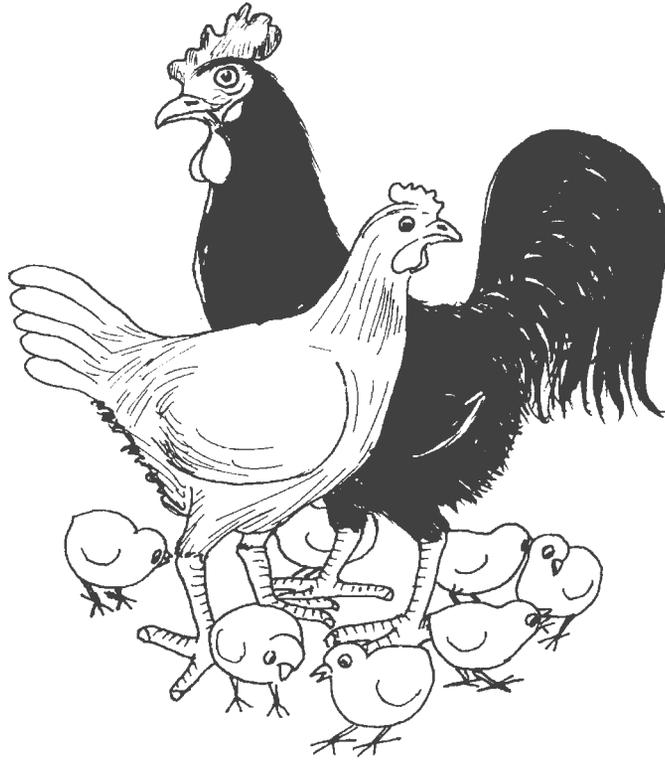


A MANUAL ON IMPROVED RURAL POULTRY PRODUCTION



A project supported by the European Union





**A MANUAL ON IMPROVED
RURAL POULTRY
PRODUCTION**

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PREFACE

This manual has been produced as an output of the European Union - Lao PDR Project ALA/96/19 “Strengthening of Livestock Services and Extension Activities”, within the Department of Livestock and Fisheries (DLF) of the Ministry of Agriculture and Forestry.

The manual is meant for trainees attending practical poultry courses and for small scale farmers to read at home to improve their poultry production. The text has been kept to a minimum and the manual is richly illustrated with drawings by Mongkham Boualavanh and with a series of colour pictures. In preparing this manual, teaching and extension materials used in similar programs in the region have been incorporated. For general scientific background information, standard poultry husbandry handbooks have been used.

In November 2000, the Project published the first edition of the Lao language manual “Improved Rural Poultry Manual” (ISBN 974-90489-3-8). The present English language edition has taken into account the feedback and suggestions from field staff and experts from different organizations. These improvements also appear in the second edition of the Lao language manual.

Improving productivity of village poultry flocks will greatly enhance income and diet of resource- poor farmers. Using improved production methods is also essential for farmers who intend to venture later into (semi-) commercial layer and broiler production.

Oosterwijk Gerard, Van Aken Dirk, and Vongthilath Sounthone (*Editors*)
Project Management Unit, Vientiane, April 2003

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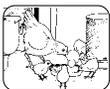
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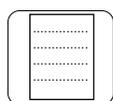
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1. Rearing Yellow Chickens

Farmers want to improve the production of local chickens. This can be done by introducing the “Yellow Chicken” breed (also called “Tam Houng”). This chicken breed originates from China and is also popular in Vietnam. The chicken is characterized by the yellow color of its feathers, skin and legs. Recently, the Yellow Chicken has also been introduced in Lao PDR. The parent-stock of this breed is at Nong Teng, near Vientiane. Please contact your provincial livestock office to find out how to obtain Yellow Chickens.

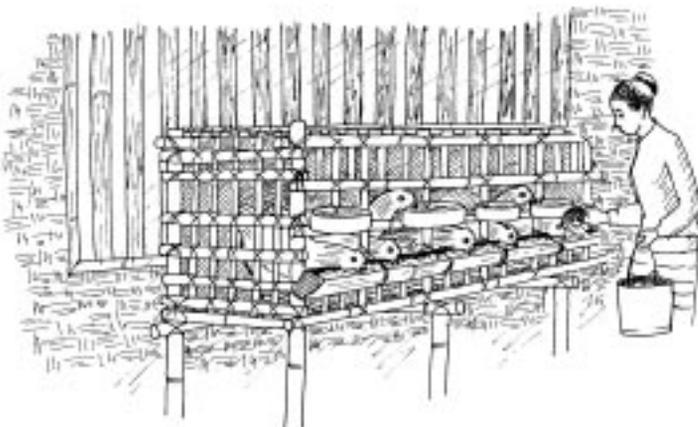
Parent stock of Yellow Chicken at Nong Teng Poultry Station



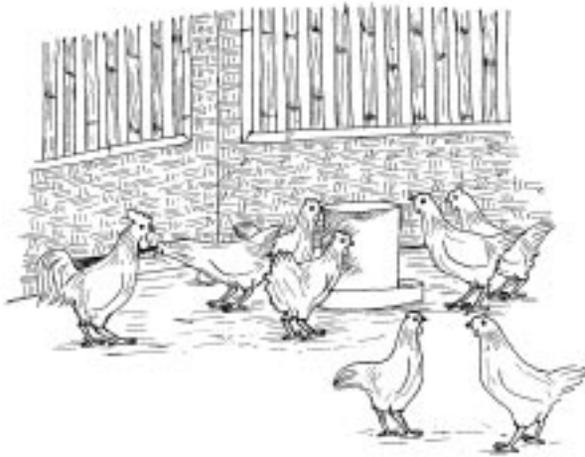
2. Advantages of the Yellow Chicken

2.1. Different rearing methods

As the Yellow Chicken can withstand a great deal of stress, it can be reared in a variety of ways.



Commercial rearing in cages



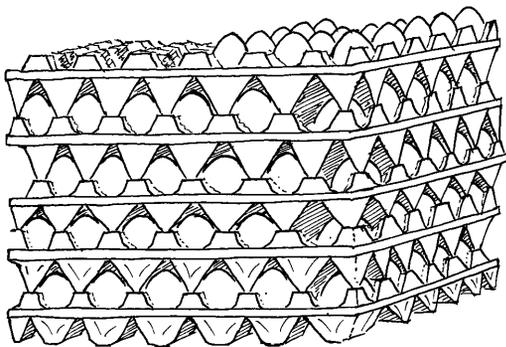
← *Semi-commercial rearing on the floor*

Small scale household production →



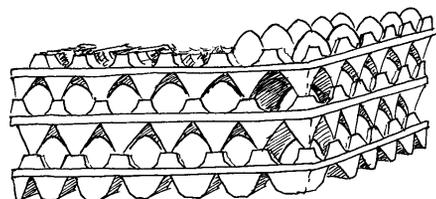
2.2. More eggs

The Yellow Chicken hen can lay around 130 - 140 eggs per year if the flock is taken good care of. This egg production is almost double that of local chickens which have an egg production of 70 eggs per year. With good management the Yellow Chicken will start laying eggs at 22 - 26 weeks.



← *Yellow Chicken producing 130 - 140 eggs per year*

Local chicken producing 70 eggs per year →

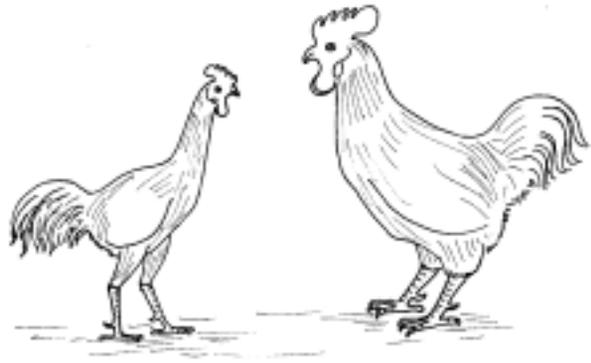




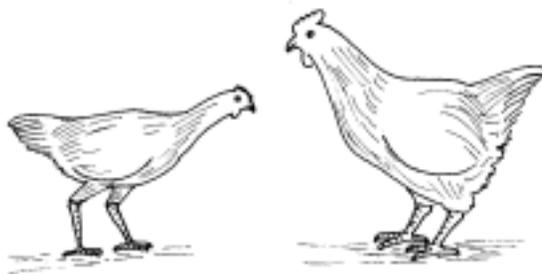
2.3. Faster growing

The Yellow Chicken grows fast and is efficient in feed utilization. With good management the chicken can grow up to 1.5 kg within 12 weeks (3 months). In comparison, the local chicken takes 6 month to reach the weight of 1.5 kg (almost twice as long). The mature Yellow Chicken hen can grow up to 2.5 - 3.5 kg and the cock can grow to 3.5 - 5 kg.

Comparing 2 cocks of the same age →



A comparison of Yellow Chicken and local chicken at the age of 15 weeks.



← *Comparing 2 hens of the same age*

2.4. Tender meat

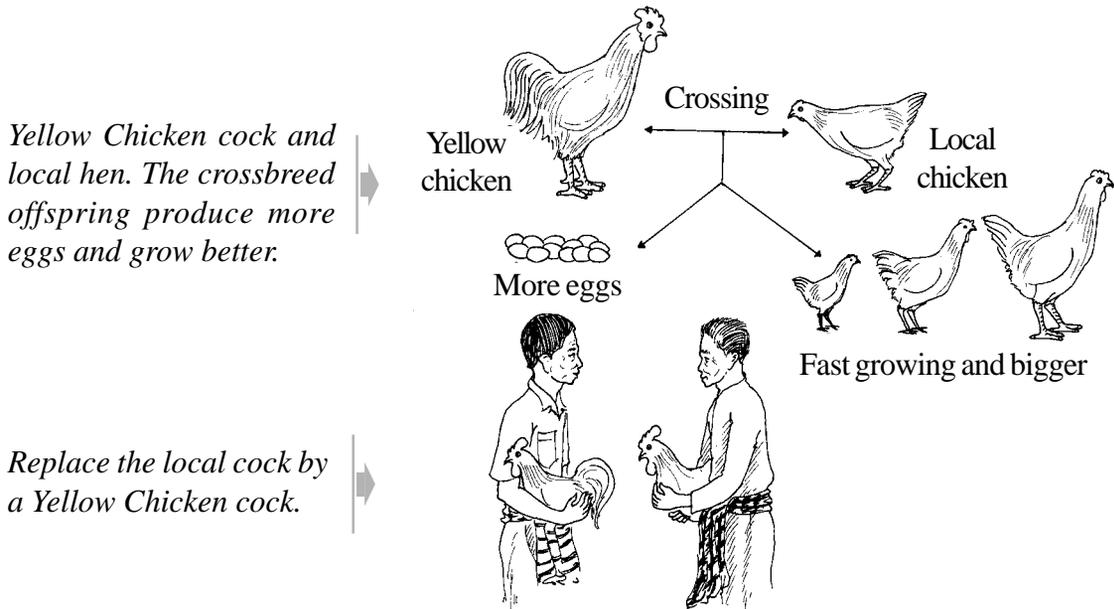
The meat of the Yellow Chicken is tender and of high quality. This type of meat is preferred in restaurants. In addition to the genetics (breeds), the quality of meat is also affected by diet (feeds).



← *Eating high quality Yellow Chicken in a restaurant*

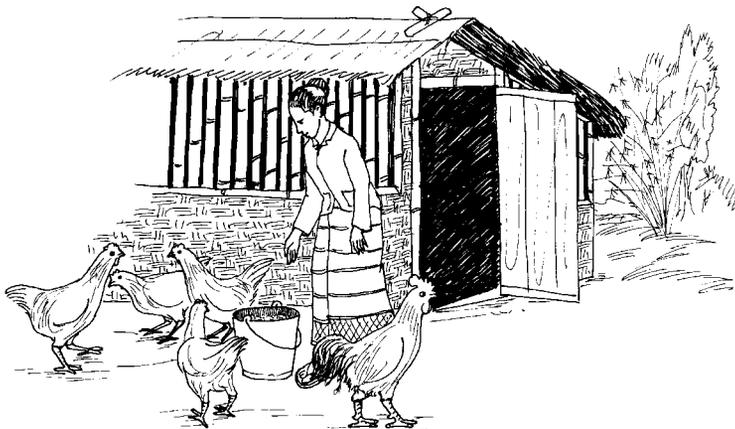
2.5. Crossbreeding

Farmers can use the Yellow Chicken cocks to get better offspring from their local hens. This is called crossbreeding or upgrading. Crossing local chickens with pure-breed cocks produces young chicks with a potential for laying more eggs and a potential for growing faster, better and bigger. This potential can be reached if the farmers also improve the management, such as feeding, housing and health care.



2.6. Pure breed production

Farmers can obtain Yellow Chicken hens as well as cocks. Together these can produce Yellow Chicken chicks which will expand their pure breed Yellow Chicken flock. The offspring will show the same production capabilities as the parents (lay as many eggs and grow as fast and big).





A Yellow Chicken flock of four hens and one cock. After about 6 months the flock could grow over 30 chickens.

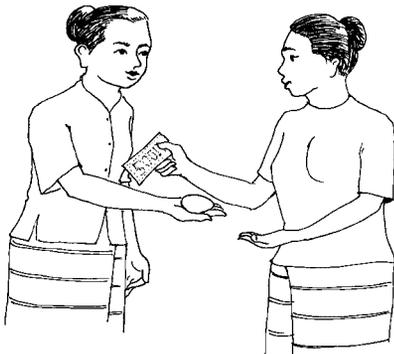


2.7. Pure breed hatchery

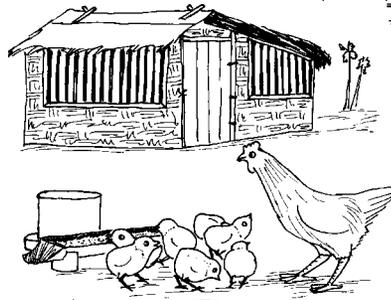
Farmers can use pure breed Yellow Chicken flock as a small hatchery from which they can sell fertilized eggs or day-old chicks to other farmers.



Selling fertile eggs can fetch higher prices than selling the eggs for consumption.



Farmers can obtain Yellow Chicken chicks by buying fertile eggs from other farmers and hatch the eggs under their local hens.



2.8. Providing food and money

The Yellow Chicken can provide the family with high quality food (eggs and meat) rich in animal proteins. These proteins are needed to make you grow strong and healthy. In addition, the farmer can have a weekly surplus of eggs and chicken that can be sold in the market. This will provide the family with regular cash money for their needs.



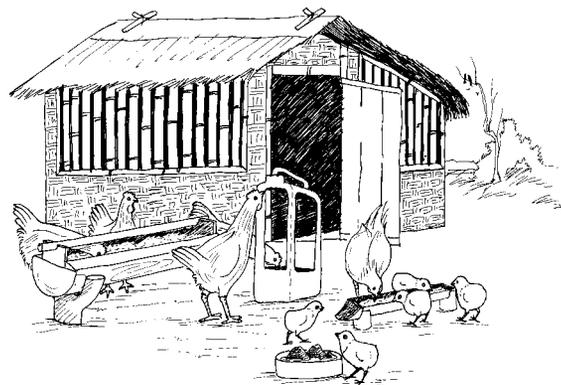
3. Caring of the Yellow Chicken

The Yellow Chicken breed is a high producing breed. Special care is required. Production will be highly dependent on improved management by the farmers.



Yellow Chicken flock kept under poor conditions: no house, no feed, high mortality.

Yellow Chicken flock kept under good conditions: simple house, homemade feed ration, many healthy chickens.

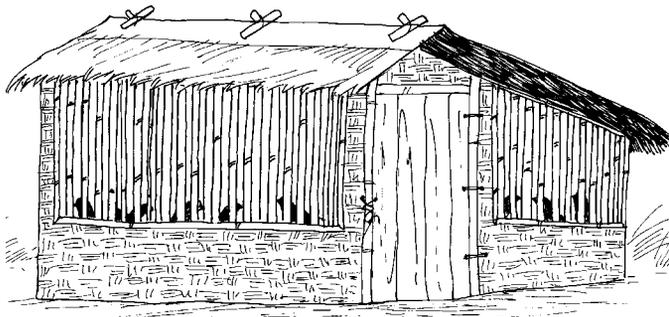
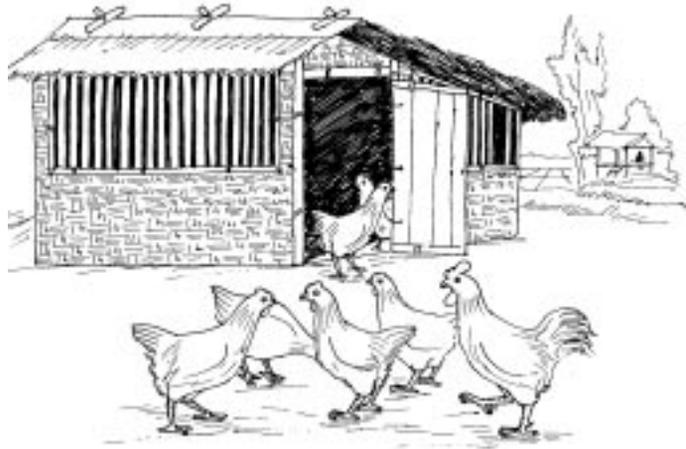




3.1. Good housing

Good housing protects chickens against rain, wind, cold and predators and reduces outbreaks of diseases. Good housing provides enough fresh air and light, enough floor space for the feeders and drinkers, and comfortable nests to lay, brood and hatch eggs. Housing with a slatted floor (see 3.3.) is more hygienic and reduces disease problems such as coccidiosis.

Day and night housing



Night housing

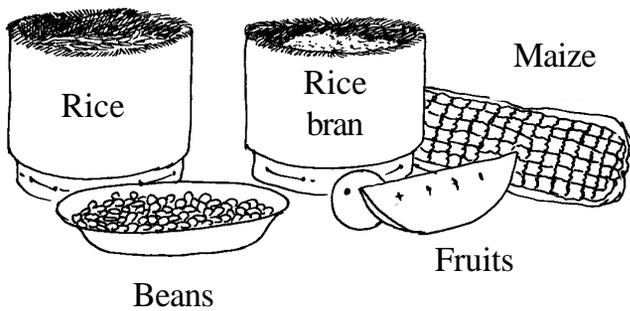
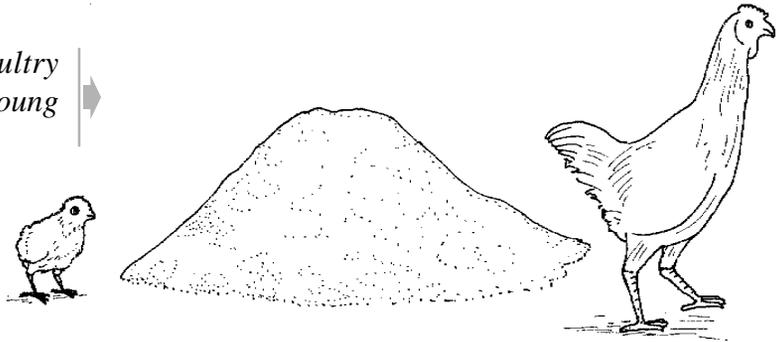
Housing for many chickens



3.2. Good feeding

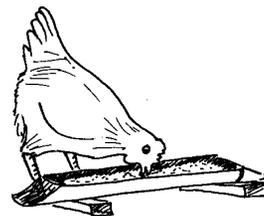
Ready-made poultry feed can make your Yellow Chickens grow fast. About 3 kg of commercial poultry feed is needed for the growth of 1 kg of meat. But as poultry feed is expensive, you may mix it with locally available feed resources to make your own homemade feed ration. A good homemade ration contains energy, protein, vitamins and minerals from a mixture of local sources (such as rice, maize, beans, fruits, plants and boiled eggshells).

About 3 kg of good poultry feed is needed for the young chicken to grow 1 kg.



Home made feed ration of rice, beans, maize, fruits, etc.

Good quality feed produces more eggs and more meat.

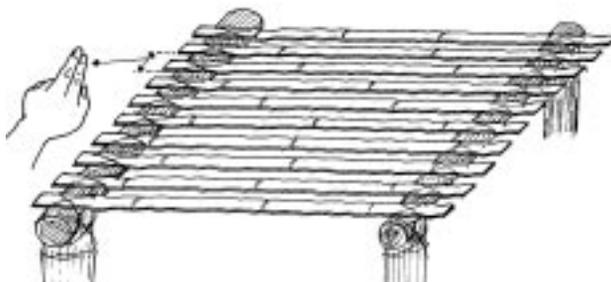
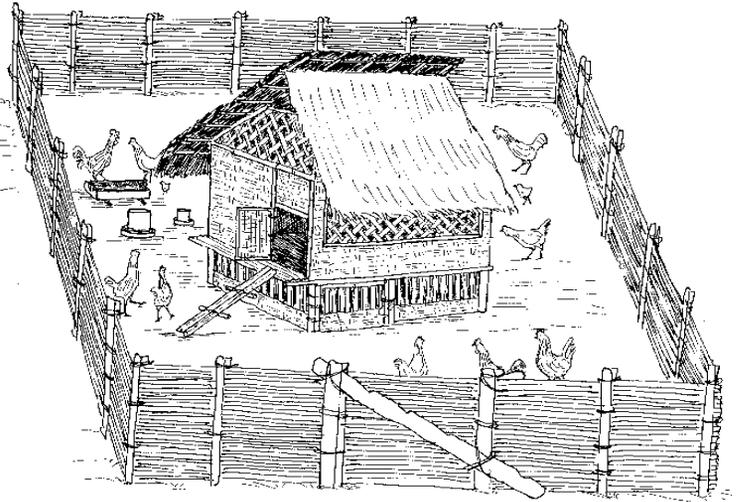




3.3. Good health care

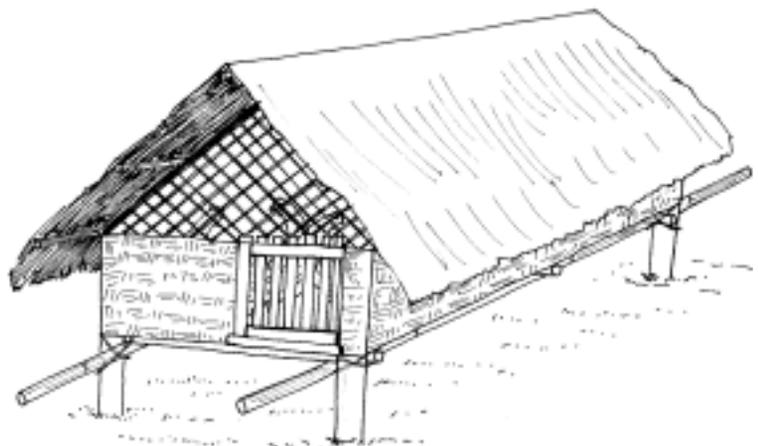
Vaccinate all chickens regularly against Newcastle Disease and Fowl Cholera. These diseases are often the cause of very high mortality, especially among young chicks. Do not vaccinate sick animals. Vaccines can only prevent diseases, they can not cure sick animals.

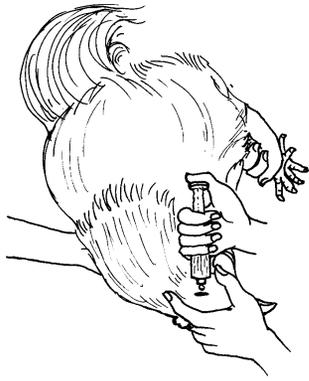
Good housing on a slatted floor can also decrease the incidence of diseases (such as coccidiosis) and internal parasites which cause a slow growth rate or even death in chickens. The slatted floor will not decrease problems with mites, ticks or lice.



Housing on stilts with slatted floors (thickness 1 cm, width 3-4 cm, with 1-2 cm in between).

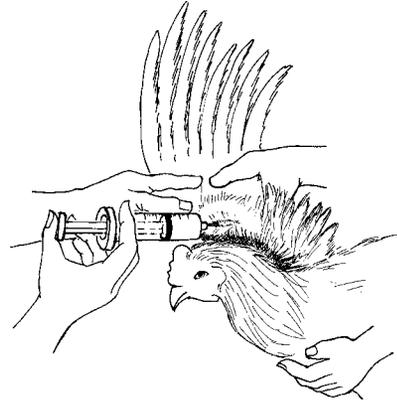
Transportable chicken pen.





Administer Heat Resistant Newcastle Disease vaccine as an eye-drop every 3 months.

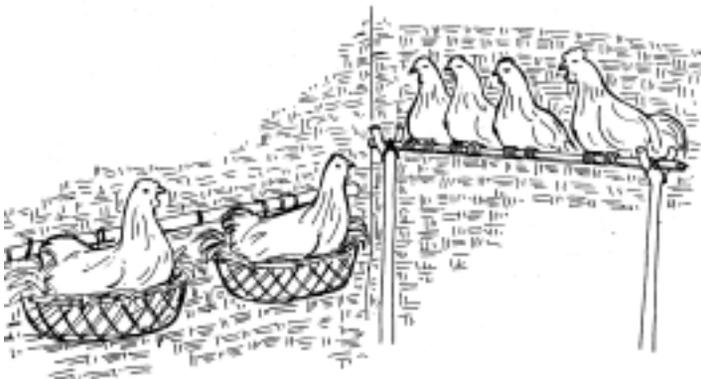
Vaccinate against Fowl Cholera under the skin of the neck or in the wing-web every 3 months.



3.4. Good equipment

Chickens need feeders and drinkers. Well placed nests keep predators away from eating eggs and the brooding hens are not disturbed. Perches prevent chickens sleeping in nests, feeders and drinkers. Litter is dry material spread on the floor (like straw, wood shavings, rice husks, etc.) and reduces the risk of disease.

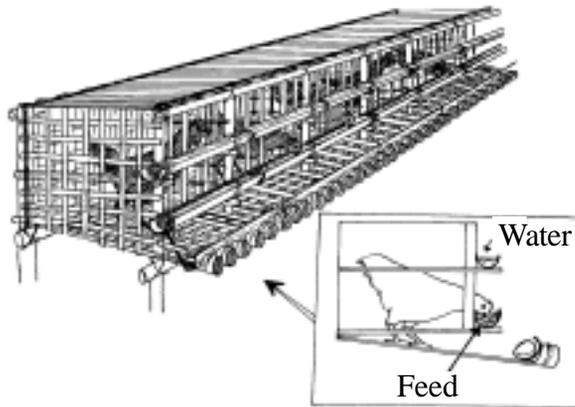
Chickens with enough space at feeders (6-8 cm per bird) and drinkers (1-2 cm per bird).



Chickens laying eggs in nests and sleeping on perches.

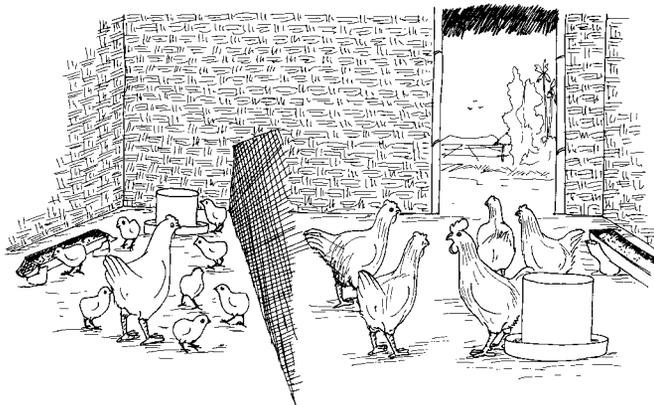


Chicken cages for high producing layer-breed.



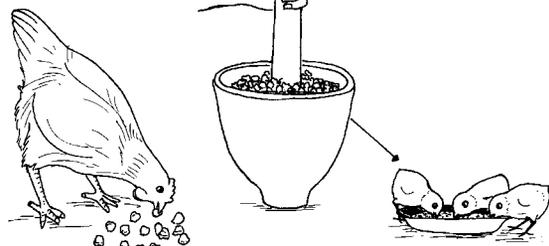
3.5. Good brooding, hatching and rearing management

Provide a warm, dry, draft-free place for the young chicks, away from predators. The night temperature should be around 30-32 °C. Pay extra attention to feeding and watering the chicks during the first 6 weeks. Crush and soak grain and rice and provide a mixture of feeds. Often local hens are good brooders and they take good care of their chicks. Use a local hen if your Yellow Chicken hen does not brood well. About 10 eggs taken around the same time from different Yellow Chickens can be put under a local hen when she starts brooding.



Provide the clutch with a dry warm place, separated from other chickens.

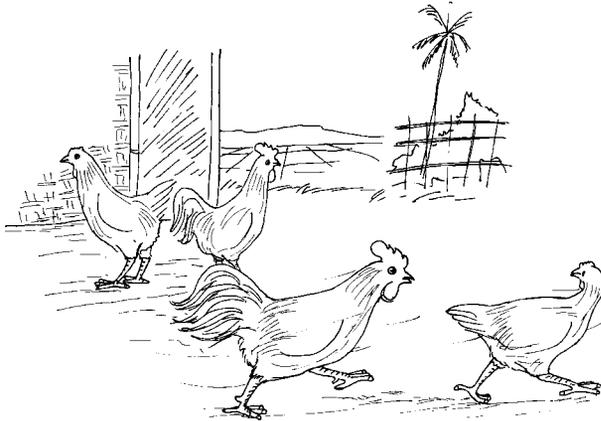
Extra feed for young chicks.



Putting eggs of the Yellow Chicken under a local brooding hen.

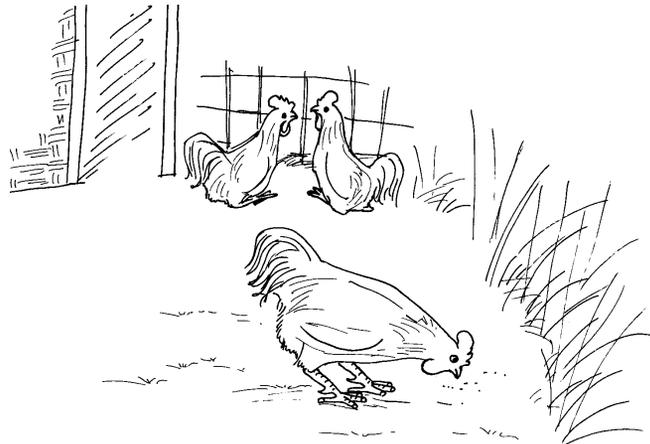
3.6. Good selection and culling management

The selection of breeding cocks requires special care, as the Yellow Chicken cocks find it difficult to compete with aggressive, local cocks. To upgrade the local chicken with the Yellow Chicken cock, it is advisable to sell the local cocks or restrict their access to the local hens.



← *Select a Yellow Chicken cock that goes after hens and can compete with local cocks.*

Select a fast growing, healthy chicken; always actively scavenging for feed. →



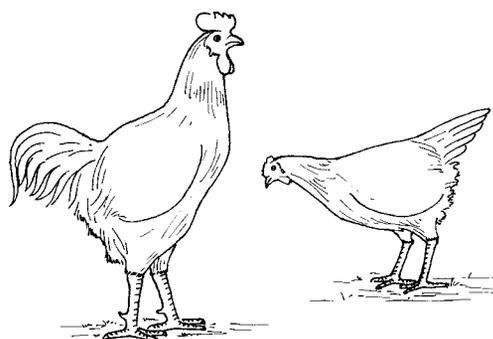
Select eggs for hatching from a good brooder. These eggs should be clean, without cracks, even in size and not older than 10 days. →





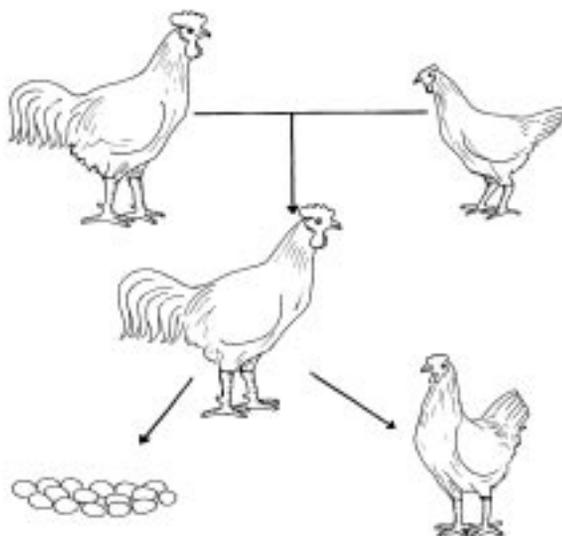
1. Quality and quantity of chicken feed

Good poultry farmers want to increase the production of their local chickens to obtain more eggs and/or more chicken meat.



By exchanging or replacing a local cock for a high producing exotic or hybrid cock, farmers know that their local hens will produce offspring which will be able to:

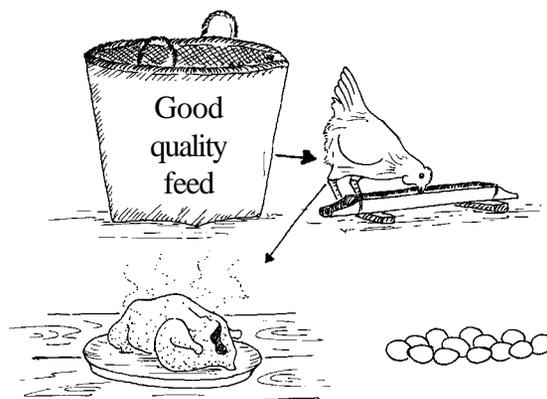
- produce more eggs and,
- grow bigger/faster than their mother.



The ability to produce more eggs and meat depends also on the **quality** and **quantity** of feed given to their chicken.

Higher quantity and better quality feed → more meat.

Higher quantity and better quality feed → more eggs.



Ready-made poultry feed can make high producing poultry breeds grow fast and lay many eggs. Only 3 kg of good quality poultry feed is needed for the growth of 1 kg of meat. But as poultry feed is expensive, it is better to use a little for improved local chicken breeds (like Yellow Chicken) and supplement this with a homemade feed ration. A good homemade ration contains energy, protein, vitamins and minerals from a mixture of local sources (such as rice, maize, beans, fruits, plants and eggshells).

Three kg of commercial poultry feed will produce 1 kg of chicken meat.



Chickens usually find their feed around the house and in the fields. They eat different sorts of feeds: grains, leaves, insects, worms, food leftovers, etc. Normally the **quality** of this feed is good but the **quantity** is insufficient for good production. Therefore extra feed (either your own mix or the commercial one) should be provided. This extra feed should be given at the end of the day to attract the chickens home to their (night) pen.

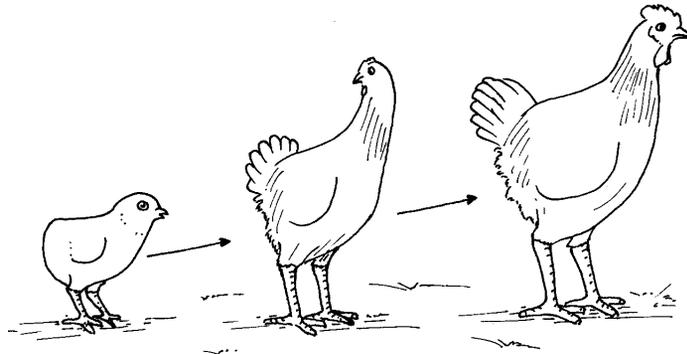
2. Components of chicken feed

Chicken feed contains the following:
energy, protein, vitamins and minerals.





Energy: Chickens need energy just to stay alive, and to walk, to search for food, to catch insects, or to run away when they are in danger. They need more energy to produce eggs or to grow big.

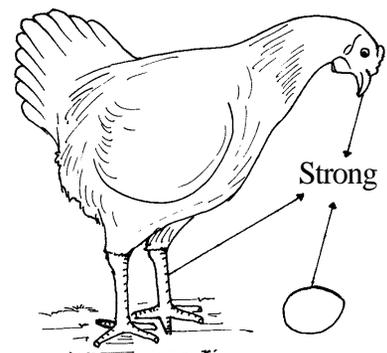


Protein: Chickens need protein to grow from chick to adult, to produce muscles and feathers and to stay healthy. All chickens need protein to survive and they need more protein to produce eggs or to grow big.



Vitamins: Chickens need small quantities of vitamins to have a long and healthy life, to protect them against diseases and to produce healthy and strong offspring. They only need small quantities - but of many different sorts of vitamins.

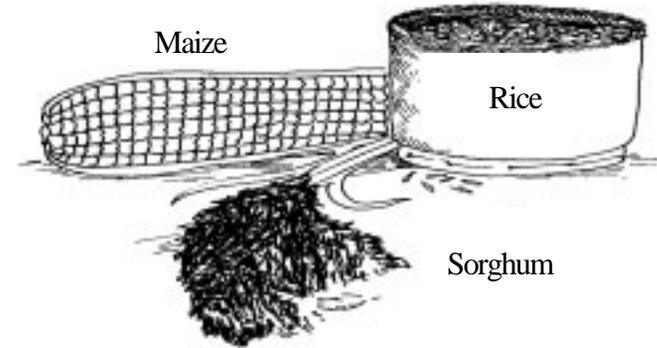
Minerals: Chickens need small quantities of minerals to develop strong bones, good feathers and to produce shells around the eggs. Be careful when you give egg shells, as some chicken develop the bad habit of cracking an egg and eating the yolk.



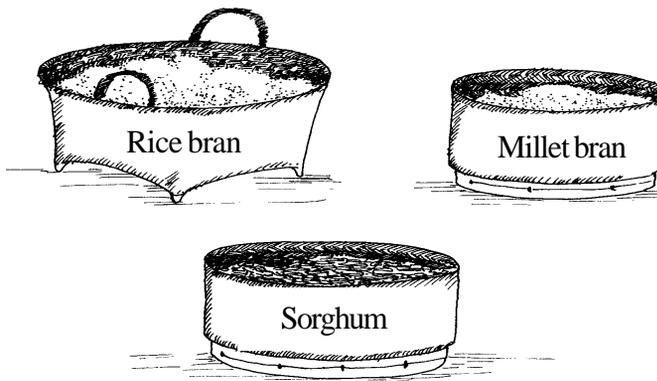
3. Ingredients of chicken feed

In all the feeds we give the chickens, energy, protein, minerals and vitamins are present in different quantities.

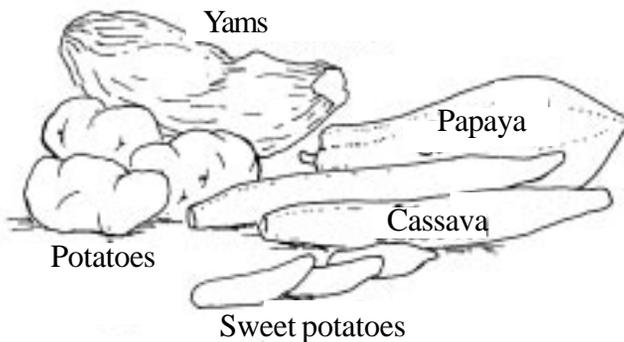
Energy can be found in:



All kind of grains:
maize, sorghum,
wheat, rice, etc.



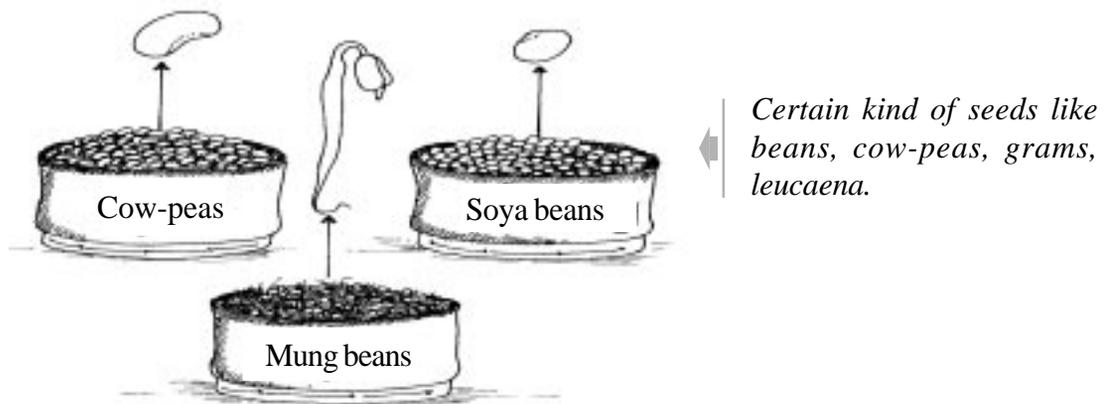
A number of crop by-
products: maize bran,
rice bran, millet bran,
etc.



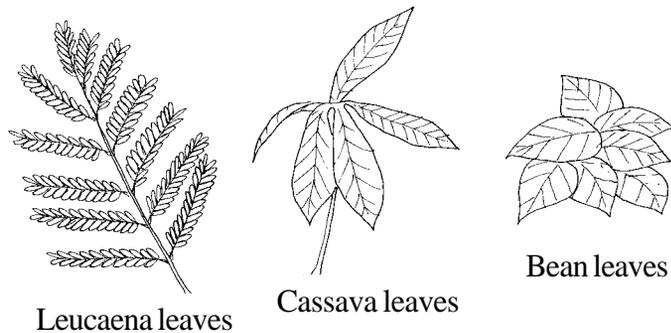
All kinds of root crops:
cassava, potatoes, sweet
potatoes, yams. Also
kitchen left-overs.



Protein can be found in:



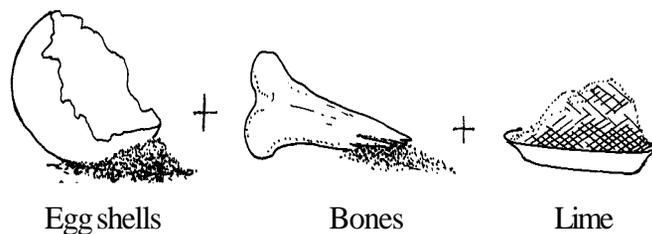
Leaves of certain plants like cassava, cow-pea or leucaena.



- In crop by-products which have to be bought like cotton seed cake, copra cake, sesame cake.
- In products from animal origin like fish meal, termites, ants, bugs, ticks, worms, boiled blood (or blood meal), crushed snails from the rice fields.

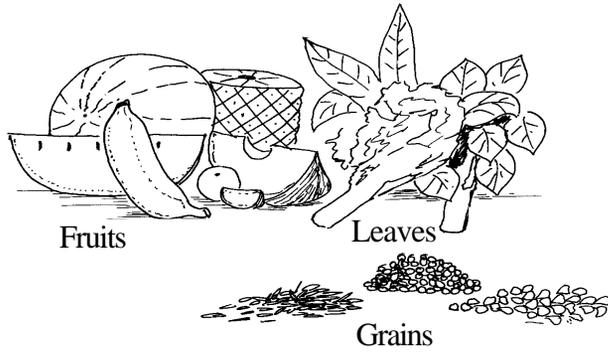
Minerals can be found in:

Shells, bones and lime (and commercially available pre-mixes). The most important minerals are calcium and phosphorus for the formation of bones and egg shells.

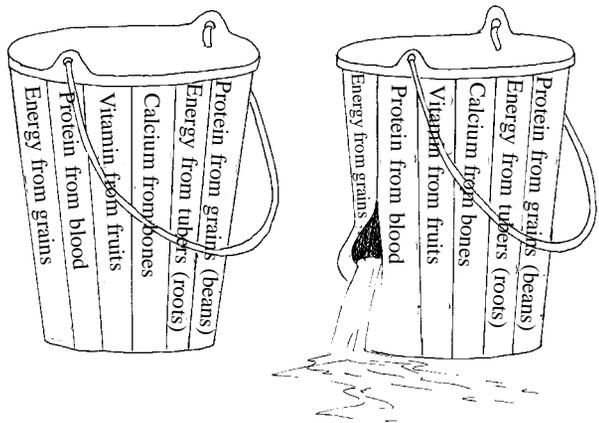


Vitamins can be found in:

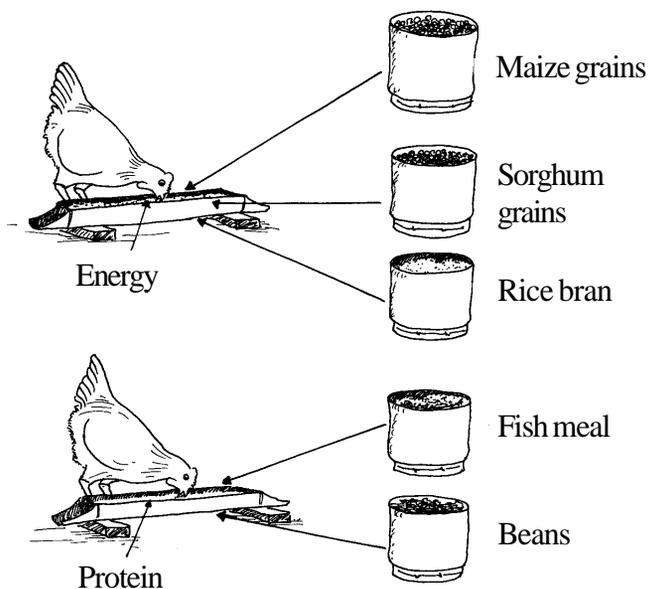
All types of fresh plants, fruits, seeds and other products. There are many different types of vitamins. These are provided in sufficient and balanced quantities by giving your chickens a wide variety of different foods.



All these components are equally important. The amount of each component needed to make a good poultry feed varies. Therefore, a good poultry feed is always a mixture of different types of food. However when an element is missing or is insufficient in the mixture, egg-production will drop or growth will be slow because the other components are not utilized.



It is important to have elements from different feed sources. For example, not only energy from maize but also from sorghum, rice bran etc. Not only protein from fish meal, but also from plants. Again, good poultry feed is a mixture of different types of foodstuffs.



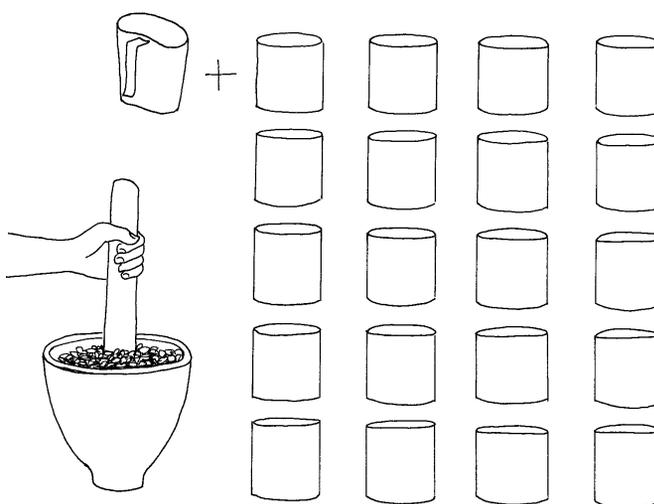


4. Improving local poultry feeds

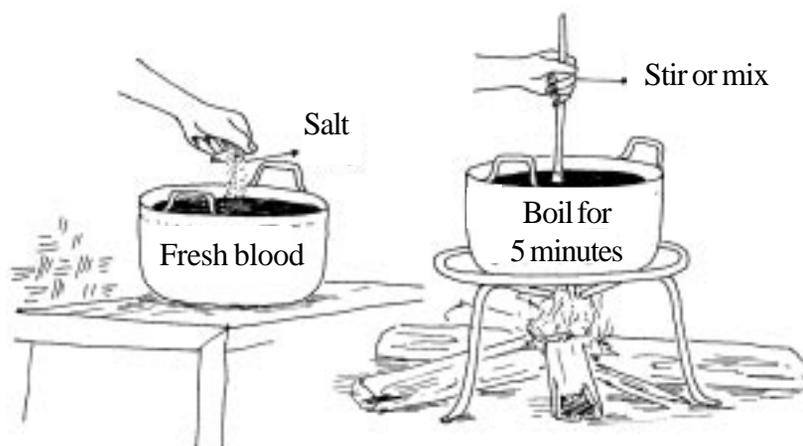
By providing various sources of energy, proteins, vitamins and minerals, the farmer can improve the quality of the poultry feed. Here below are a number of suggestions which may help the farmer.

Energy: Do not provide only maize. Try to obtain other energy sources like sorghum, millet, or crop by-products like maize bran, rice bran, etc. Supply from time to time cooked potatoes, cooked sweet potatoes, cooked cassava. Prepare powder of cassava leaves, pigeon pea, cow-pea or leucaena leaves. Harvest the leaves when they are green, dry the leaves under shade (as sun-rays can destroy the vitamins) and store them in bags. If needed, crush them to powder and mix them with your other feed.

To give you an idea about the quantity you can mix, you should use a tin. Mix one tin of leaf-powder together with 20 - 40 tins of your other feeds, This gives around 5.0 - 2.5 % leaf-powder in your homemade ration.



Protein: Preparing blood meal. Collect blood from freshly slaughtered animals in a bucket or pan. Mix it with a teaspoon of salt. Cook it above a fire for five minutes with constant stirring.

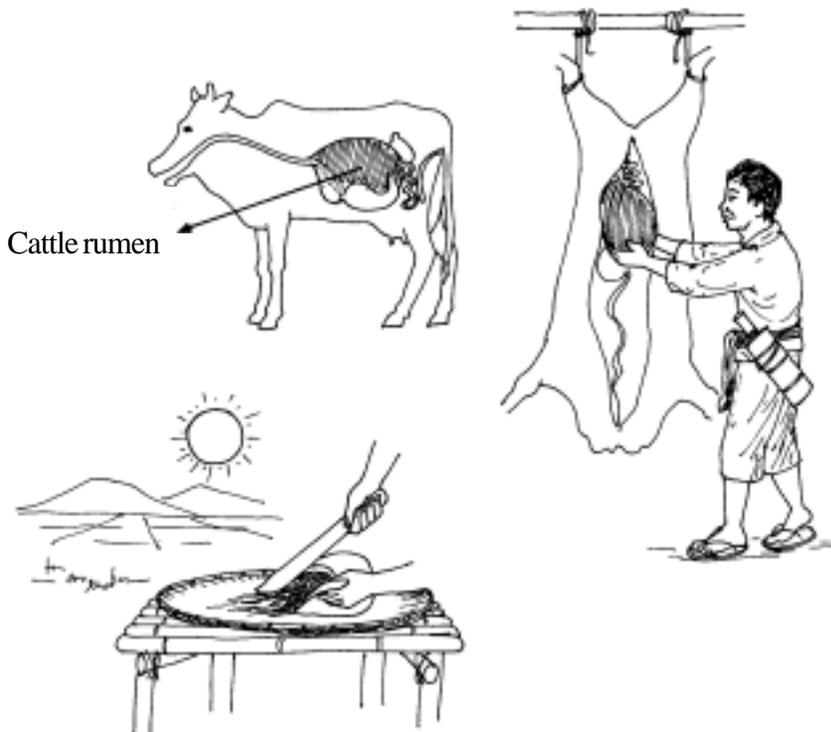


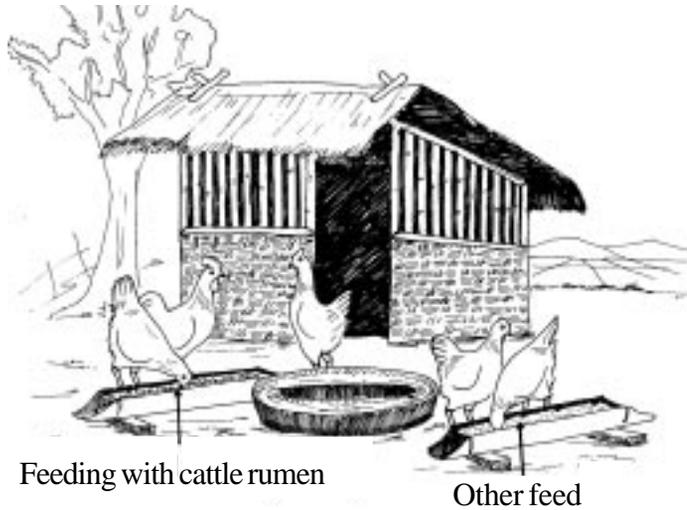
Remove it from the fire and dry it in the sun, protected from flies. After drying, store it in a cool place, and give it in small quantities to your chickens. Never mix more than 1 tin with 40 tins of your other feed (chickens do not like the taste very much, so mix it well before you give it). Note: You can store blood meal for only fourteen days, not longer !



Drying in the sun

Protein: When a goat or cow is slaughtered, collect the contents of the rumen, dry them in the sun. Do not store for a long period. Give it separately from other feeds.





Feeding with cattle rumen

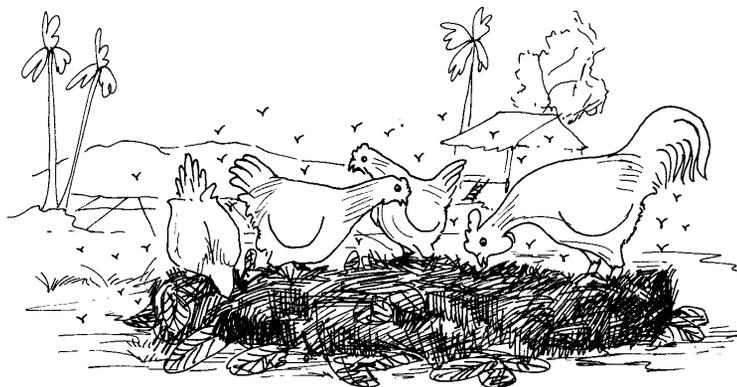
Other feed

Spoiled grasses

Protein: Trap insects like termites, ants or worms. Termites and ants may be trapped with banana leaves and/or grass. Worms may be caught during activities in your fields.

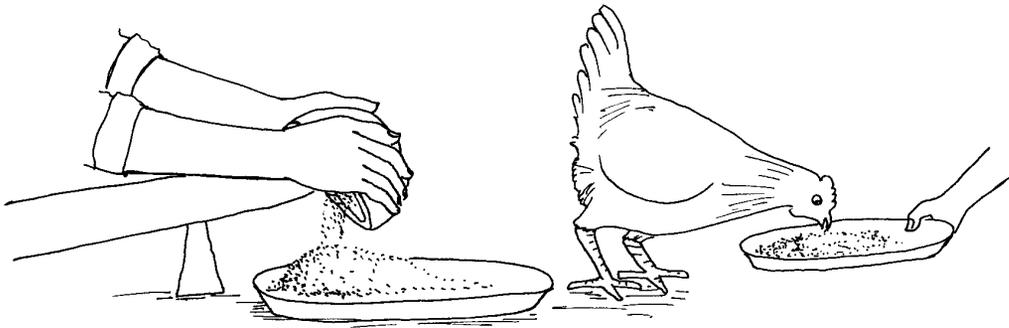


Protein: Providing your chickens with another important source of protein can be done by making a compost heap or pit.



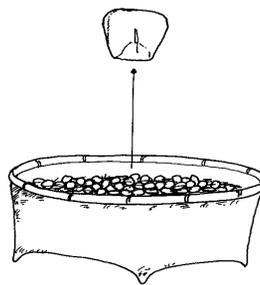
A good compost heap produces a lot of insects, maggots, eggs and other sources of protein which your chickens like to eat. Collect all plant materials, weeds and harvest residues. Old litter and other manure from your fields or your compound and heap them together. Add water regularly and turn the heap upside once every month. Remember that your food crops will also benefit if you produce good compost to fertilize the land.

Protein: The flesh of coconuts is rich in protein. After consuming the juice scrape the flesh out of the nut and give it your chickens. Add no more than 1 tin to 10 tins of your other feed.

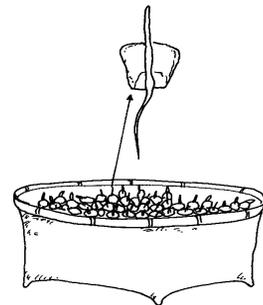


Vitamins: If your chickens scavenge around and find most of their feed outside, they will find vitamins themselves. When you confine your chickens, make sure that you feed them every day with fresh greens: vegetables like cabbage, all types of fruits, etc.

Soak grains of maize, sorghum, etc. in a bucket of water overnight. Remove them the following day and feed to the chickens. Alternatively store it for 4 days on a flat surface in a dark spot in the house. The seeds will germinate. When the germinating seeds are 1-2 cm long give them to your chickens. These seedlings contain many vitamins.

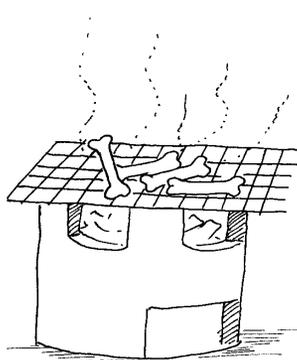


Soak grains of maize



Germinating maize grains

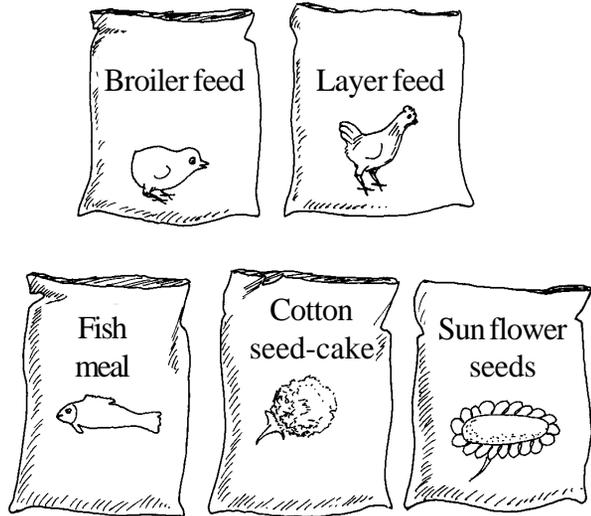
Minerals: Preparing bone meal. Collect bones from slaughtered animals, char them over a fire until they become soft. Crush them to powder. Feed the powder in small quantities to your chickens. Never mix more than 1 tin to 25 tins of other feed. Alternatively you can use lime-stone or buy commercially available mineral/vitamin pre-mixes. Be careful with egg shells; chickens should not start the habit of cracking eggs!



These suggestions for improving the feed composition of your poultry feed can be carried out by the farmer, just by giving more attention to the preparation of feed. No extra money is needed.



It may be worthwhile considering buying small quantities of commercial feeds. Available products worth adding include fish meal, cotton seed cake, sunflower cake, sesame cake, broiler or layer (chicken) feed. Small quantities of these products may result in increased egg-production or healthier chickens. Provide small quantities mixed together with your own prepared feed.



5. Using commercial feeds mixed with locally available feeds

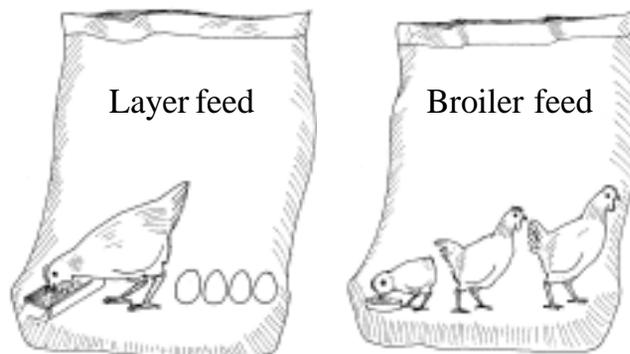
Commercial poultry feed can make high producing poultry breeds grow fast (broilers) and lay many eggs (layers). But as poultry feed is expensive, it is better to use a little for improved local chicken breeds (like the Yellow Chicken kept under local conditions) and supplement this with locally available feeds to make you own homemade feed ration. The following main commercial poultry feeds are available in many markets:

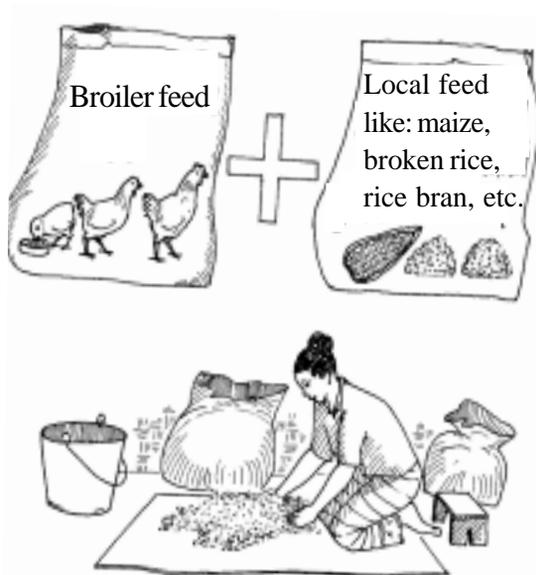
Layer feeds:

This type of feed is meant for layer breeds that can lay up-to 5 eggs per week. Improved local breeds, however, normally lay only 2 - 3 eggs per week, so using only this feed is too good and too expensive (it provides more than is required).

Broiler feeds:

This type of feed is meant for broiler breeds that can grow up-to 1.5 - 1.8 kg in 6 weeks. Improved local breeds, however, normally grow only 1.5 kg in 12 weeks, so using only this feed is not recommended (too expensive).





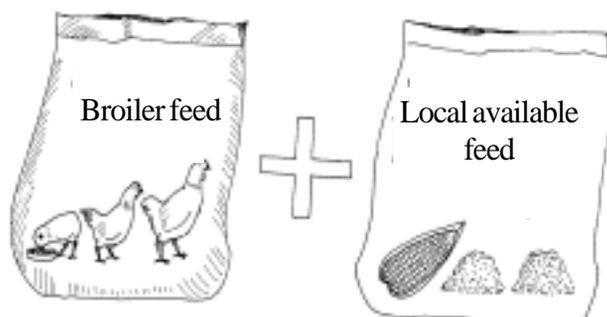
It is not economical to use only commercial feeds for rural Yellow Chicken production. You can make a homemade ration with locally available feeds like broken rice, rice bran, maize, beans, fruits, plants, etc.

To make your poultry feed complete and of high nutritional value (especially important for young chickens), you can add and mix commercial feeds.

For mixing, the best results are obtained by using "concentrated feed" (usually 30-35% protein content). But often this feed is not available in rural areas and then the following alternatives can be used to make cheap improved home-made rations.

Example 1: When the chicks are still young (till 3 months), a good mix is:

- 50% or 1 bag locally available feeds (broken rice, rice bran, maize, beans, etc) and
- 50% or 1 bag commercial broiler feed (usually 22% protein content).



Example 2: When the chickens are older and start to lay eggs, a good mix is:

- 65% or 2 bags locally available feeds (broken rice, rice bran, maize, beans, etc) and
- 35% or 1 bag commercial layer feed (usually 16% protein content).

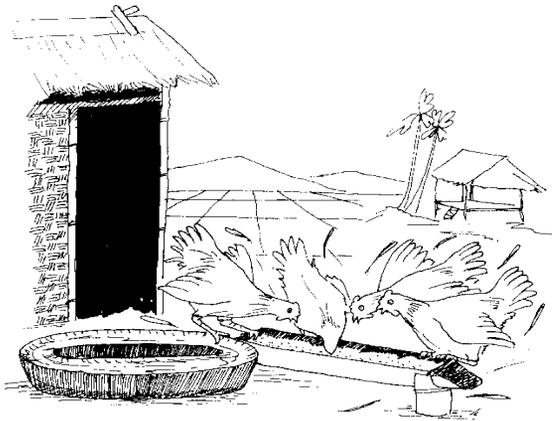


It is important that you separate the chicks at feeding: chicks require better quality feed than the older chickens.



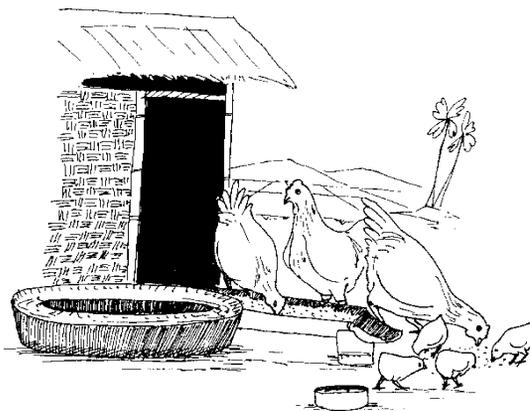
6. Improving feeding

Apart from improving the quality of feeds, a farmer can also obtain increased production by paying attention to the quantity of the feed and the way in which the chickens are fed.

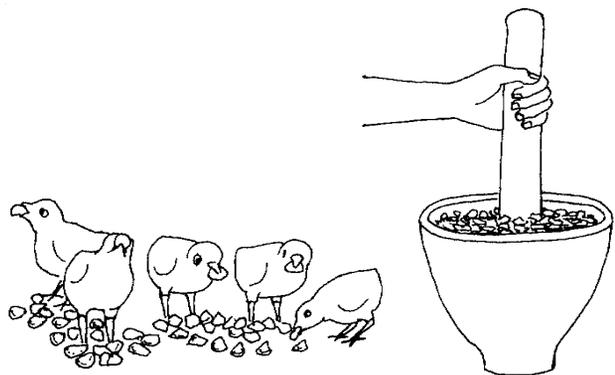


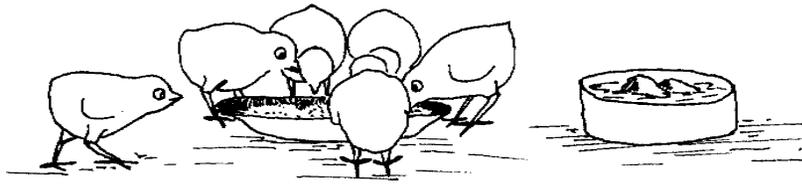
A poultry farmer who really wants to increase egg or meat production, makes sure that the chickens receive enough feed to achieve this. The number of chickens should be adjusted to the quantity of feed available. If feed is limited, unproductive hens should be either sold or eaten in order to allow sufficient feed for the productive hens. It is better to have 10 productive chickens for which you can provide enough feed - than 20 half-starved, unproductive birds.

Provide feed at least twice a day, in the morning and in the evening. Feed your chickens before setting them free. A full stomach keeps them closer to the house, thus minimising loss by predators. Feed the chickens after they return to the house, always at the same time, to teach them to come back to the (night) pen.



Good farmers always crush their grains (maize, sorghum) before giving them to their chickens. By crushing the feed, all the components will become more easily available to your chickens. Although adult chickens may easily pick up whole maize grains, the younger ones will find it hard to swallow them. Do not crush the grains to powder.





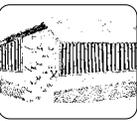
Good farmers always use a chicken feeder to feed their chickens to prevent wastage. Before they give the feed, they make sure that the different ingredients are well mixed.



Good farmers provide their chickens with fresh drinking water every day. Release your chickens for a couple of hours to find their own feed. Be careful in the rainy season; make sure no rain is expected during their hours of freedom.

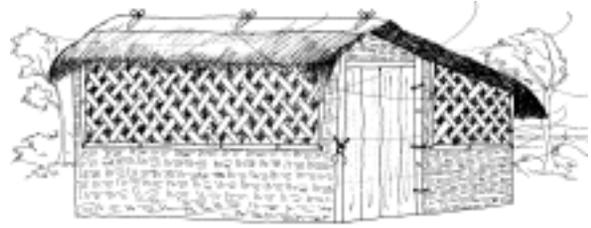
Feed and water intake are key factors for good production, especially in hot climates. At higher temperatures the chicken needs more water, but can eat less. A hot temperature in the chicken house should be avoided as this results in lower production. Below are daily intakes of layers at different temperatures:

Temperature	Water intake	Feed intake (commercial feed)
20 °C	23 liters per 100 birds	115 grams per bird
26 °C	31 liters per 100 birds	110 grams per bird
32 °C	56 liters per 100 birds	100 grams per bird
38 °C	95 liters per 100 birds	90 grams per bird

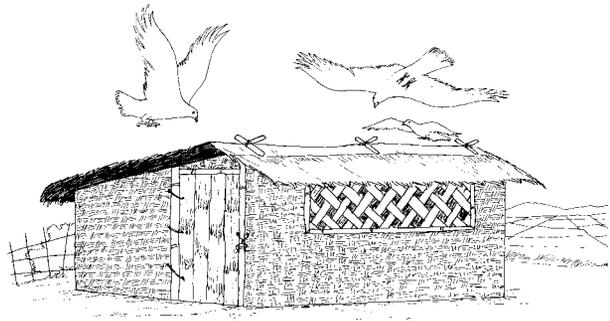


1. Why improve chicken housing?

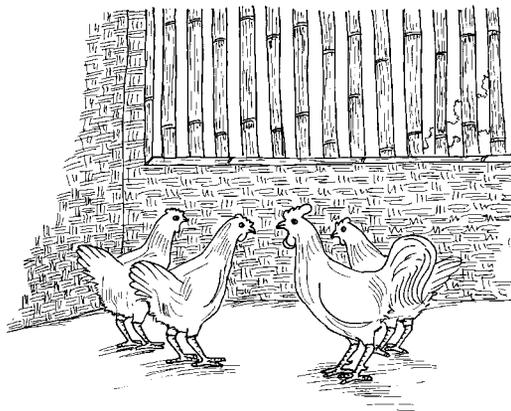
To protect chickens against rain and wind.



To protect chickens against wild animals and predators.



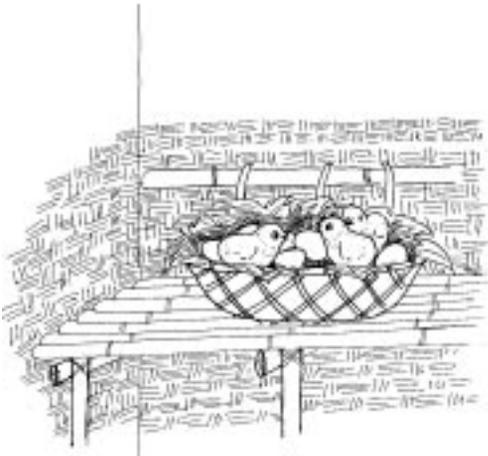
To reduce outbreaks of disease.



But provide chickens with fresh air and light.



← To provide the chickens with nests; comfortable dark places to lay, brood and hatch their eggs.



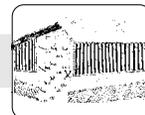
← To increase egg and meat production.

→ To improve family diet by eating surplus eggs and chickens.



→ To increase family income by selling surplus eggs and chickens.





2. How to make your chickens comfortable and increase production of eggs and meat



Chickens need a house which is well protected against rain and wind.



Chickens need a house with fresh air and ample daylight. Healthy chickens have a nice coat of feathers that can stand the cold easily. Chickens are unable to sweat. They need fresh air to remove body heat; this they achieve by opening their beaks.



The housing needs long roofs to give shade to protect chickens from the hot sun. Chickens need a house with enough space to walk around, to feed and drink and to lay and hatch eggs.

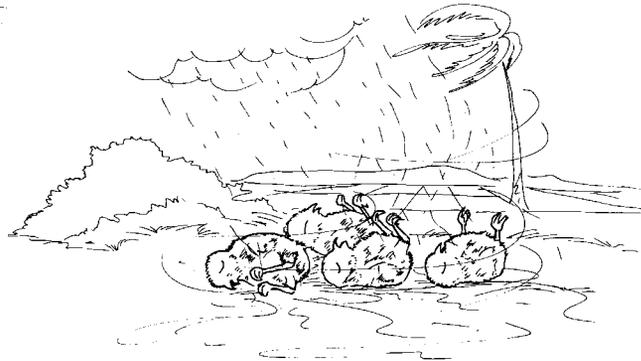
To be comfortable, chickens need a high and dark place for sleeping (on perches or a slatted floor 60 cm above the ground).





Chickens hate wet feet and dirty, smelling floors. It makes them sick.

Young chicks can not stand cold and wet places. It makes them sick.



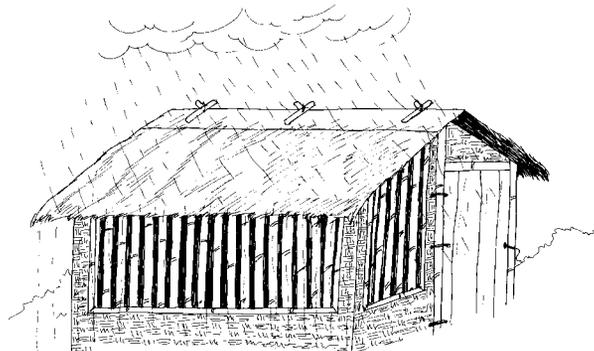
3. Principles of good housing

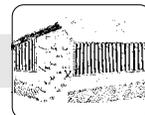
3.1. Protection against rain and wind

The chicken house should protect against heavy winds (closed walls on the side of the prevailing wind).



Protection against rain is achieved by a well constructed roof with overhang, made of thick thatch or galvanized iron-sheets.





3.2. Protection against hot sun and high temperature

Poultry houses need long roofs to provide shade to protect the chickens from the hot sun. The roof can be of thatched grass, bamboo sheets, galvanized iron sheets, tiles, etc. Roofs made of thatched grass or bamboo sheets are cheap and good for ventilation, but are not durable. The cost of tiles or galvanized iron roofs is high, but these roofs last a long time.



A tall tree will shade the house and reduce the temperature.

Chickens need a house with fresh air and sufficient day light. In hot climates, a galvanized iron roof can make the house very hot during the day.



Shrubs too close to the house will block ventilation and day light.

Chickens are unable to sweat. By opening their beaks they remove body heat. This can also be a sign of heat stress. Chickens in a hot house suffer from heat stress. They eat less and thus become less productive (less eggs and less growth).



Wrong direction: the hot sun penetrates the longest side of the house.

The site of the house and the roof should protect the chickens from the hot sun and high temperatures. The sun should not penetrate the house at the hottest time of the day. The direction of the longest side of the house should be East-West. This position will provide maximum shade during the hottest time of the day.

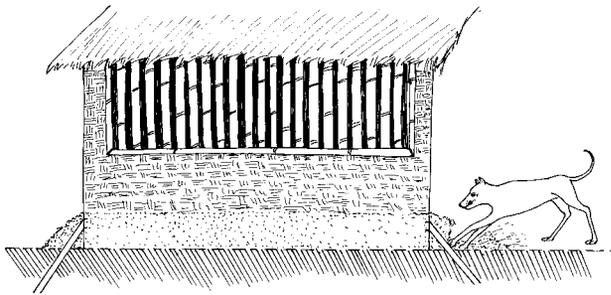


Right direction: the hot sun is blocked by the shortest side of the house.

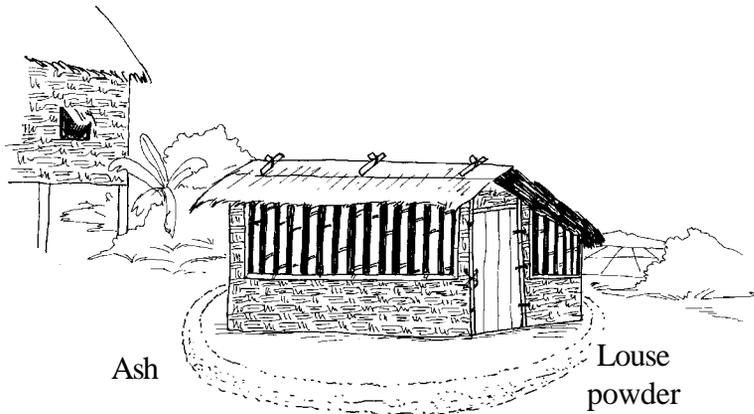
3.3. Protection against wild animals and predators



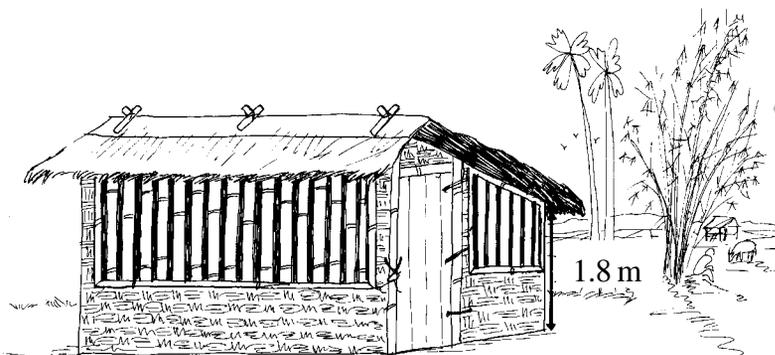
← Solid construction of walls. Made of bamboo, timber, off-cuts, old metal-sheets or sticks with clay.



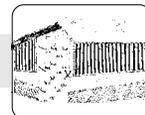
← Foundation with stones against mongoose, stray dogs, rats. Inner side of walls smooth.



← Protection against biting ants, using ash or louse powder.

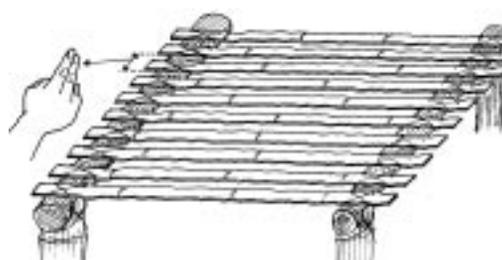
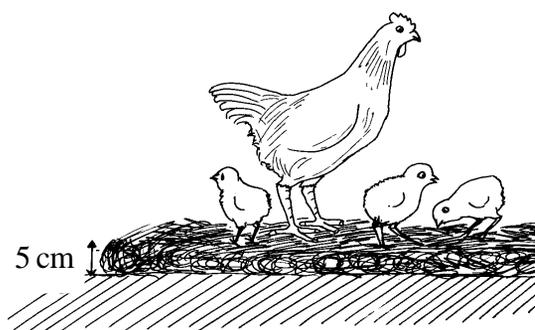


← Walls should be at least 1.8 meter high.



3.4. Reduce outbreaks of disease

The floor can be covered with a layer of litter of 5 cm (levelled and trampled solid).



The litter must be changed when it is dirty, wet and mouldy to keep away diseases. Alternatively the house can be made on stilts with a wooden, slatted floor.

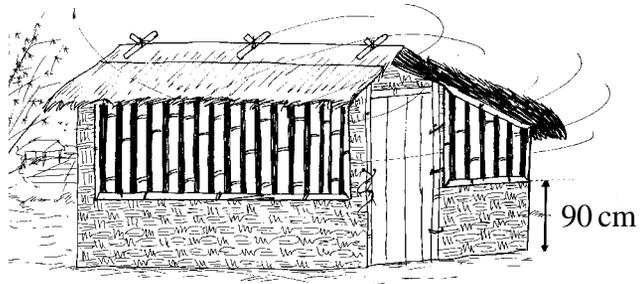
The place under the house, where the manure falls, must **not** be accessible to animals because it often carries microbes causing diseases.



Wooden houses need special attention to control external parasites (mites, ticks and lice) by painting surfaces with carboleum or mixtures of old oil. Clean and disinfect the house and equipment regularly (e.g. with lime), especially before a new batch of chicken arrives.

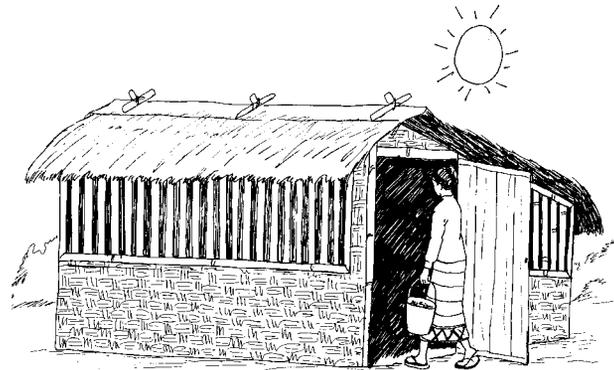
3.5. Provision of fresh air

Two solid walls that are about 1 meter high with windows of chicken wire or small bamboo sticks on top. Place these 2 walls away from the prevailing wind.



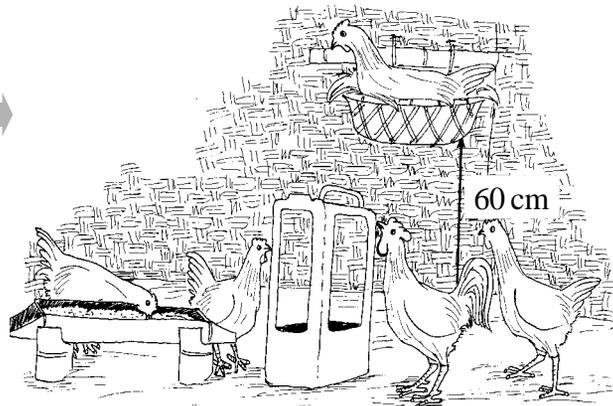
3.6. Provision of light inside

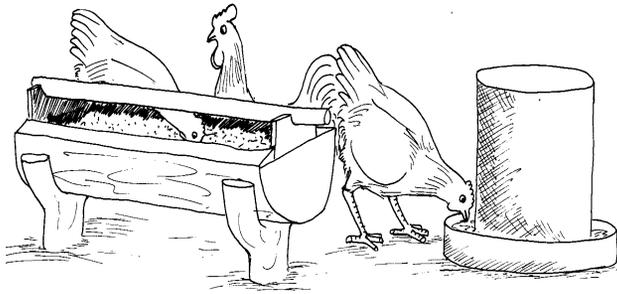
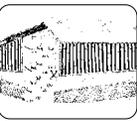
Roof construction at least 1.8 meter from ground level. Advantage: a farmer can enter the shed. If possible have open walls facing the rising sun. Protect the house (provide shade) from the setting sun.



3.7. Floor space per bird

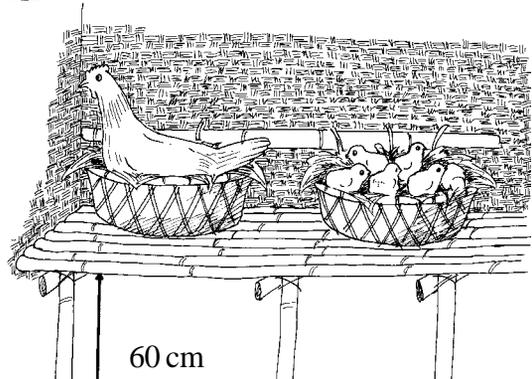
Provide floor space for drinkers, feeders, nests and for the birds to walk. Space requirement for 4 - 6 chicken is **at least** 1 square meter.





Feeders/drinkers should be placed in an open part of the shed, not too far apart and close to the nests.

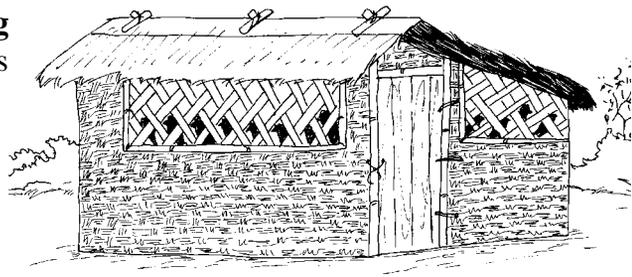
The nests should be constructed in a dark corner of the house. Placed 60 centimeters above ground level.



4. Type and choice of housing

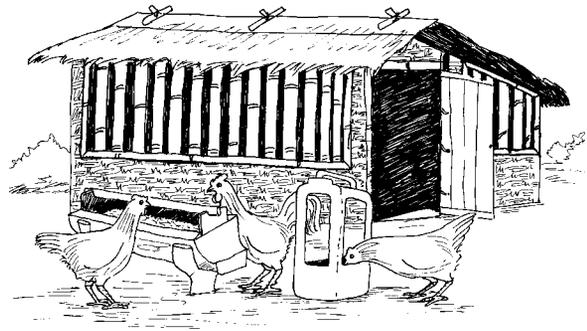
4.1. Type: day and night housing

- Housing where all the conditions discussed above are met.



4.2. Type: night housing

- Place where chickens can be confined during the night.
- House should contain perches for sleeping and nests for laying eggs.
- Feeders and drinkers can be placed outside.
- Floor space is not so important.



IMPORTANT: Even with day and night housing, let the chickens outside to feed.

4.3. Choice: day and night housing without free range

Day and night housing is preferred in regions with:

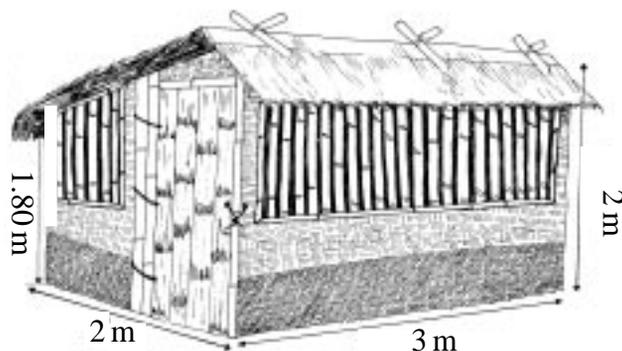
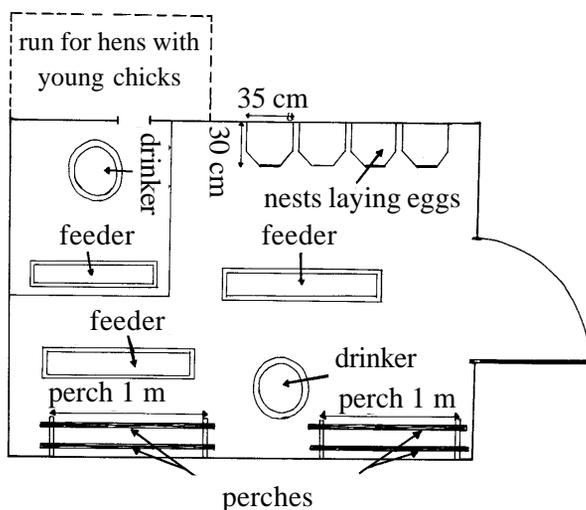
- High rainfall.
- Two foodcrops whereby chickens are enclosed for two periods of six weeks during the growing season.
- Densely populated villages, urban areas.

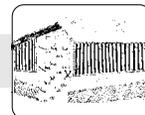
4.4. Choice: night housing

Only night housing is often used in regions with:

- Hot and dry climates.
- Where farmers have large plots so that chickens can roam without interfering with neighbours' chickens.
- Where birds can choose to go inside or outside.

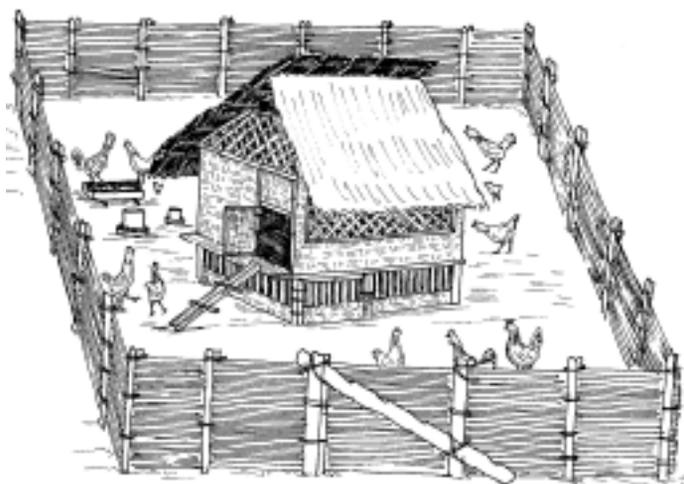
4.5. Layout of chicken pen for keeping 15 - 20 birds





4.6. Night housing with enclosed range

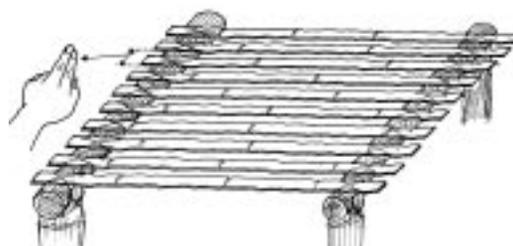
Where there is not enough feed to provide sufficient protein, the chickens can find some food by scratching and scavenging in the enclosure. The feeders and drinkers can be left outside, but moved every 3-4 days to another spot in the enclosure.



4.7. Housing with slatted floor

Why? Because then the droppings do not remain in the house. Its stays clean without extra work for the farmer. The ventilation is also better. The floor of the house is slatted and can be made of wood or bamboo. The droppings fall on the ground under the house and lower the risk of diseases.

The space between the bamboo must not be too big so pullets do not have problems. The round side should be up with enough supports across (every 0.5 meter).



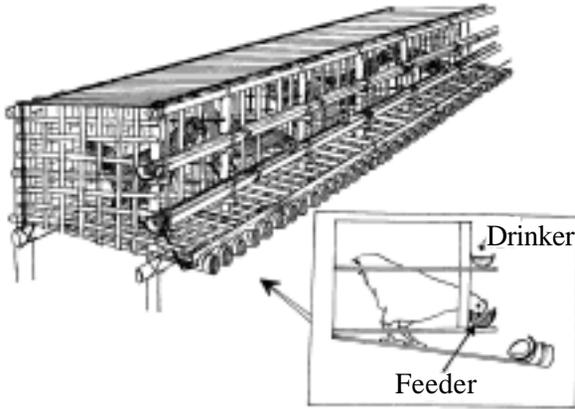
The underside must not be accessible to the chickens. They should not be able to come and eat the droppings which could spread disease.

The droppings/manure should be removed from time to time and put on the gardens or in fields to fertilize the plants.



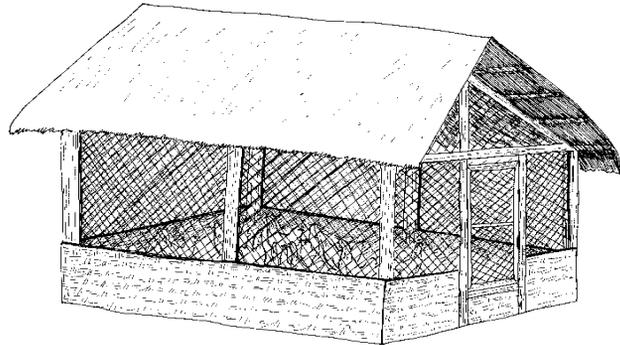
5. Other housing models

- Housing at large scale poultry farms.



*In cages with slatted floor.
Remark: in some countries, small cages with many birds per square metre are no longer recommended because of animal welfare concerns.*

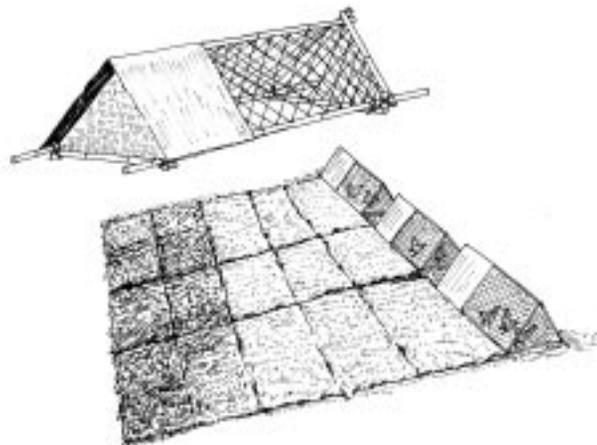
In houses with deep litter on the floor.



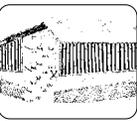
- Transportable chicken houses.



On stilts and with a slatted floor.

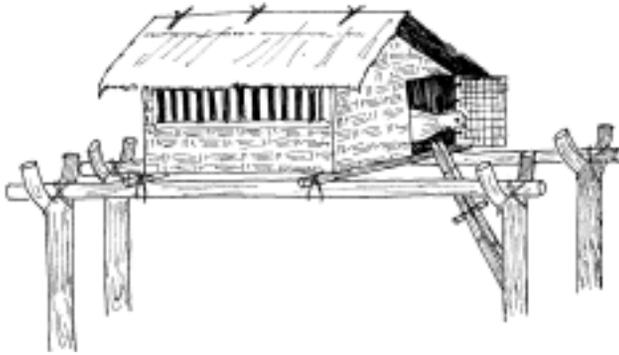


Without a floor allowing chickens to find feed in the fields without getting lost. Every day the pen is moved to a different place in the field.



- Housing on stilts for 10 - 20 chickens.

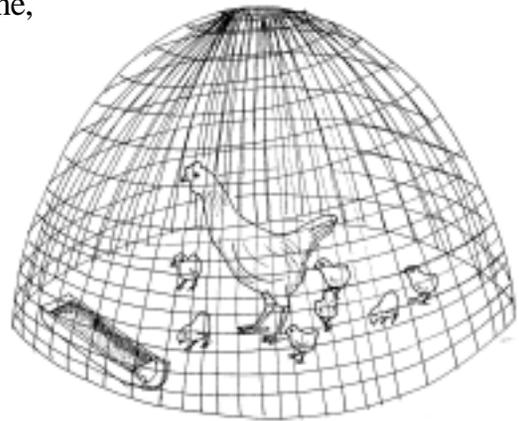
Permanent housing



Housing with free-range

- Simple temporary housing for quarantine, brooding, at the market, etc.

Round bamboo cage



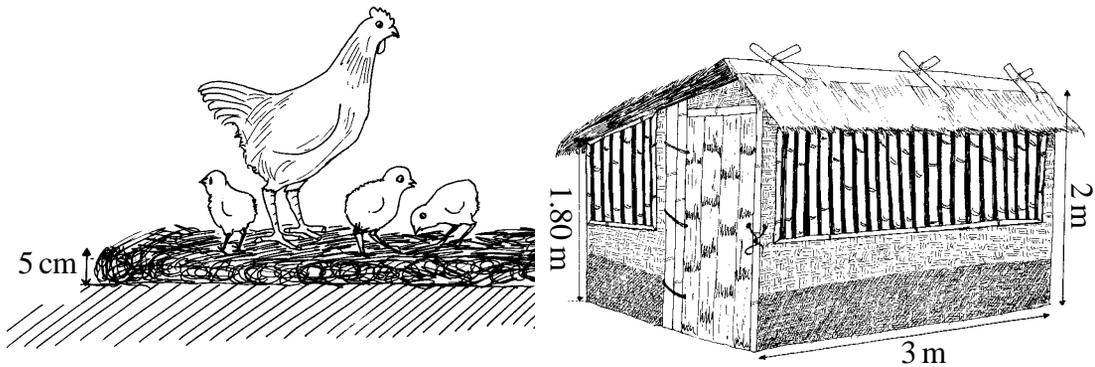
Tethered and with a roof





1. Housing with earth floor and litter

For chickens to be productive, they need good housing containing feeders, drinkers, nests, roosts or perches and litter. The litter (5 cm) can be made from dried chopped grass, sawdust, crushed maize cobs, rice husks. etc.



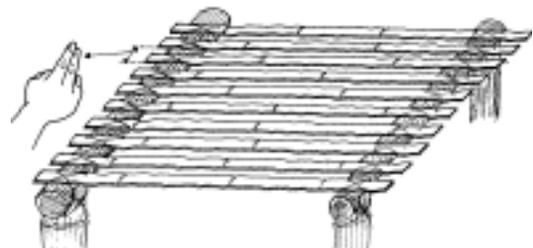
2. Housing on stilts and slatted floor



This type of housing is an alternative to the earth floor with litter. The house is on stilts with slatted floor of wood or bamboo (1 cm thick bamboo sticks, with 1-2 cm space in between). The space under the house, where the manure falls, must be fenced so that the chicken cannot go there.

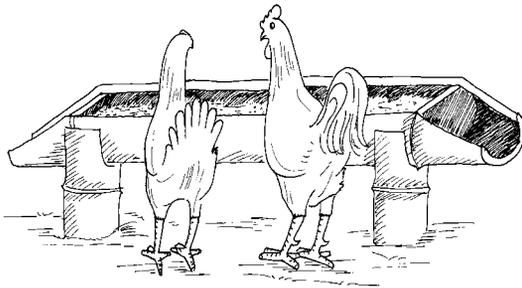
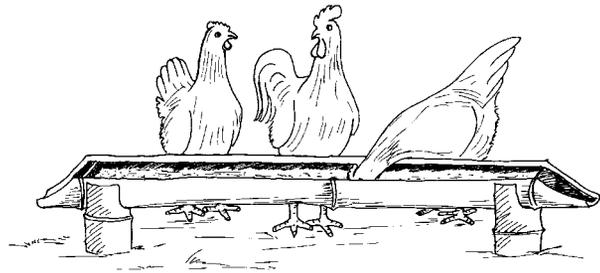
Advantages are:

- Better protected against predators like snakes, rats, etc.
- Little contact with manure (source of parasites and diseases like coccidiosis).
- No need for litter thus saving labor.
- Better ventilation and cleaner air.



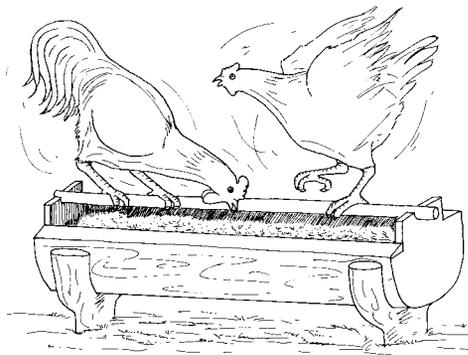
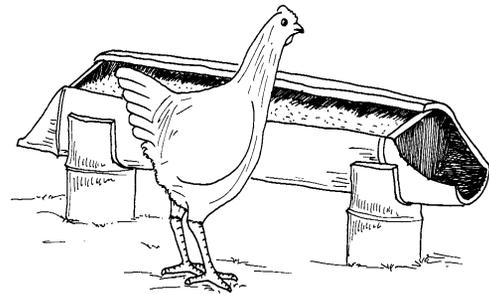
3. Feeders

A good feeder should be able to feed all your chickens with ease (i.e. there should be 6-8 cms of space per chicken).



A good feeder should be able to adjust to the size of the chickens (adjustable with stones/timber, height of the hanging wire).

A good feeder should not allow any wastage. To prevent wastage, lips should measure 2 cm. A good feeder should keep chickens out otherwise they will soil or waste the feed.



A good feeder should not tip over.

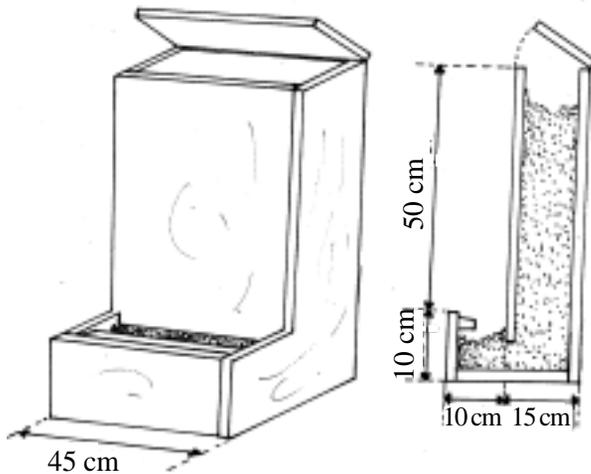
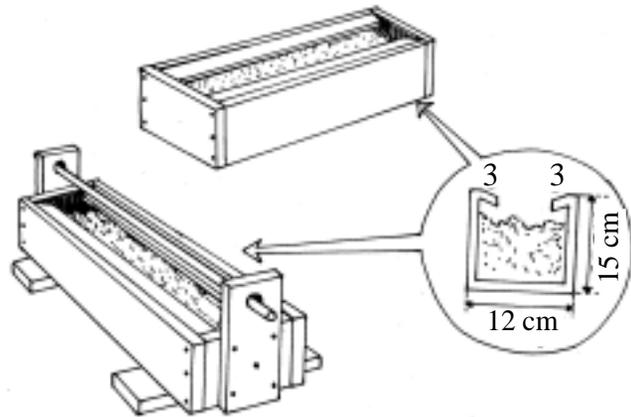
A good feeder can be made out of any material (like a piece of old tyre) as long as the above-mentioned principles have been met.





Other types of feeders:

Feeders made of wood, with lips to reduce spilling.



A feeder for many chickens (not recommended in places infested with rats).

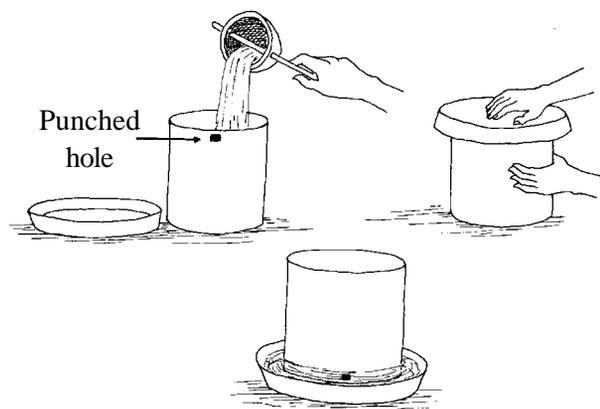
Advantages of a good feeder:

- The feed does not get dirty (spoiled).
- There is no wastage of feed.
- Reduced risk of disease.
- Saves labor (continuous feeding).

4. Drinkers

Drinking water is essential for chickens regardless of whether they are kept inside a house or are scavenging outside. In dry, hot climates, chickens may consume twice as much water than they do in high land areas. Therefore, watch the water consumption carefully. Never allow chickens to run out of clean water. Good, fresh drinking water keeps your chickens healthy and increases egg production.

The simplest drinker is a tin can inverted on a pie plate, with a punched hole about 2 cm from the open end of the tin can. Fill the can with water and cover it with the plate. With one hand on the plate and one on the tin can, quickly invert both. The position of the punched hole and the vacuum in the tin can will regulate the water level in the plate. A weight (like a stone) on the can prevents chickens from tipping the can.





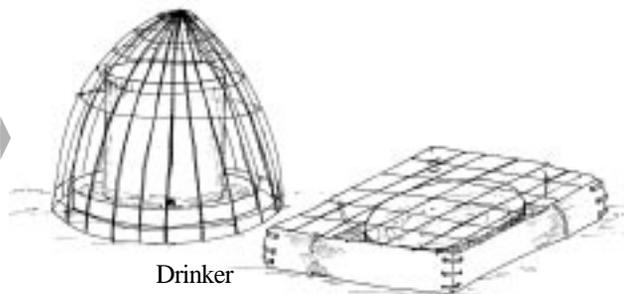
◀ A good drinker should be easy to clean and can be made out of anything.

A good drinker should not spill water on the floor or allow young chicks to fall into it and drown. ▶



◀ A good drinker should be filled with fresh water daily. The height of a good drinker should be adjusted to the size of the chickens (adjustable with stones or timber)

▶ Birds should not be able to get in the drinkers. Better to cover the drinkers with wire.

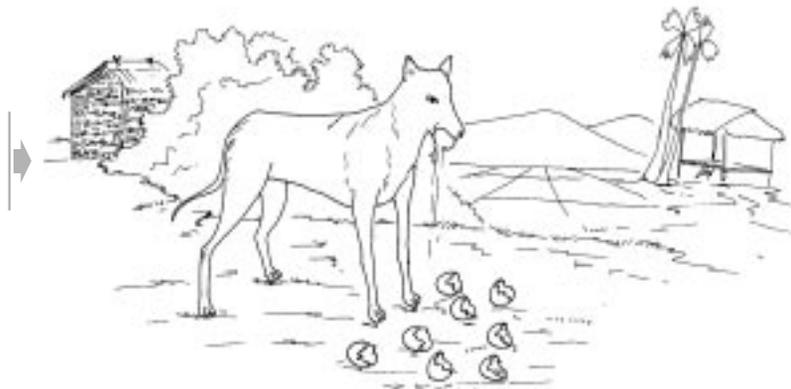




5. Nests

To save eggs from damage and being soiled, your chickens need a place to lay, brood and hatch their eggs. Having nests for your chickens means:

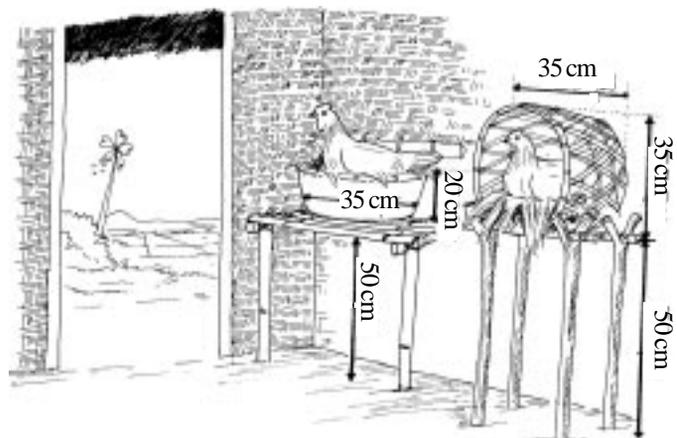
That eggs will no longer be laid just anywhere in the open where they get dirty or eaten by birds or other animals.



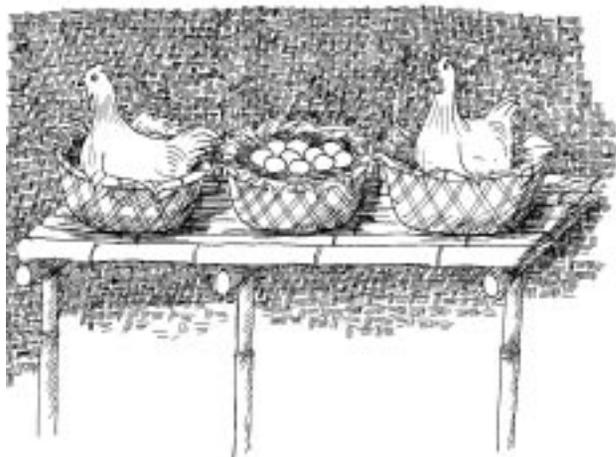
It will also mean that you will be able to collect more eggs. Your chickens will not be disturbed during laying thereby increasing the number of eggs.

With clean eggs in a nest you will get an increased number of chicks hatched. Your chickens will be protected against rain and cold nights - reduced risk of disease. A comfortable nest should give your chickens enough room to hatch comfortably (approx. 35 cm deep and wide).

Good nests should contain nesting material (chopped, dried grass or other dry soft material). A nest should be used only for laying and hatching (prevent chickens from entering when not in use). The nest should be in a dark corner of the house (no direct sunlight) and be raised 50-60 cm from the floor.



A nest should be available when your chickens start laying eggs (1 - 2 nests per 5 hens).



A comfortable nest can be made out of all kinds of materials. Providing nests for laying hens helps to keep eggs clean and reduces breakage. Sometimes baskets, reinforced with sun-baked clay on the outside, can be used for nests. Nests should be placed on the darkest side of the house, preferably where the sun will not reach the chickens. Line them with fresh litter and keep them clean. In hot climates, nests should be in a well ventilated, but draft-free place.

Nests should be made from cheap and easy to find materials. In case of disease or parasitism (such as lice) they should be burned.

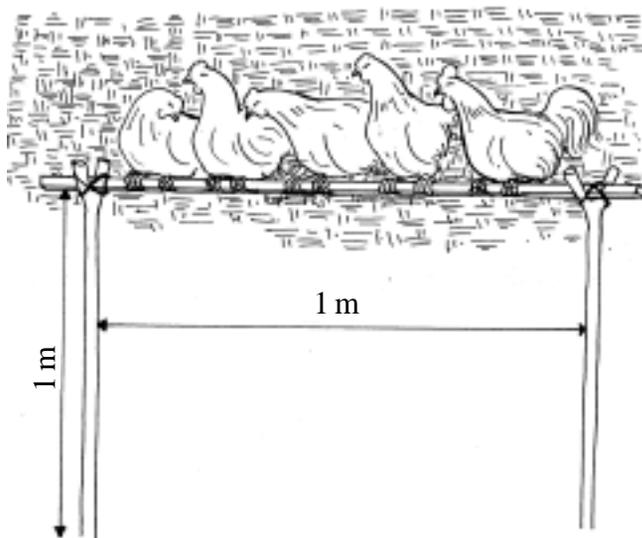
6. Roosts or perches

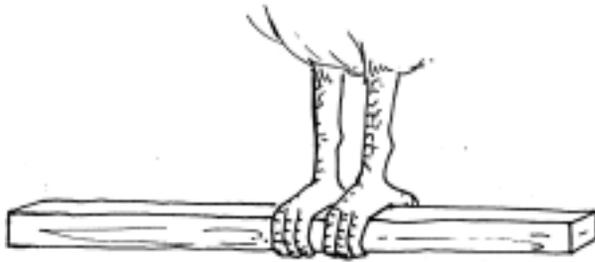
Chickens have a natural instinct for sleeping high in trees, where they feel protected against danger. To make your chickens feel comfortable, the chicken house should have perches to allow them to roost during the night.

Perches stop your chickens from sleeping in the nests, feeders or drinkers, so they do not get soiled during the night.

Perches that are a bit rectangular (4 by 2 cm) give chickens a better grip and more balance than round perches.

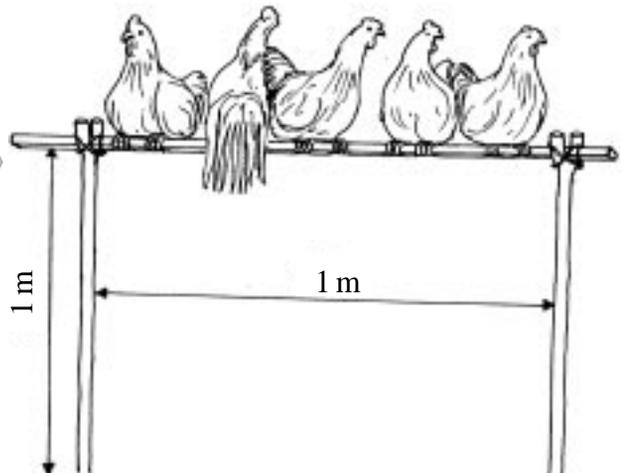
Good perches should be placed high up in the chicken house, higher than your nests (but not directly on top of these nests). To keep your chickens out of air currents, the perches should be around 1 meter high.





Good perches are thick or have edges (4 by 2 cm) allowing chickens to have a better grip with their feet than on small round perches.

Good perches should have space for all your chickens (20 cm per bird). The perch should be 1 meter high.



7. Litter



Litter is dry moisture-absorbing material which is spread on the floor (straw, hay, shredded paper, wood shavings, sawdust, rice husks, etc.). Litter absorbs chicken droppings and waste water from your drinkers.

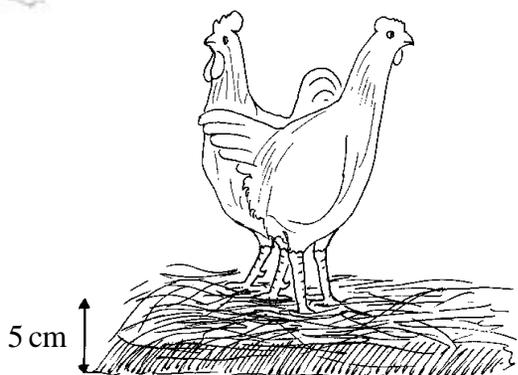
Litter reduces the risk of disease: this is particularly so for small chicks which are susceptible to cold, humidity and air currents.





Litter makes the floor of your shed easy to clean and reduces the risk of disease. Old litter is an excellent manure for your food crops.

A good layer of litter should be at least 5 cm thick.



Wet patches in the litter (leakage, waste water) should be removed immediately and replaced. All the litter should be removed, the floor cleaned, and fresh litter put down at least twice a year.

When the housing is on stilts with a slatted floor, the underside must not be accessible to the chickens. They must not come and eat in the droppings and spread disease. The litter should be removed regularly and put on the gardens to fertilize the plants.





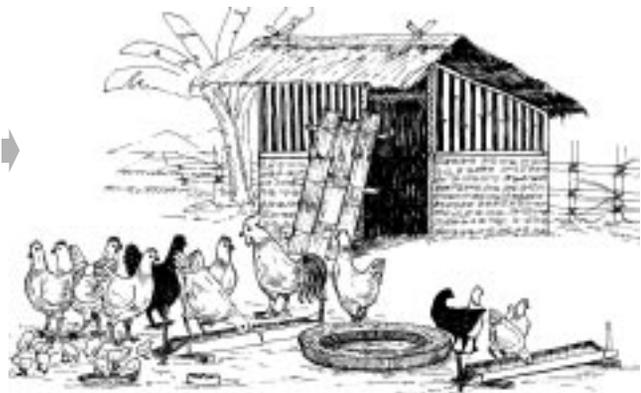
1. Improving poultry production

In other chapters ways of improving local poultry management (improved housing, feeding, health care, etc.) are presented. If these suggestions are carried out, the number of chickens will increase.



Example: Before following these suggestions, the farmer had 4 hens, 2 cocks and 3 chicks.

Example: After following these suggestions, the farmer has a productive flock of 8 hens, 1 cock, 4 growers and 10 chicks.



The next step for farmers is to improve flock management. Flock management means that farmers keep a limited number of productive hens and cocks as a breeding flock. This breeding flock will provide an increased number of eggs and chicks.

The size of the breeding flock will depend on:

- The quantity of feed farmers can give to their chickens. To get a good production farmers have to provide chickens with good quality feed.
- The size of the chicken house: the farmer should prevent overcrowding.
- The quantity of eggs and chickens for sale or consumption.

This means that farmers should start **planning** their poultry production.



To obtain a good breeding flock, farmers should start selecting their hens and cocks. Selection means the separation of productive hens and well-sized, active cocks. The remaining birds should be sold as soon as they have attained a proper size. Timely culling of mature chickens, especially cocks, is important as the feed that these unproductive chickens eat can better be eaten by chickens that grow or lay eggs.

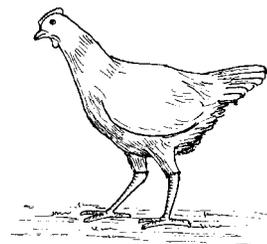
A farmer selecting her chickens to remain as a part of her productive flock.



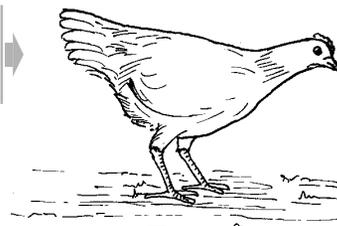
A farmer selling her unproductive hens and her surplus of cocks.

It is important to select from all the chickens; this is equally important for different types of chicken breeds.

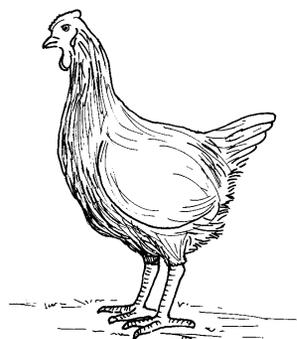
Local hen



Crossbreed hen



Pure breed

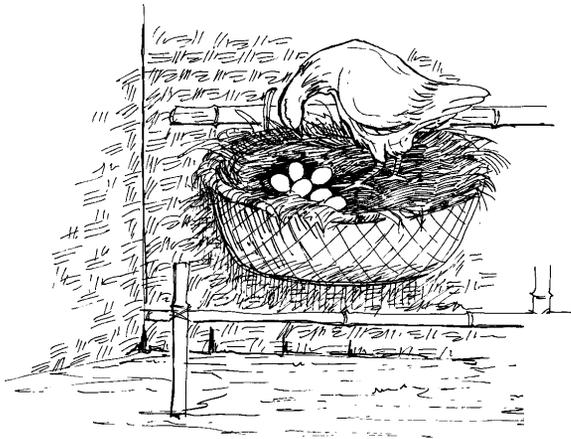


Good selection involves four steps: selecting the hatching eggs, selecting the growers (pullets), selecting the productive hens and selecting the breeding cocks.



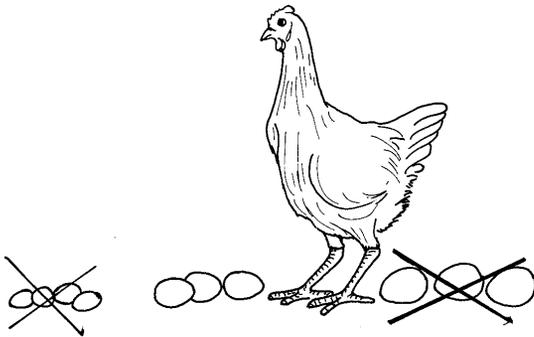
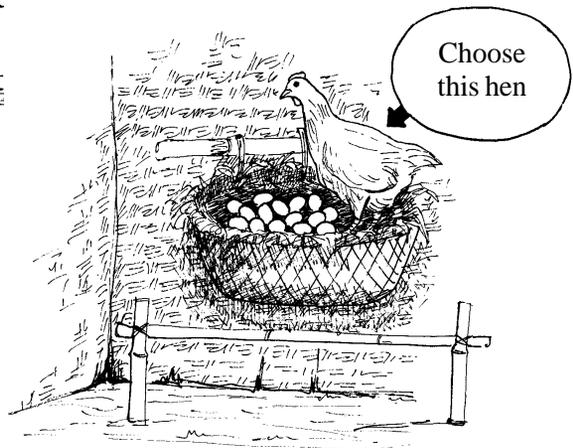
2. Step 1: the choice of good hatching eggs

- Good hatching eggs should be chosen from good producing hens.



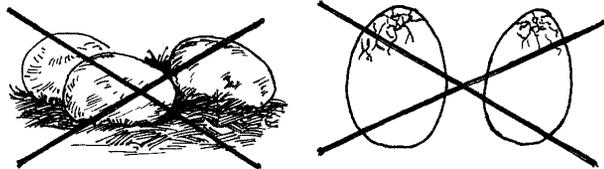
← *Hen with 6 eggs.*

Hen with 15 eggs. Choose this clutch as hatching eggs. →



← *Good hatching eggs should have a normal size.*

Good hatching eggs should not be dirty or damaged. →



- Good hatching eggs should not be too old. Use only eggs which are not more than 10 days old (better, not older than 1 week).
- Hatching eggs should be removed from the laying nest and be stored in a cool and dark place (best at 15 - 20 °C).

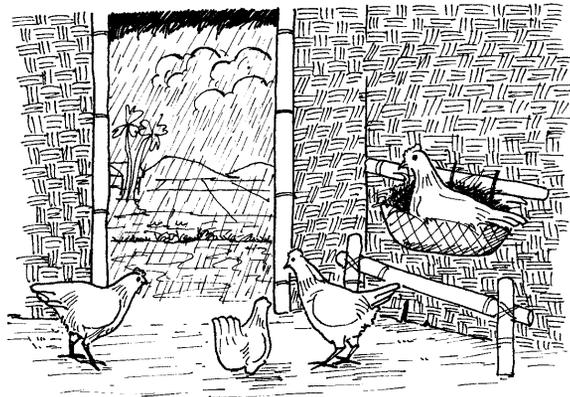


Remove the eggs from the nests and store them in a cool place.

After the farmer has selected her eggs, she should equally select a good broody hen to hatch the eggs. The other hens can continue laying eggs.

- Select broody hens that have shown good brooding qualities. Likely these are older hens that have hatched before with good results.
- The hen should be free of fleas or other external parasites (suggestion: put some tobacco leaves in the hatching nest).

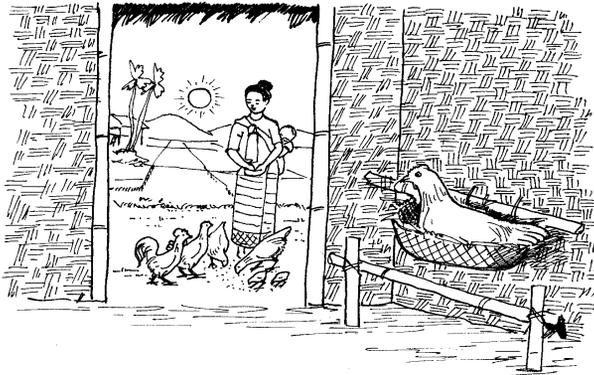
Equally important is the period of hatching. When the hens get broody at the start of the rainy season it is important that the newly hatched chicks are protected from the rain. They should stay indoors being fed a good home-made ration and only be let out during sunny periods.



A clutch of 10 chicks in the rains. Soon 7 are dead because of cool, wet conditions and lack of feed.



It is better for farmers to choose the end of the rainy season as hatching period. As a result they will be able to raise more chicks because of better feed and improved climatic conditions.



The hen is brooding and the rice is being harvested. Sunny and dry conditions.

As a result of good climate conditions, only 2 chicks have died. With good management, no chicks should die.

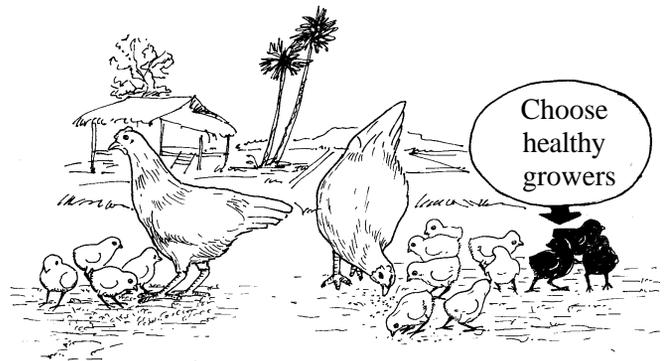


Good brooding management (good feeding and a warm, dry place) and vaccination against Newcastle Disease, will keep mortality low and produce a good number of growers (chickens aged between 8 - 20 weeks).

3. Step 2: selecting grower females (pullets)

After about 17 weeks the second selection step has to take place, preferably at a time when the offspring has reached a good size. The selection criteria are the following:

- When possible, select the off-spring growers from good producing hens. You need to consider this when you select the hatching eggs. The potential for good egg production is transmitted from mother to daughter.



One hen with 4 chicks

One hen with 10 chicks



Three selected growers and 12 unselected growers.



- Choose fast growing, healthy females.



Ten growers of various sizes, 3 big ones.

- Select females that search continuously, far and wide, for food.

Five hens chatting and being lazy in the sun, 1 searching actively for feed.



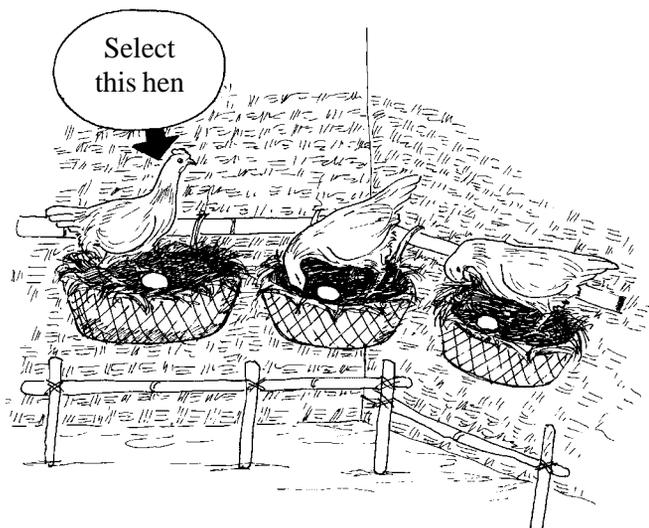


After having separated selected growers, the farmer should sell the remaining, un-selected birds. The farmer should realise once more that production will be dependent on the amount and quality of feed provided. The farmer should consider supplementing future hens with small quantities of commercial feed.

4. Step 3: selecting productive hens

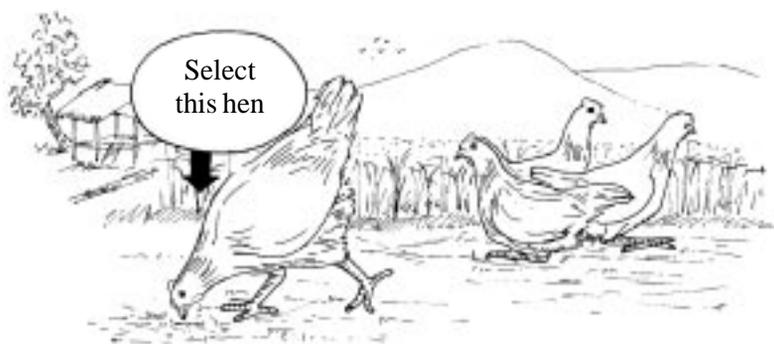
The third step in selection is the choice of good producing hens. In general, the farmer should realise that hens produce the most eggs during the first 1.5 years of life. This means that hens kept for producing eggs, should be replaced after 1.5 years by their female offspring. The replacement stock should be selected from older hens that are productive and have good hatching qualities.

- Select hens that start laying early.



First egg produced after 24 weeks, 26 weeks and 28 weeks.

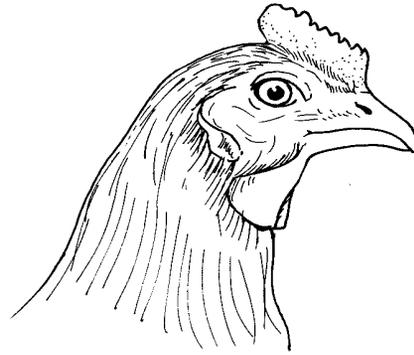
- Select active hens that look continuously far and wide for feed. You can distinguish them because they will have a strong, short beak and short toenails because of scavenging.



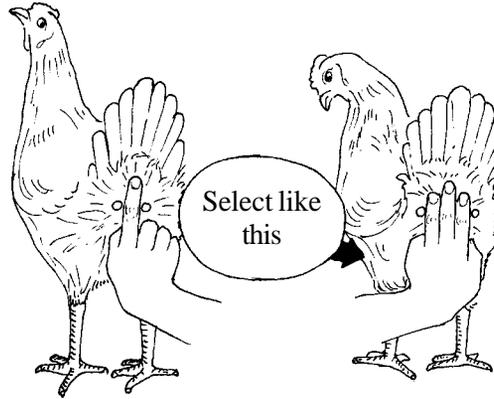
1 hen scavenging

3 hens chatting

- Select hens with a bright red comb and wattles and with bright, alert eyes.



- Make sure that your hens are producing eggs regularly. This can be done by measuring the space between the laying (pelvic) bones. For productive hens the distance should be at least two to three fingers. Also watch the nests for productive hens.



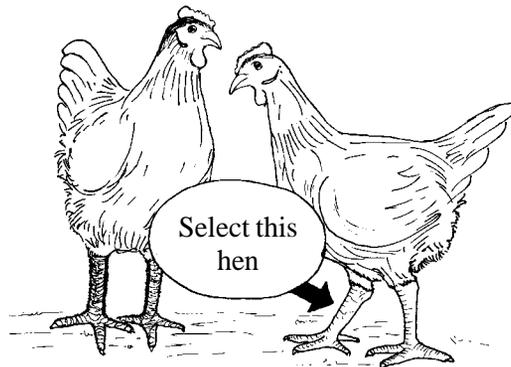
One finger

Two to three fingers

- Select hens with a clean, soft and large vent (cloacal opening).



- Select hens that have healthy legs (no mites under the scales).

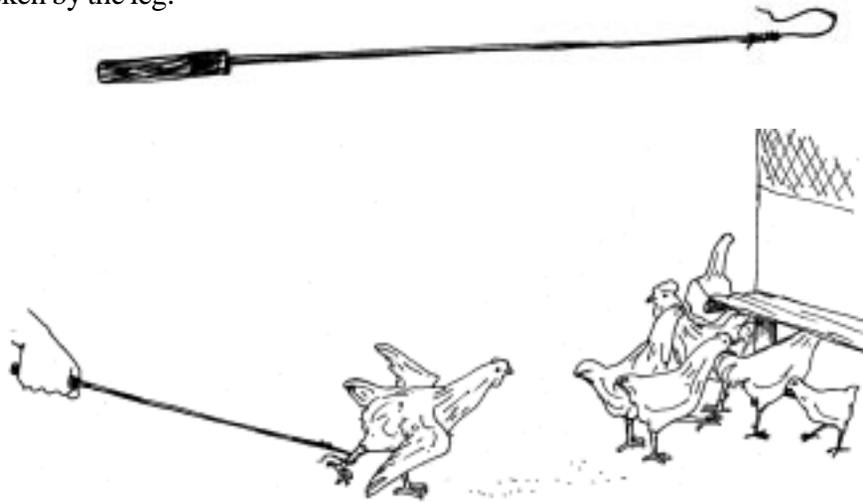


Hen with rough legs

Hen with healthy legs



Good hens may look a bit dirty and pale because of the laying of many eggs or taking care of their clutch. A culling hook can be used to catch chickens for examination. The hook catches the chicken by the leg.

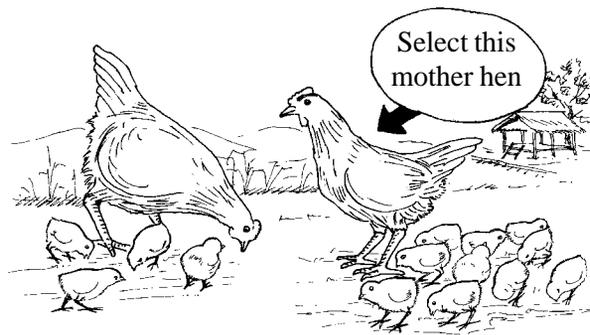


Catching a chicken with a culling hook.

5. Step 4: selecting breeding cocks

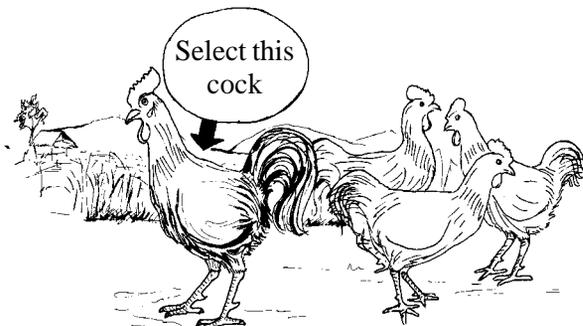
Apart from selecting productive hens, the choice of a good cock for breeding is equally important.

- When possible select a cock from a good producing hen. The potential for increased egg production is also transmitted by the father.

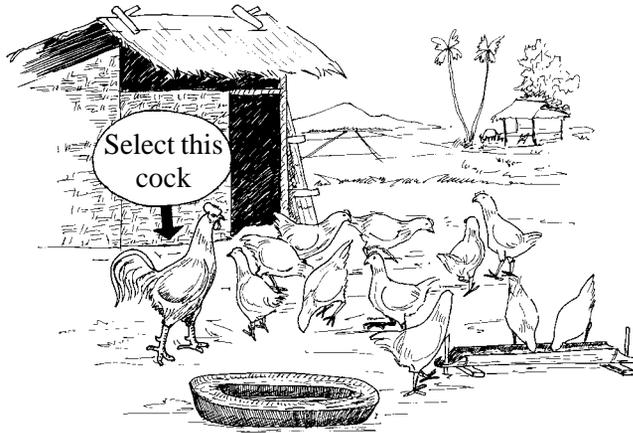


Hen with 4 chicks

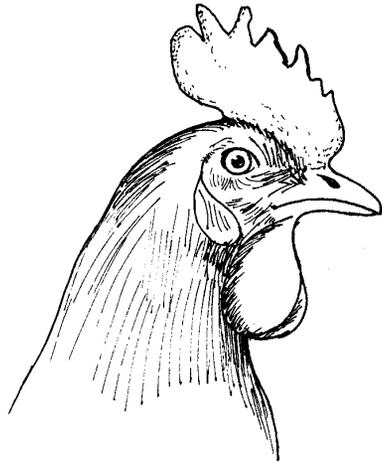
Hen with 10 chicks



- Select a fast growing cock.



- Select a cock with bright, alert eyes and large red comb and wattles.
- Select a cock that goes after the hens.



Cock idling in the sun.

Cock chasing hens.



Apart from selecting a good cock (rooster), the farmer should realise the importance of changing the cock regularly to prevent inbreeding. Everybody knows that it is not good to cross a father cock with daughter hens. Inbreeding leads to:

- poor egg production,
- weaker offspring and therefore more susceptible to diseases and higher mortality,
- poor fertility and poor hatchability,
- deformed offspring.

Remark

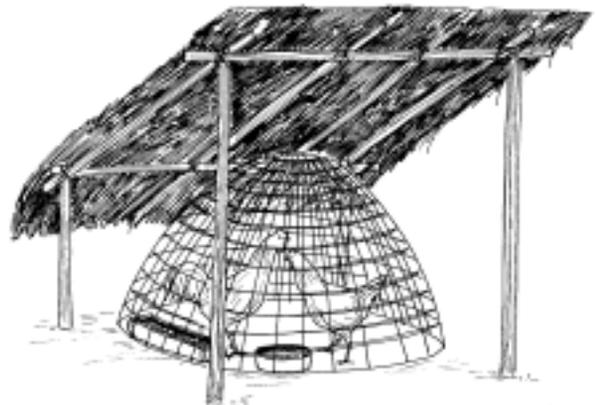
- If farmers are serious about having a good breeding flock then they should change their cocks with every new generation.
- For indigenous cocks it means that they should exchange their cock with a cock of neighbouring farms.



When farmers have hybrid chickens (or an improved breed), they should exchange or replace their own cock with another hybrid or improved cock from another farmer.

When bringing in a new hen or cock, always keep them for two weeks in a separate coop (quarantine) to see that they are free from disease. You can put one of your chickens with it to see if it develops a disease.

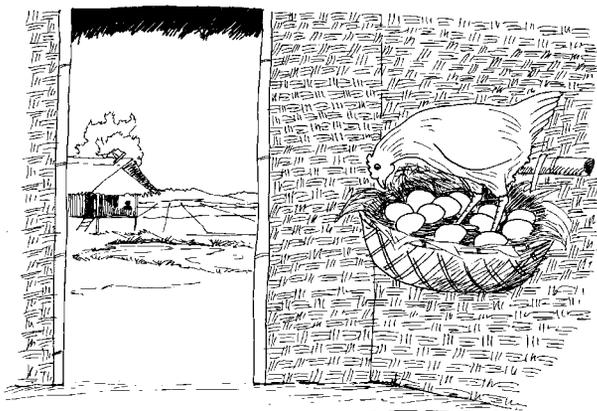
Always quarantine and vaccinate incoming animals.





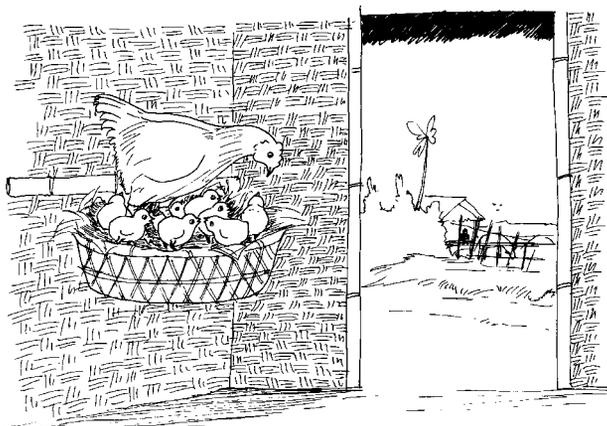
1. Improved hatching management

With improved hatching management, more chicks will come out of the total number of eggs the hen started to brood and hatch.



The number of eggs produced and the number of chicks hatched depends on:

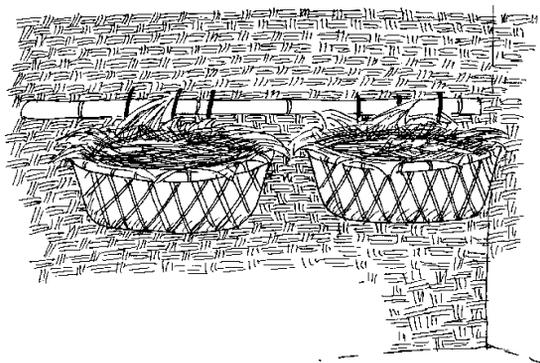
- The quality and the quantity of feed provided to the chicken.
- The cock: hen ratio. To make sure that the eggs are fertile, not more than 10 hens should be served by 1 cock. If the farmer has more than 10 hens, another cock should be added.
- The laying, brooding and hatching place.
- The way the eggs are stored during the period the hen is producing eggs.
- The age of the eggs given to the hen for hatching.

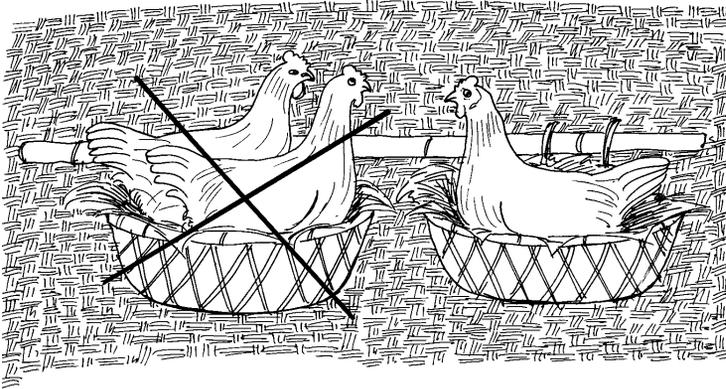


Increasing the number of eggs produced means that the hen has to be provided with good chicken feed.

Ensure that your chicken has a proper nest to produce the eggs. A proper nest means:

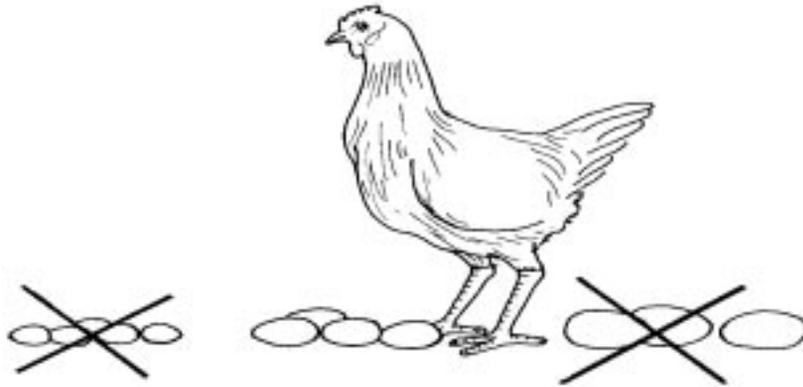
- The nest should be placed in a dark, quiet corner of your chicken house.
- The nest should be clean and sun-dried before the hen starts producing eggs.
- The nest should contain nesting material (dried cut grass, saw dust etc.) to prevent eggs being damaged or getting dirty.





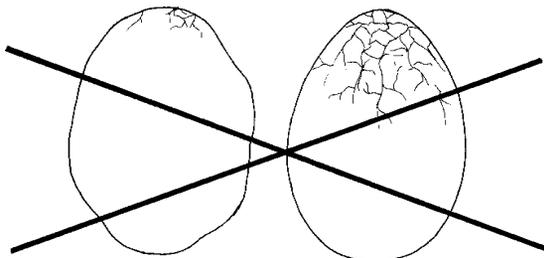
If a number of hens are laying and brooding, provide a nest for each of them.

To increase the possibility of successful hatching, the eggs should be selected. Do not use eggs for hatching purposes which are:

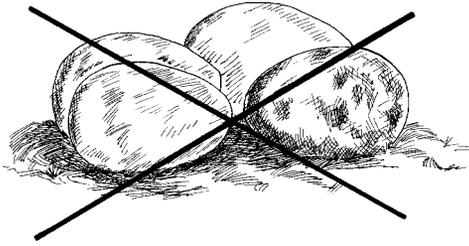


- **too small;** below 45 grams (these eggs might be without a yolk)
- **normal;** 45 - 70 grams = good
- **too big;** over 70 grams (these eggs might contain two yolks)

Do not use eggs for hatching purposes which:



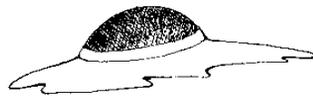
- Show any damage on the shell (cracked or deformed).



- Very dirty (covered with chicken droppings etc.) or eggs which are found on the floor or outside the chicken house.
- Too old (more than 10 days).

Select only those eggs which are clean and uniform in size.

When you open an egg, a bad egg looks flat or very flat, while a good egg is round.



Good quality egg



Bad quality egg

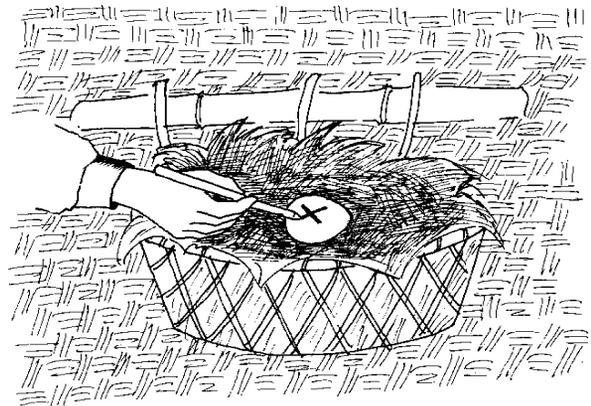


Very bad quality egg

When your hens are laying, it is important to collect the eggs frequently and regularly (especially in the morning when most of the eggs are laid). Store them in a specific place. In this way you increase the chance of obtaining chicks and you reduce the risk that the eggs:

- will be damaged,
- get dirty,
- become too old.

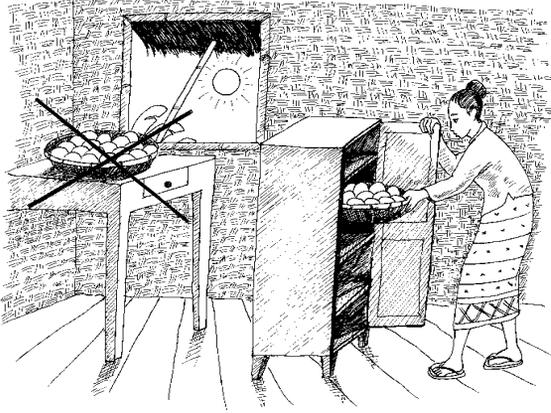
For the sake of encouraging your hen to make use of the laying nest, leave only one egg in each nest. To be sure you leave the same egg, mark this egg with a pencil (a pencil mark does not spoil the egg).



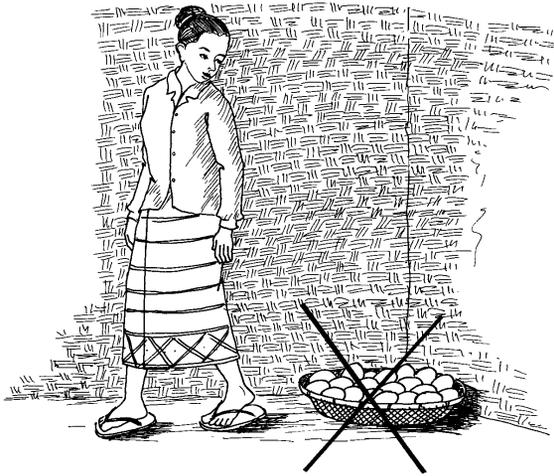
Your eggs should be stored properly.

- Store your eggs in a cool and dark place. The cooler the place (best between 15 - 20 °C), the longer you can store your eggs.

To increase the possibility of successful hatching:

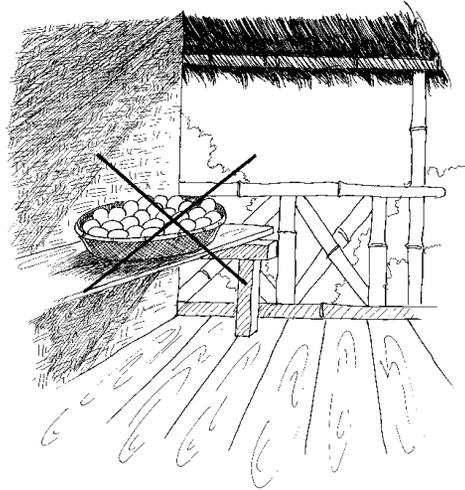


← *Ensure that no direct sunlight falls on the eggs.*

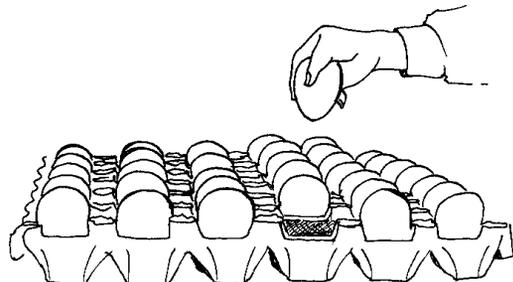


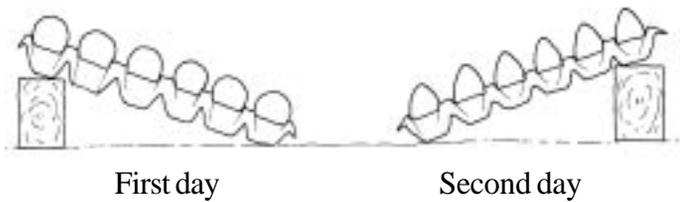
← *Never store your eggs on the floor.*

Prevent draughts in the place where you store the eggs. →



- Store your eggs with the pointed side downwards. In this way the air cell of the egg is upwards. To achieve this you could use an egg tray.





When you have to store eggs for one week, you should turn them upside down every day. Turning can be done as shown in the left drawing.



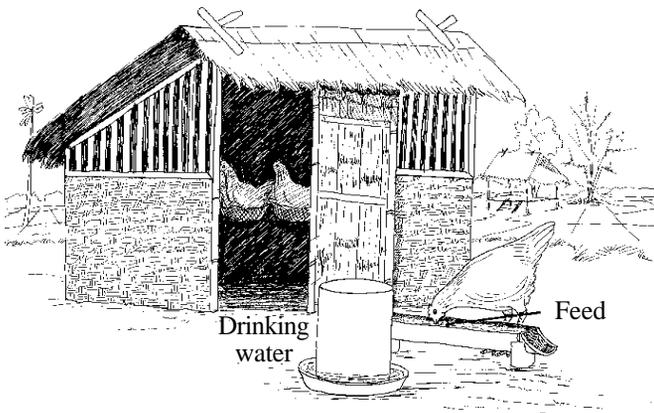
Clean the eggs well before storage. Do not wash eggs; washed eggs are unlikely to produce chicks. Very dirty eggs and eggs from the floor are not kept for hatching. You can distinguish stored eggs from different hens by marking them with a pencil!

The maximum period for storing eggs, depends on the way the eggs are stored and the outside temperature. The cooler the region, the longer you can store eggs without spoiling. As an indication, eggs can be stored up to 7-10 days, afterwards the chance of obtaining chicks will be reduced.

2. The brooding and hatching period

When your hen gets broody (starts sitting on the eggs) give her the eggs you have stored. Not more than fifteen eggs. The hatching period will be 21 days.

Feed her well during this period, separately from your other chickens (feeder and drinker close to the nest). Doing this means that your hen:

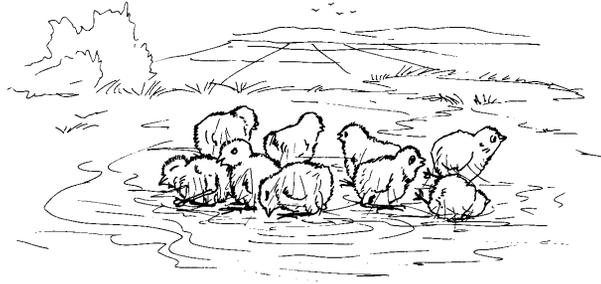


- Will take good care of her brooding and hatching duties (no need to go far looking for food).
- Will remain in a good condition. After her brooding and hatching duties have finished, she will be able to produce eggs again quickly.

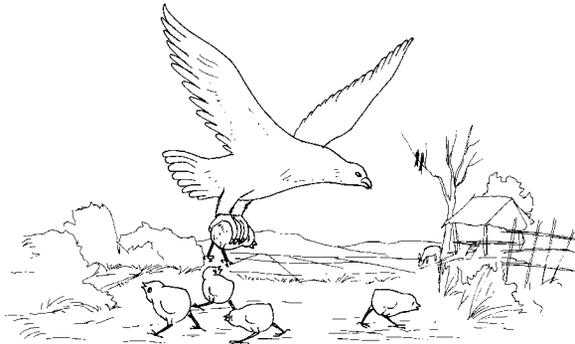
3. The initial rearing period

The term "broody period" or "broody hen" covers not only the period when the hen is actually sitting on her eggs, but also the first few weeks when she is taking great care of her chicks (the initial rearing period). Many young chicks die during the first 4 weeks of their life and the main causes of mortality are:

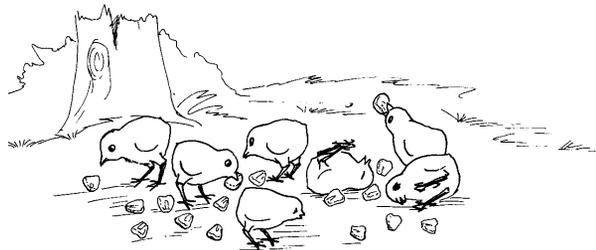
Cold and/or wet environment. Especially at night the young chicks need to be kept warm (30-31 °C).



The chicks are taken by predators.



Improper feeding.



Diseases (parasites and infections).

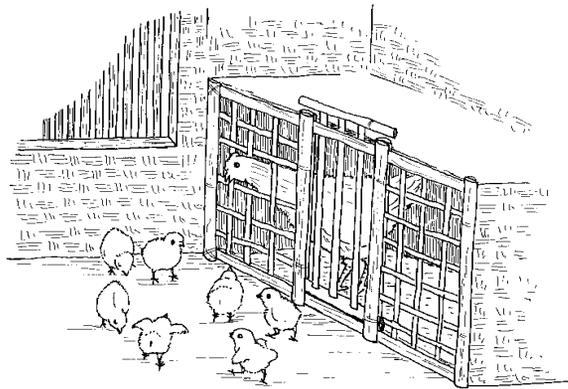
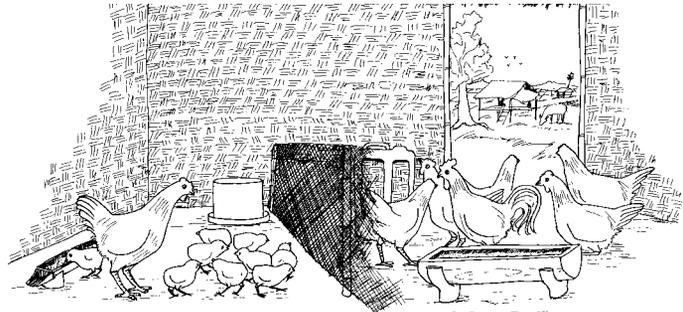




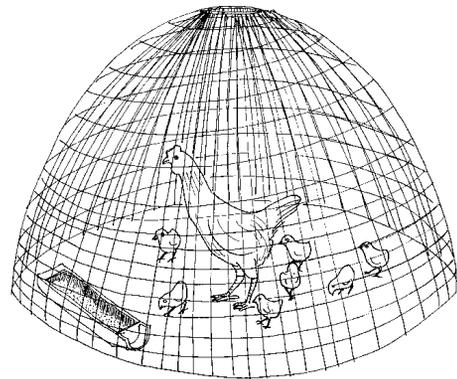
To reduce mortality during this initial period the farmer should confine the chicks together with the hen for at least four weeks in a so-called rearing pen.

A good rearing place means that:

The hen and chicks are separated from the other chickens.

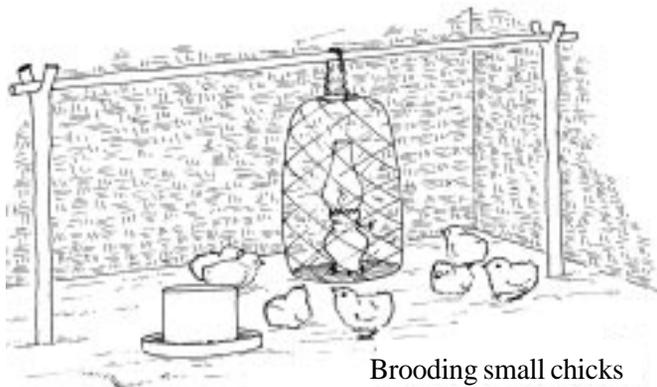


Extra care and feeding for hen and chicks.



Hen and chicks in cage with water and feed.

- the pen is well protected against rain, wind and draught,
- if cold, extra heat should be given,
- the floor is covered with fresh litter (sawdust, wood-shaving, crushed maize cobs, etc),
- the pen prevents predators (cats, mongoose etc.) from entering,
- day-light enters the pen,
- the space is big enough to allow hen and chicks to walk around.

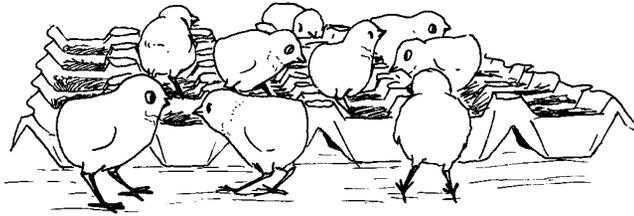


Brooding small chicks

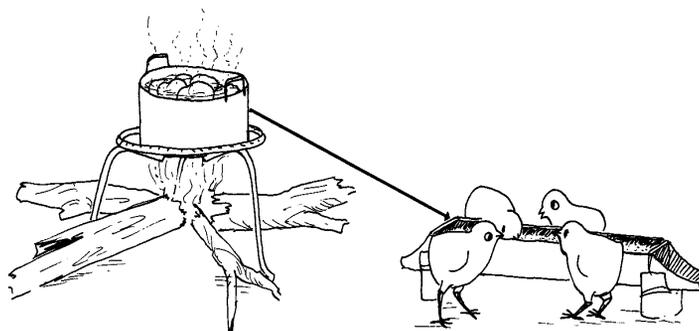
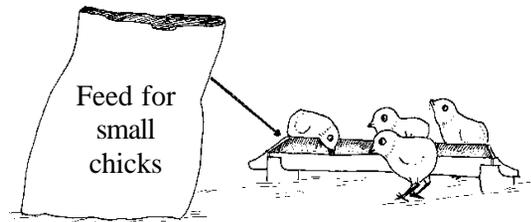
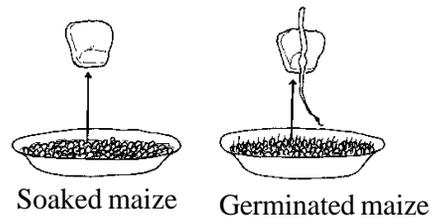
The hen should stay with her chicks to provide them with warmth and shelter. If the sun is shining you can allow mother and chicks to go out for a short while. Feeding and fresh water are very important during the initial period. Do not forget: the more attention to good feeding, the better the chances your chicks will stay alive and grow to be healthy and big.

4. Feeding suggestions

- Chicks should have fresh water from the beginning and it should be available at all times.
- For the first 3 days give feed for the chicks on an old newspaper, piece of iron-sheet or timber, old egg tray etc. It makes it easier for your chicks to find the feed. After this period you should provide the feed in a proper feeder adjustable to the size of your chicks.



- Crush your grains (maize, sorghum, millet) before giving it to your chicks.
- Do not feed one sort of grain only. Provide a mixture of different sorts or alternate.
- Soak your grains (maize, sorghum).
- If possible, buy a small quantity of commercial chick feed to supplement the feed for your chicks. When you do not want the hen to eat it, leave her out for a while.
- Various sorts of beans (green gram, cow pea, pigeon pea, local beans, etc.) provide essential feed ingredients for chicks. If you prepare them for the family, crush some for your chicks as well.
- Kitchen leftovers (cooked potatoes, sweet potatoes, cassava, etc.) are valuable for giving to your chicks. Take away the remainder daily.
- Make sure that your chicks cannot fall and drown in the drinker you have given them.





5. Vaccination

Ask your Village Veterinary Worker (VW) to vaccinate your chicks against Newcastle Disease. In order to reduce the costs of the vaccination, ask your neighbours to vaccinate their young chicks as well. When you vaccinate your young chicks, vaccinate your other chickens at the same time.

6. Two stories

To conclude here are two farmers experiences which may be useful for you.

a. A lady farmer in Luang Prabang successfully hatched 125 chicks at the same time. Here is her story: “First I took part in a cockerel exchange programme. Then I was lucky enough to get 15 offspring pullets of approximately the same age. When the offspring were about 4 months old, and because I wanted to prevent inbreeding, I exchanged my cock for another. I wanted to get as many chicks as possible at the same time. In order to achieve this, I started to trick my hens as soon as they started producing eggs. First of all, I left a single marked egg in each hen's nest. The other eggs I stored in a dark and cool place. After 10 days, when the first hen became broody, I gave her only the marked egg to hatch. After a few days, a second hen became broody, and I gave her a single marked egg to hatch. After 10 days I had 10 broody hens, each sitting on only one egg. Then I gave them all the eggs I had stored. So I had 10 hens hatching on 130 eggs. Of these 125 hatched, so I had 125 chicks all born within a few days of each other. I kept them for 3 months, then I sold them in one batch and with the proceeds I was able to buy 50 commercial layer chicks and the necessary feed for rearing.”

b. Another farmer in Luang Namtha has a different practice. Although his hens produce eggs throughout the year, he sells most of his eggs. He allows his hens to hatch the eggs only twice a year, just towards the end of the rainy season and at the early start of the rainy season. His reasoning is as follows: “When I have chicks during the dry season, there is hardly any available feed for them because nothing grows in the fields. I lose many due to improper feeding. When my chicks are hatched during the rainy season many of them die because of disease. The right time to have young chicks is when the rains have just ended or have just started, which means that there is enough for my chicks to eat while the risk of losing chicks through disease is much reduced.”

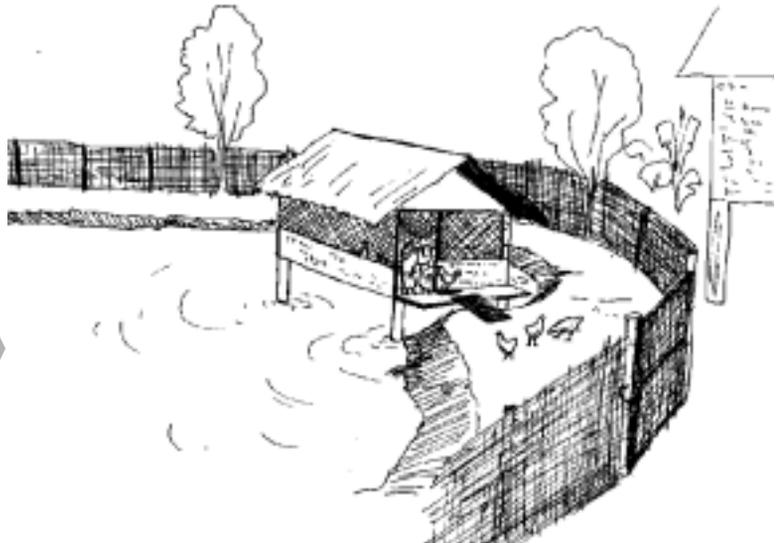




1. The parent-stock keeper

If you have reliable electricity and keep hens for reproductive purposes, you might wish to use an incubator. Your hens can then continue laying eggs instead of “wasting time” hatching these eggs.

Parent-stock keepers should have their poultry flock well apart from the village poultry.



In many villages, small-scale farmers do not vaccinate their birds regularly (or not at all). This means that diseases often occur, sometimes with high mortality. Vaccination gives the best protection when all farmers vaccinate their flocks. When only a few farmers vaccinate, then the disease can still spread to all birds in the village.

The parent-stock keeper should encourage the neighbours to vaccinate their flocks also to minimize disease outbreaks.



The parent-stock keeper should keep his/her expensive poultry flock well apart from the village flocks and the birds should be vaccinated according to the recommended schedules (see **Annex1**).

2. The use of a small incubator

This small incubator has 2 setting-trays (each with 144 eggs) and a hatching tray for 120 eggs. Small incubators have the setting and hatching trays in one compartment. Big incubators have separated compartments for incubating and hatching to achieve better hatching results.



The setting-trays keep the fertilized eggs from 0 till 18 days. The trays need to be turned regularly (at least once every 4 hours), manually or automatically. The temperature should be kept constant between 37.5 to 38.5 °C with a humidity of around 55%. It is advisable to put new eggs in batches in the incubator, like every 5 or 7 days.



Close to hatching, the eggs are moved from the setters to the hatching tray to stay from 18 till 21 days (till hatching). In big incubators with a separate hatching compartment, the humidity is increased to around 80%.





Eggs for hatching should be selected carefully. The shell should be clean, smooth with no cracks, of a normal shape and weighing 50–70 grams. The fertilized eggs should be kept cool (from 15 to 22 °C) and be not older than 10 days. Store the eggs with the large end up (pointed end down). See also chapter **Hatching and Brooding**.



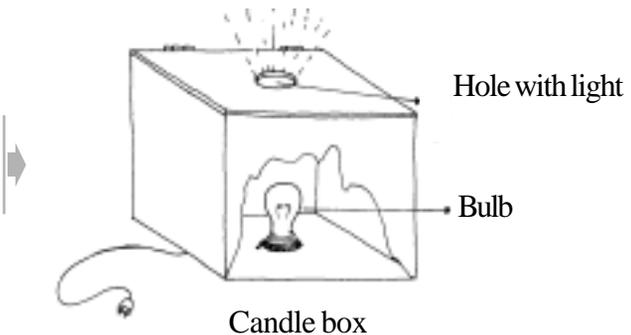
7 days - fertile 18 days - alive



7 days - infertile 18 days - dead

The eggs in the incubator need to be “candled” at 7 days to see if they are fertile. At 18 days, before being put into the hatchery tray, the eggs need to be candled again to see if the embryo is dead or alive. Fertilized eggs and eggs with living embryos have a sharp border-line between the egg and air-cell (the air-cell of a bad egg also becomes cloudy). This border-line can be seen easily by candling the eggs. Eggs that do not have a sharp border line should be taken out of the incubator.

The candle box with a bulb inside, shining through a hole to light and see through the egg-shell.





The development of a fertilized egg into a well developed embryo over a period of 21 days.

The hatching trays should be washed after every batch of hatched eggs and dried in the sun before replaced in the incubator. The whole incubator needs to be disinfected every 3 months with formaline and kept empty for a few days. This requires careful planning by the farmer. Do not store too many eggs and for too long when you can not use the incubator during that period.



Keep the incubator room clean and dispose of hatched egg-shells far away as they can spread diseases.

With selecting only good eggs, good hatching management (e.g. cleanliness and regular turning of the eggs) and an uninterrupted supply of electricity, the hatching percentage should be around 70% or more.

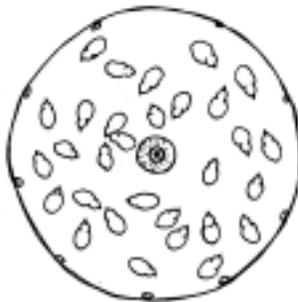


3. Brooding rings

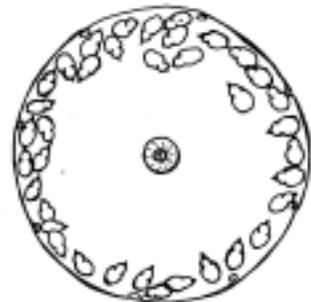
After hatching, the chicks need protection from cold and drafts. This can be arranged by keeping the chicks in brooder rings of 0.60 meter height with a heating source. Often electric light-bulbs are sufficient to supply enough warmth. During the first week the chicks need a temperature of around 30°C. During the second week the temperature should be decreased to around 26°C. The wall of the ring should be closed to avoid any draft and to keep the brooding area warm. Do not put the feeders and drinkers under the heating source. The litter material can be of wood shavings, rice hulls, chopped rice straw, etc.



Too Cold



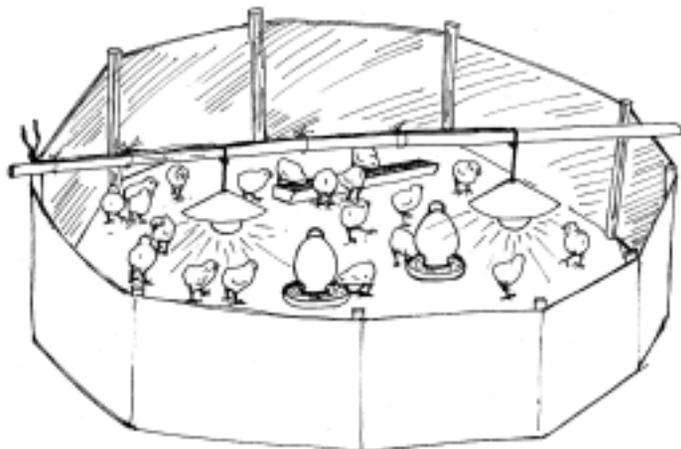
Just Right



Too Hot

Brooder temperature – top view of chicks distributed around the heater source.

Temperature can be controlled by putting more or less bulbs, or by hanging the bulbs higher or lower.



4. Sexing

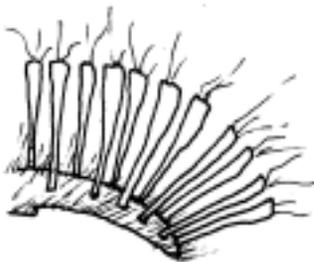
Young chicks can sometimes be sexed by color (males and females are of different colors) and sometimes on feather appearance (see below). Feather sexing is possible with the Yellow Chicken breed. Pure line sexing requires special skills and is based on the difference of appearance of the vent (cloaca). Or, just wait till the male and female characteristics appear, usually after 2-3 months.

Feather sexing needs skills that need to be learned. This method is best carried out when chicks are about six hours old. Hold the chick in one hand, legs downwards. Take the small wing and pull it out to observe the feathers as below.



Female:

The bottom (back) row of feathers is always longer than the top (front) row.



Male (type 1):

Both rows of feathers are the same length.



Male (type 2):

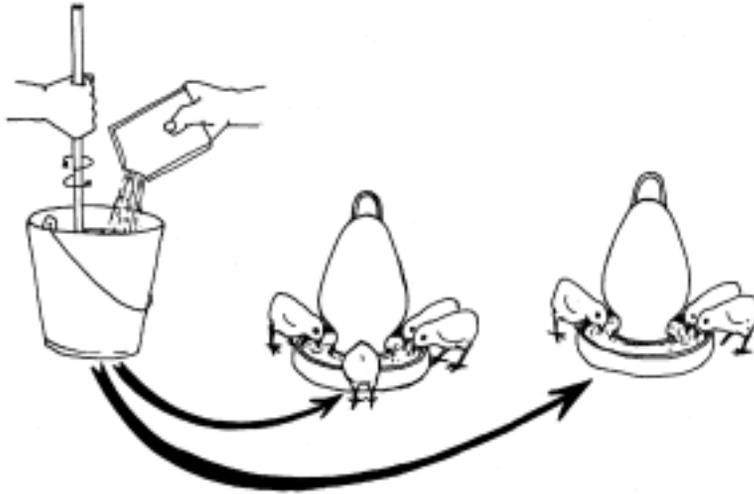
The bottom (back) row of feathers is shorter than the top (front) row.

Both male types can occur within the same chicken breed.



5. Health care of chicks

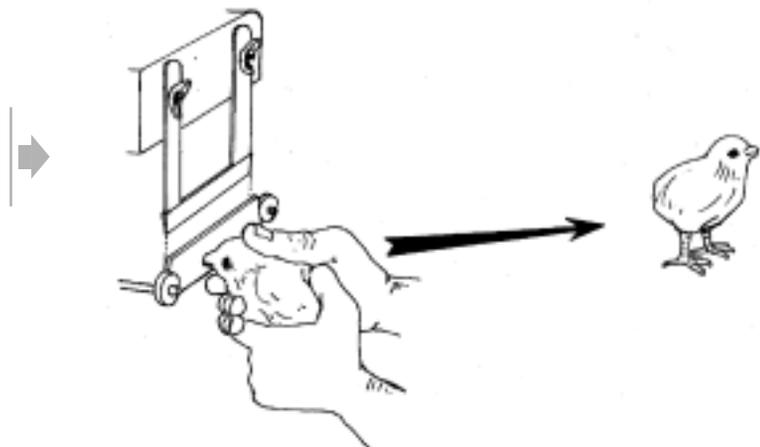
During the first three weeks the chicks need to be vaccinated against Newcastle Disease, Infectious Bronchitis and Fowl Pox, but preferably also against Mareck and Gumboro. See also **Annex 1: Vaccination schedule for poultry**.



Parent-stock keepers should keep available at all times supplies of antibiotics and coccidiostats for use in drinking water. As soon as chicks show first signs of disease, treatment should be initiated.

Parent-stock keepers should be encouraged to raise the chicks for 3 weeks. This will allow the chicks to receive the basic vaccinations and to grow strong to withstand the stress of transportation.

Sometimes chicks are de-beaked to prevent cannibalism in pens where many birds are kept.



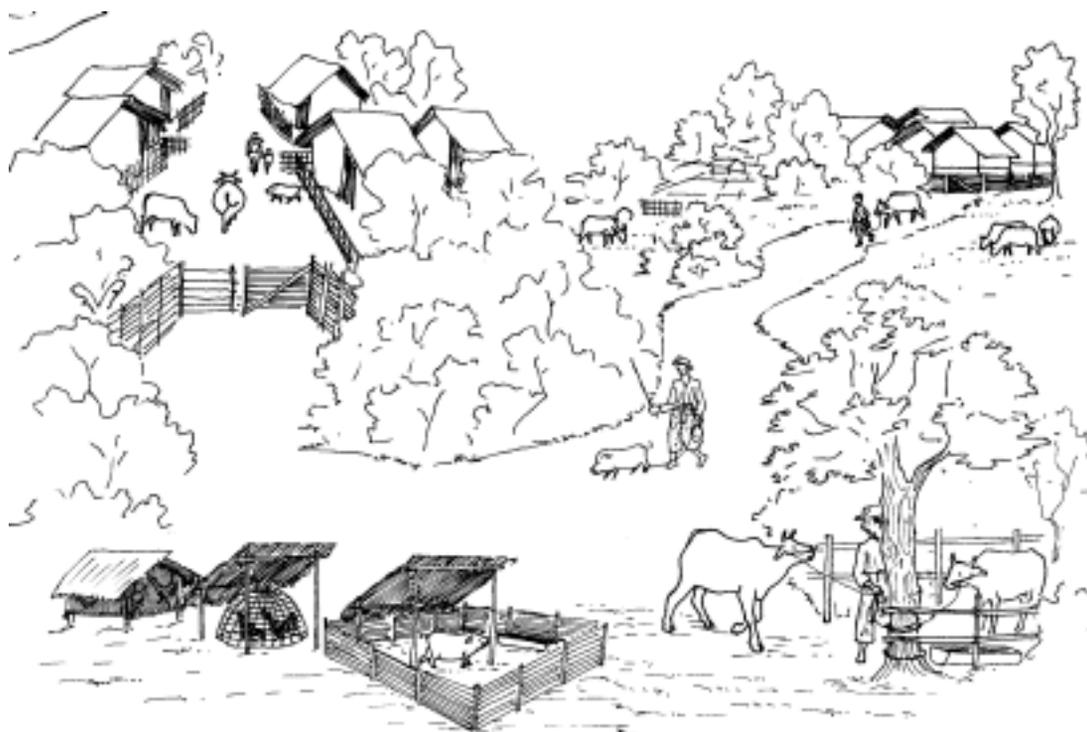


1. General animal health problems

Animal health problems can be classified into 4 groups:

- **Nutritional:** Good food in sufficient quantities at all times will avoid this problem. Lack of feed will make the chickens weak and susceptible to diseases.
- **Poisoning:** If chickens eat rat poison, fertilizer, weed killer or insecticide they can die from poisoning.
- **Infectious:** Animals become sick and some diseases can cause death. Diseases are caused by germs that are too small to be seen by the naked eye. The signs of the disease can be seen in the sick animal and in the organs after its death. Sick chickens can easily pass on the disease to healthy chickens living closely together.
- **Parasitic:** Parasites alone seldom kill birds, but sick birds grow slowly and do not seem in good health. In many cases parasites can be found inside or outside the body (worms, lice) or in the pen (blood-mites suck blood from the chickens at night and hide during day-time under the perches and slatted floors).

Village with livestock



2. Where do diseases come from?

Disease can be brought in by other animals, wild animals and birds, feed or by water and air. In some cases it can be brought in on the feet, clothes and body of people coming back from the market.



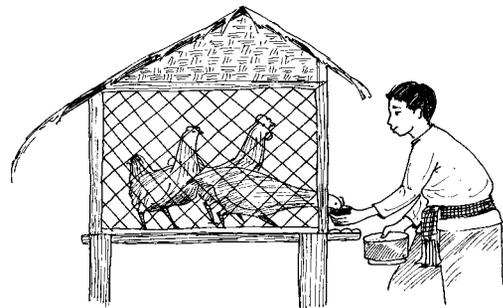
Infections can sometimes be passed on from the hen to the chicks through the egg. Some chickens can recover and show no sign of disease, but they still carry and spread the infection and cause other chickens to become ill and die.



3. How to avoid diseases

3.1. Good housing

The chicken should at least return “home” at night for checking, protection and supplementary feeding. The floor must be cleaned often. Chickens should have as little contact as possible with faeces (preferably by the use of a slatted floor made of bamboo). There should be enough space in the chicken house for each chicken. Not too crowded; 4 to 6 adults per square meter.



3.2. Good nutrition

Chickens usually find enough food to survive, but they also need a feed supplement given by the owner. Food should be given regularly: every day at the same times, better twice a day. If the chickens come back only for the night, feed should be given after they come to the chicken house.





3.3. Keeping flocks apart

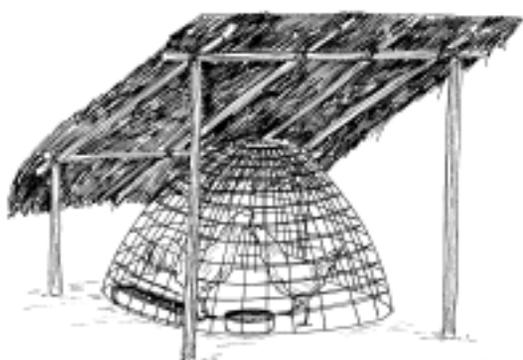
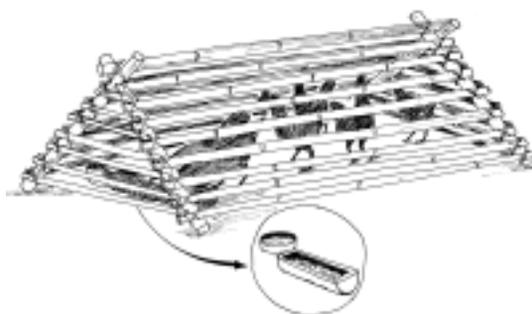


It is good to keep the birds of different households or different areas of the village apart and not in contact with each other. This will limit the mortalities in case of a disease outbreak.

← *One household with sick chickens and one household with healthy chickens.*

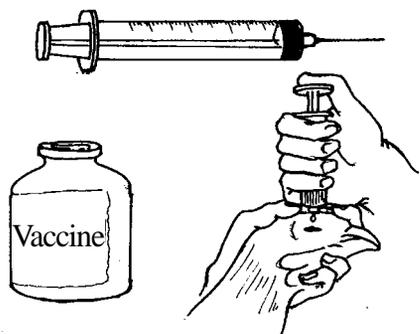
3.4. Quarantine housing

A newly bought chicken can carry a disease, but not yet show signs of disease. It can have been in contact with a sick chicken in the market or it can have caught a disease on the way to the village. It is better to keep new chickens separate (apart) from the rest of the flock for 2 weeks, in quarantine housing. During this period the disease will have time to show. It is also a good time to vaccinate and deworm the chickens.



A quarantine house should be small and simple because it will not keep many birds at the same time. It must be located as far as possible from the other birds in the village. The chickens should NOT go out of the house at any time during the quarantine period. You will have to give enough food and water and watch them carefully for signs of problems and diseases.

3.5. Vaccination and treatment



Birds can be vaccinated against important diseases and sometimes diseases can be controlled if they are seen very soon and action is taken rapidly. A sick animal does not have to be very sick to spread the disease. It is important to check the health, habits and appearance of the birds every day.

4. How to recognise a sick bird

Less activity; it does not run away; it eats less or stops eating; stays hidden. Abnormal movements; the feathers become ruffled or sticky.



Always observe chickens when you feed them, to see if any eats less than usual.



Loss of feathers, diarrhoea, blood in faeces, sneezing, difficult breathing, etc. are more specific signs which may indicate the type of the disease.

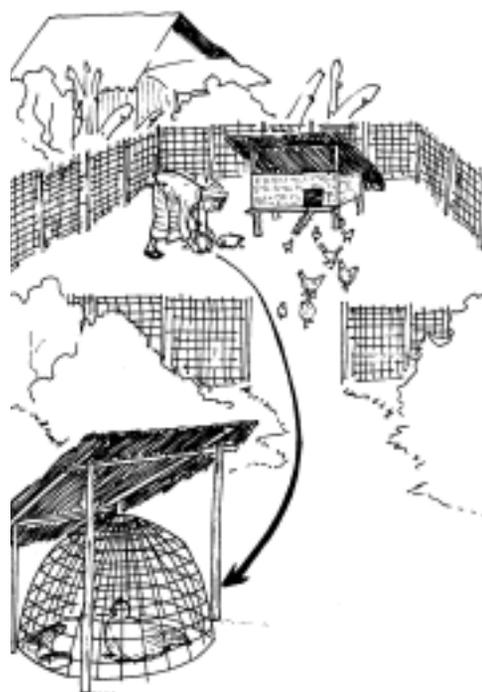


5. What to do when a chicken dies or is sick

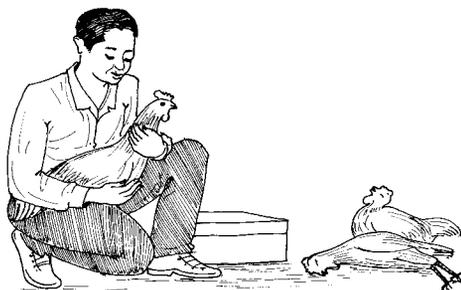
5.1. Quarantine

Birds that look unhealthy must be immediately removed from the flock. Observe the birds in quarantine and note their signs. After the outbreak (when chickens in quarantine have died), burn the whole quarantine house to eliminate any possible remaining source of the disease.

Do not give the left-over feed from sick chickens or from the quarantine house to healthy chickens.



5.2. Call for veterinary assistance



The nearest veterinary worker should be called for assistance and asked to treat the sick chickens. If there is a good chance of recovery, a treatment can be undertaken (see next chapter). The VVW will perhaps prescribe antibiotics and/or other medicine. It is better to treat all the birds that have been recently in contact with the dead chicken.

Once the birds are in quarantine, it is easy to see the disease signs and determine whether or not the chickens will die. If you find a dead chicken with no apparent traces of injury, do not eat it; but ask the veterinarian to examine the carcass. Open the carcass and look at the internal organs and note abnormal findings. Then burn the carcass.



The veterinary worker should report outbreaks of disease to the district veterinarian as soon as possible.

Be prepared to give the following information:

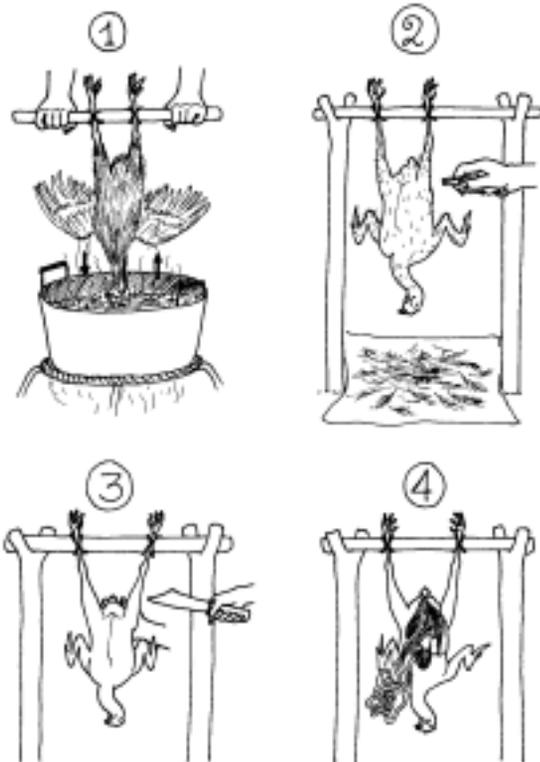
- ages and number of infected birds,
- description of the signs,
- length of time the signs have been observed,
- number of birds that have died,
- time between first signs of illness and death,
- types and dates of vaccinations.

5.3. Treatment or elimination of sick chickens

If the disease is recognized it is likely that the whole flock will need to be treated. If the prognosis is very bad, it is sometimes better to slaughter the whole flock. This may limit the financial losses for the farmer. Do not eat sick chickens or unhealthy parts. Carcasses or remains must be burned or buried under a compost heap.

6. Slaughter of chickens

- ① The chickens can be killed by dislocating the neck, bleeding or cutting off the head. Dip the chicken in very hot water for a short time to ease the removal of the feathers.
- ② Remove all the feathers and splash with hot water to wash off all feathers.
- ③ Cut from the vent down to the head.
- ④ Pull out the intestines and organs and examine these. If everything is normal, the chicken can be eaten. Separate liver and heart from intestines. Cut and wash the intestines separately. Eat all the meat as soon as possible.



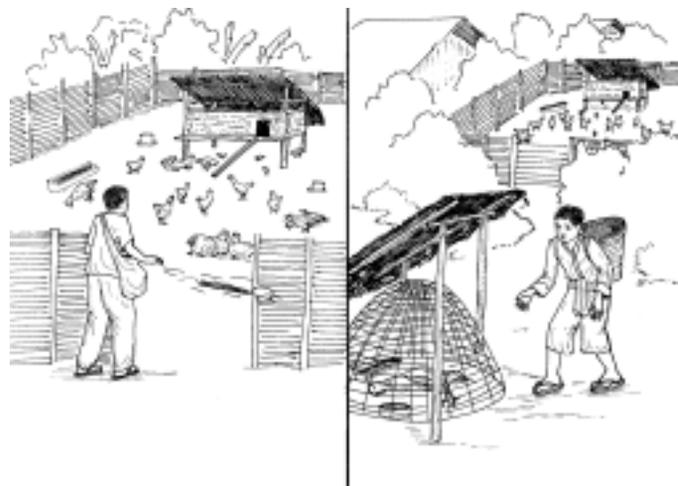


7. Story of two friends

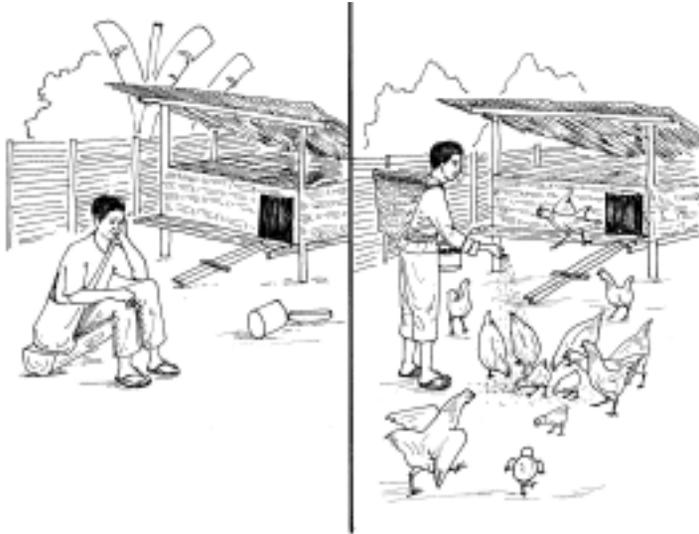
Two friends bring newly bought chickens to their village.



One farmer puts the newly bought chickens directly with his poultry flock. His friend is careful and puts the newly bought chickens first in a quarantine house.

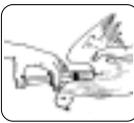


Unfortunately, after some days it turns out that the newly bought chickens were already sick and brought their disease to the village.



The first farmer has many dying chickens, but the second farmer lost only the newly bought chicken as his poultry flock had no contact with that sick chicken.

It is even better to put one bird of the resident flock with the newly bought chickens in quarantine as some chickens can carry the disease but not show any signs of the disease. If the bird of the resident flock dies or gets sick, it indicates that the newly bought chickens carry disease and should not be introduced to the flock.

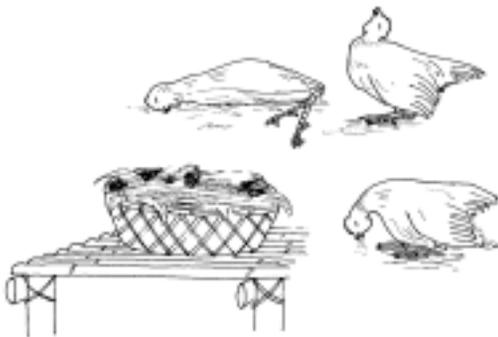


1. Newcastle Disease



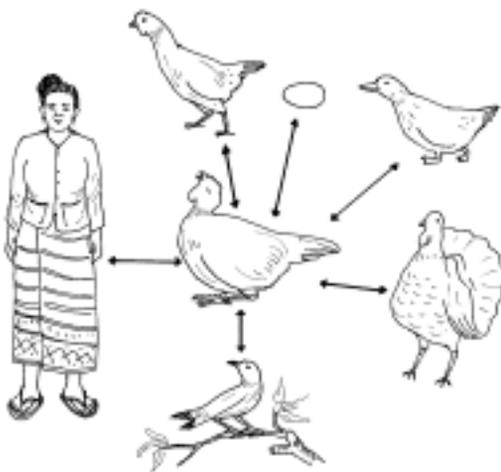
What is Newcastle Disease (NcD)?

Newcastle Disease is caused by a virus, which is found worldwide in poultry. The mortality rate can be very high, especially among young chicks (up to 100%).



What are the signs of the disease?

The most obvious signs are a sudden high number of deaths in all age groups and a drop in egg production (30-50% or more). The clinical signs are coughing, nervousness, difficulty in breathing, greenish diarrhoea, (partial) paralysis, twisted necks and thin egg shells. When opening the carcass of adults, the trachea is red and the intestine red sometimes red - black.



How is NcD transmitted?

Newcastle Disease virus is highly contagious through infected droppings and respiratory discharge between birds. In addition the virus can be spread through contaminated equipment, feed, people, air or infected wild birds. Eggs laid by infected hens may contain the virus. In a hatchery this may lead to a whole hatch being contaminated before the disease becomes apparent.

Can it be treated and controlled?

Good quarantine practice and avoiding the introduction of new carriers of the disease greatly decreases the risk of an outbreak. There is no treatment for this disease. To prevent the spread of the disease, all birds at the farm or village should be vaccinated regularly. The following two vaccination programs are applicable for Lao conditions:

- A combination of two vaccinations; the first vaccine (NcD-F strain) is given in the first week (1 drop for each eye or nostril) and the second vaccine (NcD-M strain) about 6 weeks later (intra-muscular). Annual revaccination is required with the NcD-M strain. The storage of the vaccines requires a refrigerator (cold chain).
- Using a heat resistant vaccine (HR-NcD). This vaccine does not require refrigeration and can be administered via eye drops, feeding with cooked rice and via drinking water.

Use of the Heat Resistant Newcastle Disease vaccine - via eye drop method:

This vaccine can be given to the chickens via the eye drop method. This method gives better protection than the other methods (via cooked rice or drinking water). Always read the drug instructions for correct preparation and administration. The following preparation is for a small vial with 25 doses (often enough for one household). The vaccine can be safely administered to chickens of any age from one day old to adult. For good protection, the flock should be revaccinated every 3 - 4 months.

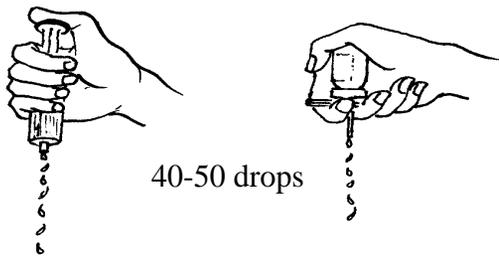
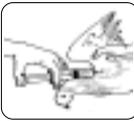


a) Materials

- Distilled water or very clean water.
- Plastic sterile syringe of 3 or 5ml.
- One vial with 25 doses.
- Eye or nose dropper.



1 Vial for 25 chickens

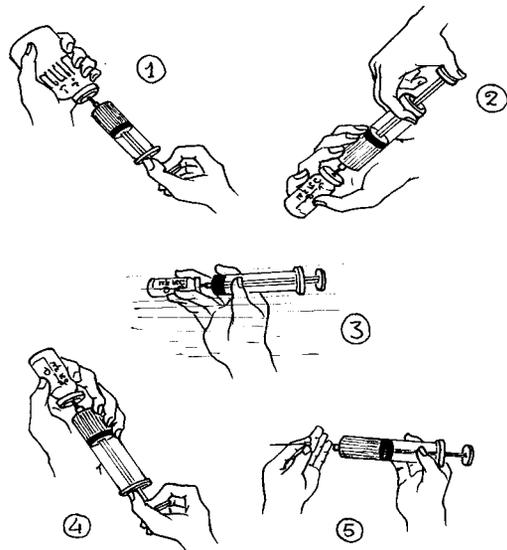


b) Calibrating an eye-dropper

One vial contains 25 doses (for 25 chickens). It is possible to use the syringe as an eyedropper by removing the needle. Beforehand, measure the volume of 50 drops of water from the syringe you will be using (2 drops per bird). This is the volume of water you will use to dilute your vaccine.

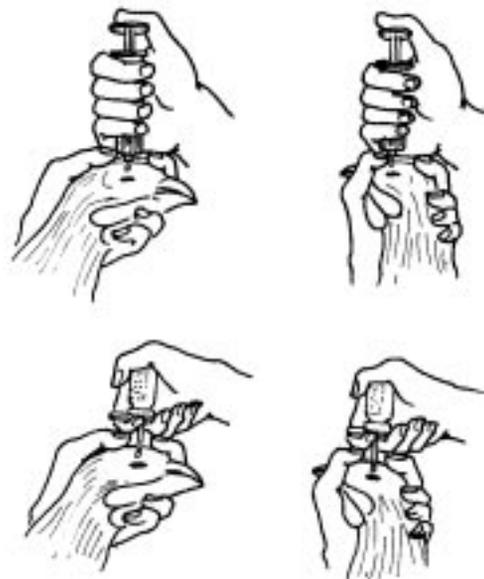
c) Mixing the vaccine with water

- (1) Suck into the syringe the correct volume of distilled water that will produce 50 drops.
- (2) Inject the water into the vial.
- (3) Shake the vial very well.
- (4) After the vaccine is well mixed, suck the mixture back into the syringe.
- (5) By removing the needle, the syringe can be used as an eyedropper.



d) Administration of the vaccine

Usually 2 drops per bird is best (one drop in each eye). The same number of drops is given to young or mature chickens. Hold the head of the chicken still and slowly give the 2 drops using the syringe or the eyedropper. The hand holding the eyedropper should rest on the other hand. It is easier to drop into the eye when the head and the hand move together. Also there is less danger of sticking the dropper into the eye.



e) Frequency of vaccination

The eye-drop method gives the best and longest immunity compared to feeding with cooked rice or via drinking water. With the eye-drop method chickens should be revaccinated at least 3 times a year (better 4 times). Special care should be given to chicks born between these periods. They need to be vaccinated as soon as possible.

f) Vaccination period

Only healthy chickens should be vaccinated (**DO NOT VACCINATE SICK ANIMALS**). Do not ask for vaccination when there is an outbreak. It is advisable to ask the local village farmers when (seasonal) NcD outbreaks are most common and to plan vaccination campaigns accordingly one or two months prior to the expected time of the outbreak.

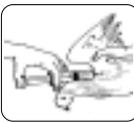
g) Storage

Keep the vaccine in a cool and dark place. Never expose it to sunlight. The heat resistant vaccine remains good at room temperature for two weeks if it is properly stored. Do not buy vaccines when the expiry date has passed. For long time storage (e.g. in the pharmacy), the vaccine should be kept in the refrigerator.

Village approach and women participation:

As Newcastle Disease is highly contagious, it is important that all the chickens in the village are vaccinated at the same time. The vaccination program should be explained especially to women as they generally rear the chickens. If the vaccination program is followed correctly, then very few chickens should die of Newcastle Disease. But the chickens may still die of other diseases such as Fowl Cholera.





2. Fowl Cholera (or pasteurellosis)



How is Fowl Cholera transmitted?

Fowl Cholera is spread between the birds through droppings and respiratory discharge. In addition the bacteria can spread through contaminated equipment, feed, animals, people, air and infected wild birds. The liquid from the eyes and beak is highly infective.

What is Fowl Cholera?

Fowl Cholera is caused by bacteria, that are found everywhere and can cause high levels of mortality in both chickens and ducks.

What are the signs of the disease?

The most obvious sign is a sudden high number of deaths. Other signs are swollen combs and wattles, discharge from nose and beak, difficult breathing and greenish-yellow diarrhoea. On the skin of the carcass and also on the intestines there may be many red spots.



Can it be treated and controlled?

Many antibiotics (like Penicillin) will lower the mortality from Fowl Cholera. Be careful with sulpha drugs (like Sulphamerazine) with layers, as this drug will affect the reproductive organs. Most drugs are given in the feed or water. If the disease cannot be quickly controlled, it is better to cull the entire flock for slaughter. Burn the chicken house and start with a new, healthy and vaccinated group of chickens after 4 weeks.

To prevent the disease, all birds at the farm or village should be vaccinated. After the vaccination it takes 3 weeks before the chickens are protected against the disease. Once an outbreak has started, it is too late and it is useless to vaccinate.

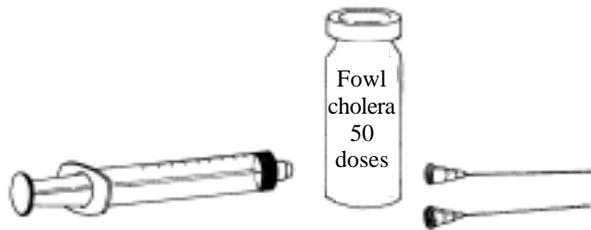
The following program is applicable for Lao conditions:

- Vaccinate all young chicks after 1 month of age.
- Revaccinate chickens of all ages every 3 months, or at least in February and October.

Preparation, handling and storage of the vaccine:

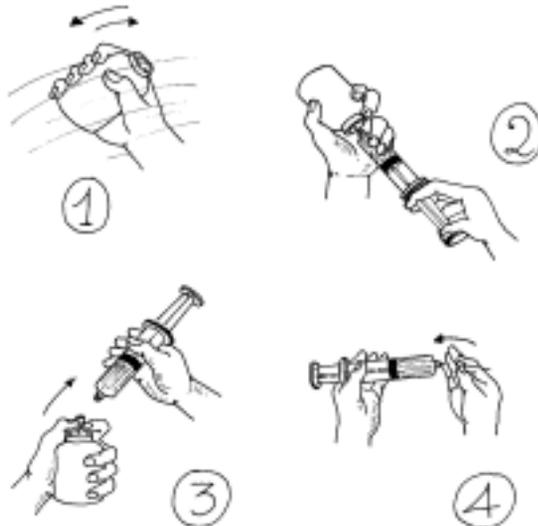
a) Materials for vaccination

- Plastic sterile syringe of 3ml.
- One vial with 50 doses.
- Two hypodermic needles (22-23 G).



b) Preparing the syringe

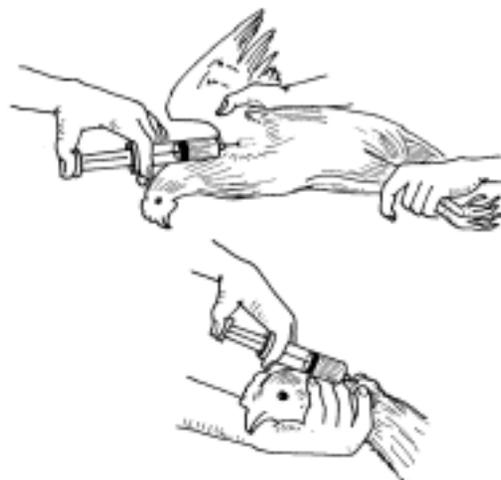
- (1) Shake the vaccine bottle well.
- (2) Suck into the syringe 1ml of vaccine.
- (3) Remove the needle from the syringe.
This needle stays in the bottle.
- (4) Put a new needle on the syringe.
Vaccinate the chickens with this needle.

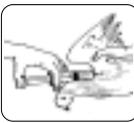


Do not use the same needle to vaccinate the chickens and to suck the vaccine from the bottle.

c) Administration of the vaccine

Sub-cutaneous injection in the wing-web or in the neck, under the skin.





d) Vaccination schedule

Chickens should be revaccinated at least 3 times a year (better 4 times). All vaccinations must be done when there is no disease problem present; vaccination does not cure the chickens that are already sick. Only healthy chicken should be vaccinated; protection against the disease starts 3 weeks after the vaccination.

e) Vaccine storage

Use the vaccine within 1 day of receipt. Keep the vaccine cold (cold box with ice, refrigerator, or in a plastic bag in cold water). Never expose it to sunlight or freeze the vaccine.

Village approach and women participation:

Fowl Cholera is highly contagious and all villagers should participate in the vaccination program to ensure that all the chickens are vaccinated at the same time. The vaccination program should be explained especially to women as they generally rear the chickens. If the vaccination programs against Fowl Cholera and Newcastle diseases are followed correctly, very few chickens should die.



3. Salmonellosis

Salmonellosis (Fowl Typhoid and Pullorum Disease) is caused by bacteria, which are found worldwide. Chickens are most susceptible but turkeys can be affected too. The mortality rate can be high. The symptoms are drooping wings, high mortality and diarrhoea. In chicks, infected with Pullorum Disease, the diarrhoea is white and sticky (over 50% of the chicks may die). The infected birds are an important cause in the spread of the disease. The eggs and faeces of the sick birds are infected with the bacteria. Contaminated feed, water, and litter are also dangerous.



Treatment and control

Salmonellosis is highly contagious and it is important that all villagers participate in the prevention and control programs. Avoid contamination from outside sources by strict quarantine practices. Burning of dead, infected birds is important. The following drugs can be used to control the disease:

- Furazolidone at the concentration of 0.04% in feed for 0 - 14 days.
- Various antibiotics in feed for several days.

4. Coccidiosis

This disease is caused by an internal parasite (coccidia) in the intestine and can cause death, particularly in chicks. Often the symptoms are thin blood-streaked faeces (but some type of coccidia cause no blood in the faeces) and weight loss by the chickens. The disease can spread by contaminated food, water or litter. Coccidia multiply in warm, dark and humid places, in damp litter around the water-drinker, or in the rainy season if the chicken house is on the ground.

Treatment and control

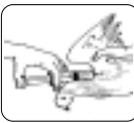
All birds will eventually come in contact with coccidia. The point is to keep the number of coccidia very low. Then the chickens will acquire some immunity. To prevent coccidiosis, keep the chickens away from their faeces, make a chicken house on stilts with a slatted floor.



The following general treatment in the middle of the rainy season may be of use:

- There are many coccidiostats available such as "Amprolium" or "Monensin".
- Sulfadimidine with water (0.1%): tablet of 500 mg in half litre water (not for layers).
- Tetracycline with some feed (0.02%): 200 mg per kg of feed.

Clean and disinfect the chicken-pen and its surrounding with 2% ammonia.



5. Fowl Pox

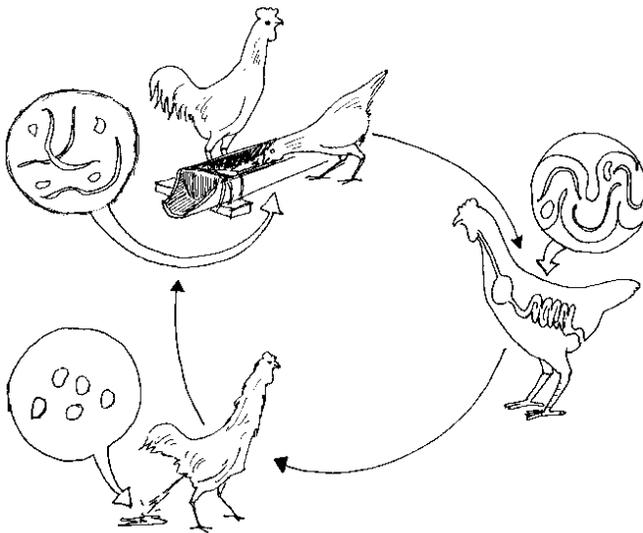


Fowl Pox causes skin lesions on the bare skin of the head, neck, legs and feet. Chickens and turkeys are most susceptible. Insects, such as mosquitoes, transmit the disease. The disease spreads slowly and outbreaks may last many weeks. Mortality is low if the disease is uncomplicated.

Treatment and control

Vaccination can prevent this disease and is carried out at the same time as Newcastle Disease vaccination. Pullets should be vaccinated well before production begins. There is no satisfactory treatment for Fowl Pox. In an outbreak of this disease you can vaccinate the chickens as the disease spreads slowly.

6. Internal parasites



There are many internal parasites, like roundworms and tapeworms. Internal parasites live in the chicken and feed on the nutrients contained in the digestive tract. These parasites rarely kill the animals, but they weaken them. Infected animals do not perform well, are more sensitive to diseases and an easier prey for carnivores.

Treatment and control

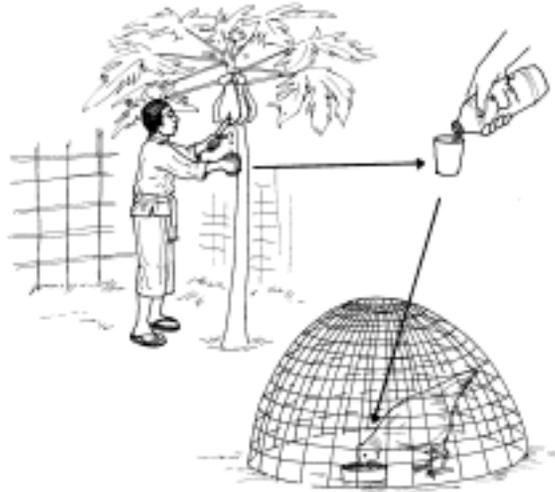
- Good hygiene, housing and absence of contact with faeces can decrease the infestation.
- Regular treatment; twice a year or more often, increases egg production and the chicken will grow faster. Treat with Piperazine or Benzimidazoles.

Examples of treatments

- In January with Piperazine in drinking water (0.2%): 2 cc per one litre water.
- In June-July with Levamisole in feed: 25 mg per one kg feed.

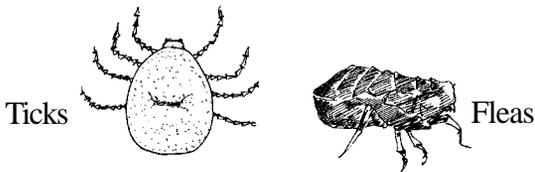
Traditional medicine

Sometimes there is local knowledge about treatments of internal parasites, like using papaya, betel-nut and chilies.

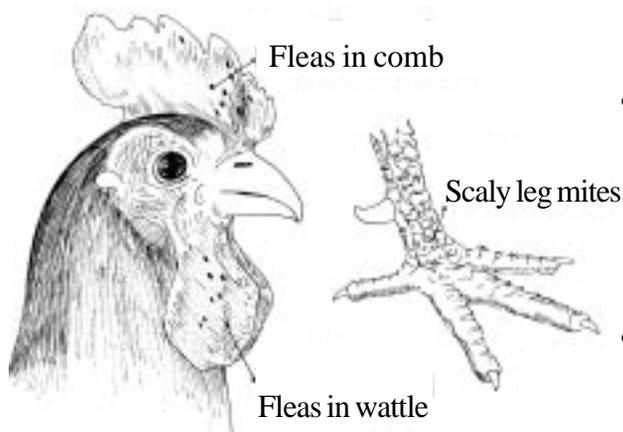
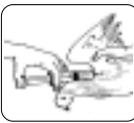


7. External parasites

External parasites live on the skin of the chicken and often suck blood, causing a drop in production and sometimes even killing young birds.



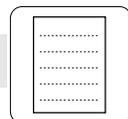
- **Ticks.** They suck blood and also carry diseases. They are normally found in hot dry areas and spend part of their life cycle in cracks of walls, thatched roofs and wooden equipment.
- **Red mite (red spider).** They feed at night and may not be noticed nor found on the chicken during the day. They can survive for a very long time in the cracks and corners of the chicken house. They may transmit diseases, such as Fowl Cholera.



- **Lice:** Usually around the rectum and under the wings. They cause skin irritation (itching) and ruffled feathers.
- **Scaly leg mites:** Most often living on the shanks and feet. The affected skin becomes thickened and scaly. Treatment: brush the shank and feet vigorously and dip the legs in old engine oil or use specific treatment.
- **Fleas:** Reddish brown and usually found in laying nests. Often tightly attached in clusters to the skin of the head.

Treatment and control

Neguvon and Asuntol are readily available in many shops. Tar products (like carboleum) or petrol mixed with old oil can be painted on the wooden parts of the pen (like on the slatted floor and walls) 14 days before a new batch of chickens arrives. Nicotine or other herbal remedies may also be used.



ANNEXES

Annex 1: Vaccination schedules for poultry

The following vaccination schedules are recommended under Lao conditions.

1. Vaccination program for parent stocks:

D-1: Marek - Live Vaccine	- Subcutaneous
Newcastle - Heat Resistant Vaccine	- Eye drop
D-10: Infectious Bronchitis - Live Vaccine	- Eye drop
D-18: Gumboro - Live Vaccine	- Drinking water
D-28: Newcastle - Heat Resistant Vaccine	- Eye drop
D-42: Fowl Pox - Live Vaccine	- Wing web
Infectious Bronchitis - Live Vaccine	- Eye drop
D-56: Newcastle - Heat Resistant vaccine	- Eye drop
D-90: Fowl Cholera - Inactivated Vaccine	- Subcutaneous
D-128: Infectious Bronchitis + Gumboro + Newcastle - Inactivated Vaccine	- Intra Muscular
Every 3 M: Fowl Cholera - Inactivated Vaccine	- Subcutaneous

2. Vaccination program for chicks for distribution to farmers:

D-1: Marek - Live vaccine	- Subcutaneous
Newcastle - Heat Resistant Vaccine	- Eye drop
D-10: Fowl Pox - Live vaccine	- Wing web
Infectious Bronchitis - Live Vaccine	- Eye drop
D-18: Gumboro - Live Vaccine	- Drinking water

Note: Chicks should not be distributed before 21 days old.

3. Vaccination program in villages where chicks have been distributed:

Based on a 3-monthly visit by a Village Veterinary Worker.

Mass vaccination against:

- Newcastle Disease - Heat Resistant Vaccine - Eye drop
- Fowl Cholera - Inactivated Vaccine - Subcutaneous

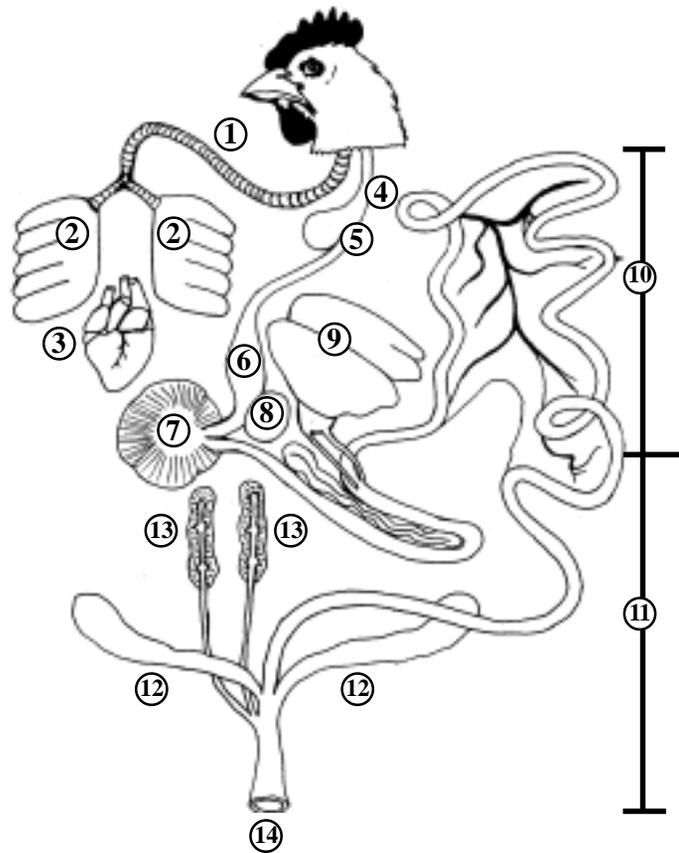
Note: Subcutaneous injection should only be administered by properly trained staff.



Annex 2: The anatomy of the chicken

A. The different organs:

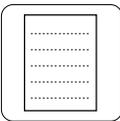
1. Trachea
2. Lung (two)
3. Heart
4. Esophagus
5. Crop
6. Proventriculus
7. Gizzard
8. Spleen
9. Liver
10. Small intestines
11. Large intestines
12. Cecum (two)
13. Kidney (two)
14. Cloaca or vent



Position of the organs in the body

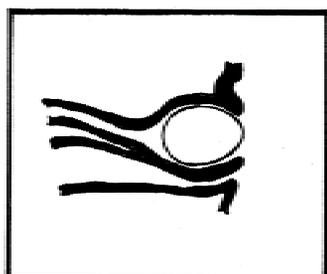
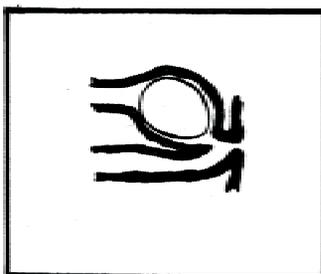
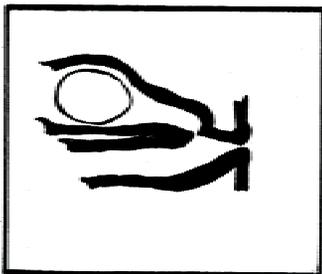
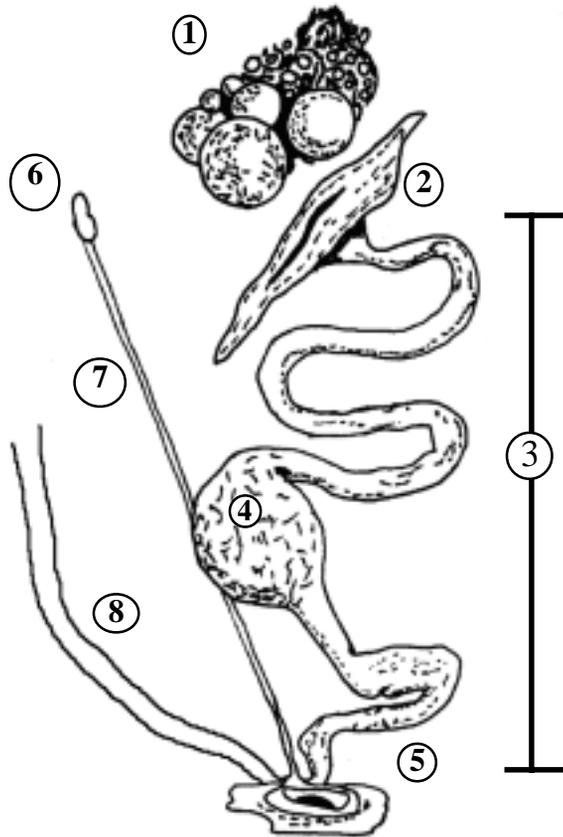


Skeleton



B. The reproductive organ of the hen:

1. Ovary
2. Egg funnel
3. Oviduct
4. Egg in development
5. Cloaca or vent
6. Kidney
7. Ureter
8. Large intestines



The passage of the egg through the cloaca (or vent).

1 ໄກ່ຜູ້ລາດທົ່ງ

Good local cock



2 ໄກ່ຜູ້ລາດຂີ້ຮ້າຍ

Bad local cock



3 ໄກ່ແມ່ລາດທົ່ງ

Good local hen



4 ໄກ່ແມ່ລາດຂີ້ຮ້າຍ

Bad local hen



5 ໄກ່ຕີ

Fighting cock



6 ໄກ່ເຫລືອງ

Yellow Chicken



7 ໄກ່ກາເບ້ຍ (ບີທີ 2)

Kabia chicken (BT2)



8 ໄກ່ໄຂ່ພັນໂບແວນ

Bovan layer chicken



2. ຄອກ ຫລື ລົກໄກ່

Chicken pens

1 ລົກໄກ່ຊຸ້ມດິນ

Pen on the ground



2 ລົກໄກ່ຍົກຂຶ້ນ

Pen with slatted floor



3 ຄອກໄກ່ທີ່ມີຄອນຈັບ

Cage with perches



4 ຄອກ, ບ່ອນລ້ຽງໄກ່ນ້ອຍ, ເດີນຫຼັ້ນ

Pen, nursery, run



5 ຄອກໄກ່ເທິງໜອງປາ

Pen above fish pond



6 ປ້ອງກັນໄກ່ນ້ອຍ

Protection of chicks



7 ຄອກໄກ່ເພື່ອເຄື່ອງການຄ້າ

Semi-comm. poultry house



8 ຄອກໄກ່ເພື່ອ ການຄ້າ

Commercial poultry house



3. ຮາງອາຫານ, ຮາງນ້ຳ

Feeders and drinkers

1 ໃຫ້ອາຫານເພີ່ມ

Supplement feeding



2 ຮາງອາຫານ ແລະ ຮາງນ້ຳ

Feeder and drinker



3 ໄກ່ກຳລັງກິນອາຫານ

Chickens eating



4 ໄກ່ກຳລັງກິນນ້ຳ

Chickens drinking



4. ການໃຫ້ອາຫານສັດແບບປະຊາຊົນ

Small scale feeding practices

1 ບົດສາລີ

Grinding maize



2 ຮາງອາຫານຕົ້ນລິດ

Tyre feeder



3 ເກືອໄກ່ດ້ວຍຜັກຕ່າງໆ

Feeding vegetables



4 ເກືອໄກ່ດ້ວຍປວກ

Feeding termites



5. ອາຫານ: ຈຳພວກທີ່ໃຫ້ ພະລັງງານ ແລະ ໂປຣຕີນ

Nutrition: energy and protein

1 ພະລັງງານ: ຮຳ Energy: rice bran



2 ພະລັງງານ: ເຂົ້າປຽນ Energy: broken rice



3 ພະລັງງານ: ເມັດສາລີ Energy: maize grains



4 ໂປຣຕີນ: ຂີ້ກະເດືອນ, ປວກ Protein: worms, termites



5 ໂປຣຕີນ: ແກ່ນຖົ່ວເຫຼືອງ Protein: soya seed



6 ໂປຣຕີນ: ຖົ່ວຂຽວ Protein: mung bean



7 ໂປຣຕີນ: ໂບກະຖິນ Protein: leucaena



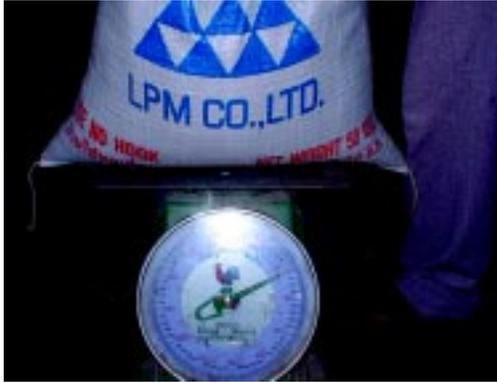
8 ຫົວອາຫານໄກ່ Commercial feeds



6. ການໃຫ້ອາຫານແບບອຸດສາຫະກຳ

Large scale
feeding practices

1 ຊັ່ງສ່ວນປະກອບ Weighing feed components



2 ເຄື່ອງບີດ, ເຄື່ອງປະສົມອາຫານ Grinder & mixer



3 ເພີ່ມວິຕະມິນ, ແຮ່ທາດ Adding vitamins, minerals



4 ຂັ້ນຕອນສຸດທ້າຍການປະສົມ Final feed mixture



5 ອາຫານໄກ່ເນື້ອ Commercial broiler feed



6 ອາຫານໄກ່ໄຂ່ Commercial layer feed



7 ປະສົມກັບອາຫານພື້ນບ້ານ Mixing with local feeds



8 ເກືອອາຫານທີ່ປະສົມ Feeding home-made ration



7. ພໍ່ແມ່ພັນສຳລັບຜະລິດແນວພັນທີ່ມີຄຸນນະພາບສູງ

Parent stock for high producing breeds

1 ແນວພັນໄກ່ເຫຼືອງ

Yellow Chicken



2 ໄກ່ຜູ້1ໂຕ ຕໍ່ໄກ່ແມ່ 7 ໂຕ

1 Cock for 7 hens



3 ໄກ່ພັນລູກປະສົມ

Commercial hybrid



4 ໄກ່ພັນລູກປະສົມ

Commercial hybrid



8. ຟາມໄກ່ໄຂ່ ເພື່ອ ການຄ້າ

Commercial layer farm

1 ໄກ່ໄຂ່ໃນຄອກ (ກົງ)

Layers in cages



2 ນ້ຳ, ອາຫານ ແລະ ໄຂ່

Water, feed and eggs



3 ໃນຄອກທີ່ມີສິ່ງຮອງພື້ນ

Chickens on deep litter



4 ໄກ່ 1ໂຕໄຂ່ 5 ໜ່ວຍ/ອາທິດ

One layer: 5 eggs/week



9. ການຄັດເລືອກໄກ່ໄຂ່ທີ່ດີ

Selection of good layers

1 ການຈັບທີ່ຖືກຕ້ອງ Correct handling



2 ມີໝຽງທີ່ດີ (ໃຫຍ່, ອອ່ນນຸ້ມ) Good crop (big, soft)



3 ມີຫົວສວຍງາມ (ສີສັນສົດໃສ) Good head (bright color)



4 ຫົວຂີ້ຮ້າຍ (ນ້ອຍ, ສີຈົດ) Bad head (small, pale)



5 ມີຜັງຫ້ອງທີ່ດີ (ກ້ວາງ, ນຸ້ມ) Good abdomen (wide, soft)



6 ຜັງຫ້ອງບໍ່ດີ (ບາງ,ແຂງ) Bad abdomen (thin, hard)



7 ມີຮູບຂວາມທີ່ດີ (ໃຫຍ່, ຍືດຢຸ່ນ) Good cloaca (big, elastic)



8 ມີຮູບຂວາມທີ່ບໍ່ດີ (ນ້ອຍ,ແຫ້ງ) Bad cloaca (small, dry)



10. ເຕັກນິກການສັກຢາປ້ອງກັນ

Vaccination techniques

1 ສັກກ້ອງຫຼົບໜັງຄໍ (ອະຫິວາສັດປີກ) SC neck (FC)



2 ສັກກ້ອງຫຼົບໜັງປີກ (ອະຫິວາສັດປີກ) SC wing (FC)



3 ກ້າມຊັ້ນເອິກ (ນິວຄາເຊັນ-ເອັມ) IM breast (NC-M)



4 ກ້າມຊັ້ນຂາ (ນິວຄາເຊັນ-ເອັມ) IM leg (NC-M)



5 ຢອດຕາ, ດັງ (ນິວຄາເຊັນ) Eye, nose drop (NC, IB)



6 ພິ້ນ (ນິວຄາເຊັນ) Spraying (NC, IB)



7 ປະສົມນໍ້າກິນ (ກຳບໍ່ໂຮ) Drinking water (Gumboro)



8 ສັກກ້ອງຫຼົບໜັງ (ມາເຣັກ) SC (Marek)



1 ພະຍາດນິວຄາເຊີນ

Newcastle Disease



2 ພະຍາດອະຫິວາສັດປີກ

Fowl Cholera



3 ໝາກສຸກສັດປີກ

Fowl Pox



4 ກິນໝູ່ທີ່ຖືກຢາເບື້ອຕາຍ

Eating poisoned rat



5 ເກັບຕົວຢ່າງເລືອດ

Blood sampling



6 ກວດກາຫຼັງການຕາຍ

Post-mortem



7 ຢາຊະນິດຕ່າງໆ

Different medicines



8 ໃຫ້ຢາໃນນ້ຳດື່ມ

Medicine in drinking water



12. ການຟັກໄຂ່ຂະໜາດນ້ອຍ

Small scale hatchery

1 ໄກ່-ຟັກໄຂ່

Laying eggs



3 ຜູ້ຟັກໄຂ່ຂະໜາດນ້ອຍ

Small incubator



2 ຄັດເລືອກ, ທຳຄວາມສະອາດ

Selecting & cleaning



4 ປ່ອນອົບໄກ່ນ້ອຍ

Small brooding ring



13. ການຟັກໄຂ່ຂະໜາດໃຫຍ່

Large scale hatchery

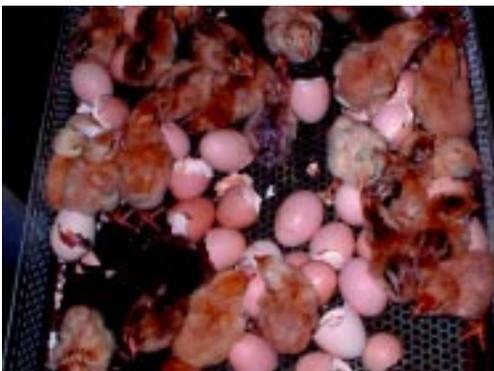
1 ເລືອກໄຂ່ທີ່ມີຂະໜາດພໍດີ

Well sized eggs



3 ຖາດເບາະໄກ່ນ້ອຍ

Hatching tray



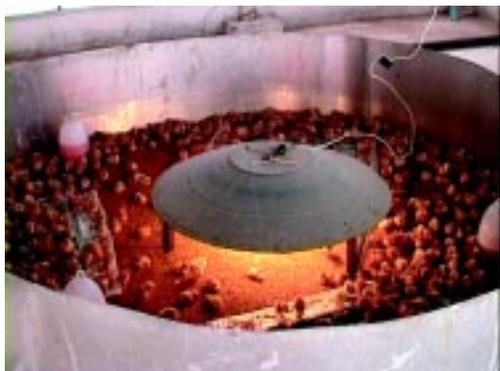
2 ຜູ້ຟັກໄຂ່ຂະໜາດໃຫຍ່

Large incubator



4 ປ່ອນອົບໄກ່ນ້ອຍຂະໜາດໃຫຍ່

Brooding ring



14. ການຄັດເລືອກເພດ, ການຊ່ອງໄຂ່ ແລະ ຕັດສິບ

Sexing, candling and
debeaking

1 ແຖວຂົນຍາວເທົ່າກັນ (ຜູ້) Rows same length (male)



2 ແຖວຂົນເບື້ອງລຸ່ມສັ້ນກ່ວາ (ຜູ້) Bottom shorter (male)



3 ຂົນເບື້ອງລຸ່ມຍາວກວ່າ (ແມ່) Bottom longer (female)



4 ຂົນເບື້ອງລຸ່ມຍາວກວ່າ (ແມ່) Bottom very long (female)



5 ຄັດເລືອກເພດຕາມສີຂອງຂົນ Sexing on color



6 ໄກ່ເພດຜູ້ ແລະ ເພດແມ່ Male & female chicks



7 ສອງໄຂ່ມີເຂື່ອນ Candling fertilized eggs



8 ຕັດສິບໄກ່ນ້ອຍ Debeaking chicks



15. ການຈັດຟາມແບບປະສົມປະສານ

Integrated farming

1 ຜຸ່ນຄອກເພື່ອປັບປຸງດິນ Manure to fertilize soil



2 ນຳໃຊ້ຜຸ່ນຄອກເພື່ອປູກຜັກ Manure for vegetables



3 ປະສົມປະສານ ໄກ່ ແລະ ປາ Poultry and fish



4 ປະສົມປະສານ ໄກ່ ແລະ ປາ Poultry and fish



16. ຮູບພາບອື່ນໆຂອງໄກ່

Other poultry pictures

1 ຂົນສົ່ງໄປຕະຫຼາດ Transport to market



2 ທີ່ຕະຫຼາດສົດ Fresh market



3 ຝຶກອົບຮົມ ທີ່ສູນຝຶກ Training at Center



4 ຝຶກອົບຮົມລະດັບບ້ານ Training at village





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