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INDIGENOUS CHICKEN PRODUCTION HANDBOOK

— SECOND EDITION —



Indigenous Chicken Production Handbook

Second Edition 2019

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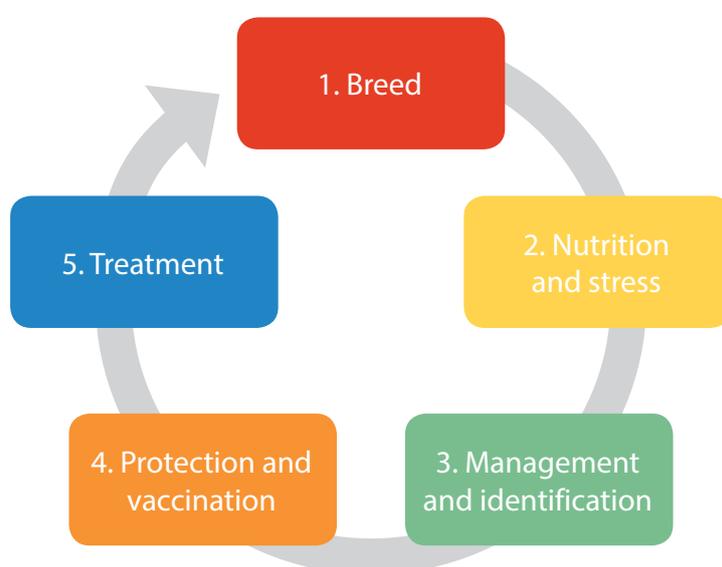
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How to use this book

The aim of this book is to assist owners of indigenous chickens using extensive farming systems. It looks at ways to improve the productivity of their flock. It is designed to be shared with farmers in a way that allows them to understand how to find their way through the book and how to find the information that they need. It is best if the book is used as part of a capacity building programme being implemented by extension officers and field workers.

Part 1: Basics of keeping chickens:

This section covers everything a communal chicken farmer needs to keep their indigenous flock healthy and productive within its current limits. This part of the book follows these five steps to a healthy chicken:



- 1. Breed** – choosing a breed that is relevant to your farming system and conditions is the best way of having a productive, efficient and healthy flock (page 8-11).
- 2. Nutrition and stress** – malnutrition, bad nutrition and stress will reduce productivity and increase vulnerability to diseases, problematic conditions and parasites (page 12-14).
- 3. Management and identification** – good management practices will reduce or prevent diseases, conditions and parasites. This is the most cost-effective way to prevent these diseases or parasites. The biggest perceived losses that farmers report occur through birds being stolen or getting lost so systems to reduce this through proper identification systems is crucial for a farmer (pages 15-17).

4. **Protection and vaccination** – giving a chicken shelter can prevent disease and stress. Farmers need to be able to identify symptoms of diseases, problematic conditions and parasites and understand how to best prevent these problems before they start or spread. Vaccination is only possible for certain diseases (pages 17-19).
5. **Treatment** – once a chicken is sick, treating the problem quickly is important. Giving the right dose and the correct type of treatment is equally important (pages 20-23).

Part 2: Common diseases, conditions and parasites:

A section on common diseases, problematic conditions and parasites that affect chickens is on pages 26-38. This details management, prevention and treatment options where possible for each one.

Part 3: Management and marketing decisions:

This section is for farmers who increase their flock productivity will notice a rapid increase in flock size which needs to be managed. Although more chickens seem like a good idea, the increase in feeding and other management costs needs to be kept under control. This section also looks at marketing and management options linked to these increases.

There are further training materials to support training farmers with this book. They are available at www.mdukatshani.com, www.hpsa.org.za or www.gapkzn.co.za. These are training modules linked to sections in the book and can be downloaded as pdfs for printing, or as PowerPoint presentations. These training materials reference this book's sections and pages.

*This book is not for sale but is distributed as part of a training programme.
It is available as a free download in isiZulu or English, from the websites
listed above and it is copyrighted to Imbuzi Imali.*



PART 1

Basics of keeping chickens



1. Breed

Identifying what a healthy chicken would look like and behave like will help understand any of the following interventions.

1.1 A healthy chicken

- It has a pink comb
- It walks without limping
- Its feathers are sleek
- It doesn't have dirty feathers
- The scales on its feet are smooth and yellow
- It does not have diarrhoea
- Its feathers are smooth and shiny
- The bones are not sticking out on the breast.



Chicken breeds

1.2 Chicken breeds

A local breed has the best chance of resistance and adaptability to the diseases and the food sources of the area, selecting a local breed is always the best place to start a healthy flock. There are many Chicken types, most adapted and bred for particular needs. The indigenous breed is a generalised land race that has adapted to local conditions. These can vary a lot in size colours and looks.

A healthy animal is more able to resist diseases and can recover more easily when it does get sick. A sick animal costs a farmer money and time. A farmer with a sick animal has to buy medicines, syringes and needles. It is therefore better for a farmer if animals stay healthy and do not get sick. So before we consider how to treat diseases, it is best to think about how to recognize healthy animals and how to keep them healthy.

Treatment is also more successful if it is given early, before the animal is so sick that the medicine can help it. This means that a farmer must be able to tell very quickly if he or she has a sick animal, what sickness it has and what he or she can do about it.

1.2.1 Indigenous chickens

- Many colours, shapes and sizes – some with bare necks.
- Tougher meat from outdoor lifestyle and diet
- Can live off the land by scavenging, so low cost
- They are 'smart' and sleep off the ground, are good runners and can fly when they need to, thus avoiding predators
- They find/make nests and brood well
- They can be hard to control/catch/handle



They are not as efficient at putting on weight as exotic or commercial breeds and do not lay all year round, even when fed expensive high protein feed. They can be selectively bred for certain colour which makes them suitable for specific traditional purposes and sacrifice ceremonies.

1.2.2 Improved indigenous breeds

They have been selectively bred to be better than (for example the Potchefstroom Koekoek) indigenous chickens in terms of growth rates and laying potential. They need more care and feeding than unimproved local chickens and cannot scavenge as well.

Many farmers express interest in increasing their perceived flock weaknesses (often related to size, growth or egg production) by cross breeding with exotic breeds. There are both advantages and disadvantages of trying this, but generally it can bring weakness into an indigenous flock and create problems that farmers had not thought through in terms of increased vulnerability to disease and stresses.



1.2.3 Exotic/introduced breeds (for example Black Australorps)

These are generally birds bred in Europe or the UK and they are not well adapted to local conditions, especially our rural areas.

There are many different types of chickens that have been bred for different purposes. Black Australorps are kept for meat, while Leghorns are kept for eggs. Some breeds are called dual purpose – they have been bred for meat and egg production.



1.2.4 Commercial hybrid layers

These are chickens that have been specially bred to produce eggs and they are normally kept in cages or in sheds. You cannot breed your own replacements – you have to buy new ‘point of lay pullets’ from a proper supplier when your hens get old. These hens can lay almost continuously for more than a year (almost one egg per day for a year). They need a lot of expensive high protein food (special layer diet) to lay eggs like this. If they are not kept in cages and are allowed to free-range, they sometimes lay eggs on the ground and they do not always return to the same nest.

Commercial layers are normally de-beaked (the tip of their beak is removed) on hatching so they are not good at scavenging outdoors and cannot compete with other chickens. They have been bred not to become broody so that they will continue to lay eggs. This also means that they will not be good mothers. They are more easily handled, cannot fly as well as local household chickens and often roost on the ground at night. This also makes them very vulnerable to predators.



1.2.5 Commercial hybrid broilers

Broilers have been bred specifically for meat production. They grow very fast and can be sold at 6 weeks of age for slaughter. They need to be fed a proper broiler ration for the full 6 weeks (as much as they can eat). Broilers get too heavy if they are kept for much longer than 6 weeks and they develop leg problems. They cannot scavenge and must be provided with all their food.



1.3 Basic information on indigenous chickens

Some key characteristics of household chickens and their production systems are:

- They are usually 'indigenous' or 'local' stock.
- They are raised in small numbers (flocks of 1-50) but commonly flocks consist of 5-15 chickens.
- They are generally not confined and scavenge for most of their food.
- They are usually only fed household food scraps or maize/sorghum.
- They require minimal veterinary inputs.
- They mainly use family labour and are usually cared for by women and children.
- Production is geared mainly towards home consumption and savings (they provide a living bank) and for small expenses such as school fees.
- Hens normally start to lay eggs at 24-30 weeks (6-7.5 months) of age. At any given time only half of the hens are productive and 8-10% never lay.
- Most birds produce 2-4 clutches of eggs a year, which they brood. There are on average 10-12 eggs per clutch.
- A hen will lay for about 12-20 days until she has a full clutch of eggs and will then start brooding. She will incubate (brood) the eggs for 21 days and the chicks will then emerge (hatch).
- 70-90% eggs will hatch varying with the season.
- The chicks will stay with their mother for about 2 months but the hen will not start laying again for some 4-6 months after the previous clutch.
- Only 20-50% chicks reach adulthood (and 85% of mortalities occur in the first 3 weeks of age).

Adapted from: Ahlers et al. 2009



2. Nutrition and stress

2.1 Why is nutrition important?

If chickens are put in cages or houses, they will not be able to scavenge for the nutrients that they need. Feeding them crushed maize alone will not be enough and they will be unproductive and may even die. Chicks will grow very slowly and will be susceptible to disease. **THIS IS WHY IT IS IMPORTANT TO SUPPLEMENT CHICKENS – ESPECIALLY IF THEY ARE CONFINED!**

2.1.1 How do you recognise nutritional problems?

Where the chickens have nutrient deficiencies, the farmers will notice that their chickens' feathers are looking untidy and not smooth. They hang their wings and are listless. They will often start cannibalizing each other. Normally this starts with them pecking feathers of other birds and then pecking at the wounds that form.

Hens with calcium deficiencies will sometimes start eating eggs and may eat old shells that are left in nests after hatching. Feeding boiled eggshells to hens can help prevent egg eating behaviour (see page 37).

A condition called hard tongue is often experienced by farmers of extensive systems where a hard sheath develops over the tongue from the chicken eating rough grass and plants while it is foraging. This is not life threatening but does seem to reduce the chickens ability to eat efficiently. Most farmers pull this sheath off which seems to solve the problem.

2.2 Stress and Immunity

The immune system keeps the animal healthy. All animals and people have immune systems. The job of the immune system is to fight germs that invade the animal and could cause it to get sick. The immune system is like the animal's own army, ready at all times to fight invaders that put the animal's life at risk.

The immune system is found everywhere in the animal's body. It is made up of millions of little cells that are too small for people to see with their eyes. When germs enter the animal's body, these immune cells come from all over to attack the germs. If the cells win the battle, the animal stays healthy. If they lose the battle, the animal may get sick and need treatment. The cells are produced in the bone marrow and then spread around the body in the blood.

The immune system can recognise diseases if it has fought these diseases before. With some diseases, this recognition lasts the animal's whole life. With other diseases, however, the immune system can recognise the disease when it is present often but stops being able to recognise it when the animal hasn't had it for a long time.

2.2.1 What commonly causes stress

Stress can lower immunity and thus allow diseases and parasites to infect or affect the goat's health. Stress can be caused by many factors:

- Hunger
- Thirst
- Egg laying
- Brooding
- Change in diet
- Cold (exposure to wind and rain or sleeping in a dirty pen)
- Change in environment
- Tiredness (walking long distances)

2.3 Why is food important?

No matter how good your animal's immune system, if it is constantly hungry and malnourished, it will eventually become sick. This is because a malnourished animal's immune system cannot successfully fight all the different diseases trying to attack it. One or more of these diseases will eventually defeat the immune system of the hungry animal, making it weaker and more susceptible to all the other diseases waiting to attack.

It is better to have a well-fed animal so that it is generally in good condition. If it gets sick, such an animal is more likely to recover from illness than a hungry, thin one. A well-fed animal that gets sick can sometimes recover by itself without treatment.

It is therefore important that animals have enough good quality food so that they are able to maintain their immune system and to fight disease. A well-fed animal is usually a healthy animal with a strong immune system. In winter when there is not enough good quality food, animals can get sick very easily

2.4 Feeds, feeding and nutrition

When chickens are not able to find enough food, they will not grow properly and their egg production will also drop. They will also become susceptible to diseases and parasites.



Protein sources for chickens that will benefit productivity

2.4.1 Essential nutrients

The following five elements of a good diet are essential to life, growth, production and reproduction in all types of poultry. With chickens that are free to scavenge, nature supplies most of these essentials in the form of grass and leafy plants, insects and other small animals such as worms, gravel, grains, seeds and sunshine, etc. You need to make sure that your chickens have access to different feedstuffs that provide sufficient amounts of these five elements of a good diet.

- **Water** – Chickens can live longer without food than without water. Growth of young chickens as well as egg production of hens will decline if they are not provided with a continuous supply of clean water.
- **Protein** – This is usually the most expensive feed material, but the one most likely to bring profitable results if properly used because the diets of scavenging chickens often do not have enough protein for chicks and growers.
- **Protein from animal sources** – milk, liver, fish scraps, eggs, meat or meat meal – is more effective in promoting growth and egg production, than protein from most vegetable sources. Grains alone are entirely inadequate in amount and kind of protein. Growth and survival rates of chicks are greatly improved if they are given preferential access to household scraps supplemented with protein.
- **Carbohydrates** – These are the starchy materials found in grains and grain products such as maize meal. They supply energy to the chickens and the excess forms fat in the body or the egg.
- **Minerals** – Calcium carbonate (from limestone, gravel, snail shells, bone, etc.), in the presence of Vitamin D, forms most of the eggshell. Bone contains mostly calcium and phosphorous. Salt supplies some essential minerals. Green feed contains small amounts of certain highly important minerals. You can also dry eggshells in an oven or over an open fire and crush them and feed them back to your hens. The drying process removes all egg content and ensures that they do not start eating their own eggs.
- **Vitamins** – These occur naturally in fresh foods, especially vegetables and leafy plants, or can be added as a supplement. They keep your chickens' immune systems healthy.



Different sources of carbohydrates

3. Management and identification

3.1 Catching and handling chickens properly

It is important that the handling of chickens is done well. Wrong handling will cause the chicken to become stressed. Stressed chickens are more vulnerable to diseases and might even stop laying.

Don't make sudden movements or loud noises. It's best if you catch a chicken at dusk or while you are feeding them. Hold the chicken by its legs and never hold it by its neck, wings or tail. Hold the chicken with your hand under its breast and hold the body against you to prevent flapping.



3.2 Collecting eggs

When collecting eggs from a chicken, a farmer needs to try not to frighten the chicken as the chicken being disturbed constantly will eventually abandon the nest and not brood any of the remaining eggs. If an abandoned nest is noticed, a farmer should take all these eggs and consume them and clean out the nest so the next chicken can start nesting. Chickens will brood 12 eggs safely so if any of these eggs are put under a chicken with fewer eggs, they might still hatch.

3.3 Identification systems

In communal areas where homesteads are close to each other, chicken flocks will often intermingle with each other. This will often result in chickens being lost, stolen or moving in with the neighbouring flock. In these circumstances, it is worth marking a farmer's chickens so they can reclaim it or identify it. Various systems exist such as cutting a toe which farmers do at a very young age. Usually, it is one of the three forward facing toes. Farmers can also use metal leg bands or coloured zipties. With these methods, one needs to be careful that the chicken does not outgrow them as it will restrict blood flow to the feet.



Different identification methods

4. Protection and vaccination

Generally household chickens should not be confined as most of the advantages of these chickens are as a result of their free ranging habits.

4.1 Reasons for confining household chickens

In some areas, farmers sustain large losses of their chickens due to predators. There are often local methods of avoiding some of these losses (such as stringing wires across yards or tying pieces of coloured plastic to chicks to discourage hawks) but where farmers feel that these losses are unsustainable, confinement of young chicks is often the only option.



Types of predators

In very hot or very cold environments or seasons, young chicks sometimes die from exposure to the weather and confinement can also help to prevent these losses.

However, there is always a cost to confinement that a farmer needs to understand and plan for. This is the cost of constructing a suitable cage, the cost of feeding the chickens and the labour required to care for the confined chickens. There is also a greater need for veterinary products to control diseases once you confine your chickens. This is because there are more chickens in a smaller space.

4.1.1 Confinement options

The best option is to enclose the chickens at night with a little food and plenty of water but let them scavenge through the day so that they can find their own food. It is also important to make sure the cage/structure protects the chickens effectively from night predators as they will be helpless once you confine them.

Another good option is to only confine and thus feed those chickens that are most vulnerable such as the hens with chicks and the hens that are brooding eggs. It is better to confine chicks with their mothers rather than separating them as the hens are the teachers regarding what to eat, what to be scared of, and so on.

If chickens are confined continuously, rather than only at night, you also have to make sure that you provide them with a complete diet (see the next section) because they can no longer scavenge and find the nutrients that they are lacking. This means you have to supply all the chickens' food requirements – the right nutrients and the right amount. You can either buy commercial chicken feed, which is very expensive, or you can buy different ingredients to make a complete diet, or you can use locally available feeds to make up a complete diet.

Note: *It is very expensive to feed chickens that are kept confined at all times. If you are going to do this, then it may be more worthwhile to invest in some hybrid broilers or layers as their high productivity justifies the investment in feed. If you are confining your household chickens, it should only be for short periods of time, for example while the chicks are small and very vulnerable to predation. However, if you have access to urban markets that will pay high prices for traditional chickens then it might make a caged/housed system economically viable.*

4.2 Nesting and housing options

Chickens will make nests or lay eggs anywhere if not provided with suitable nest sites. This makes the eggs and the brooding hens very vulnerable to predators, while damage from other animals in the homestead (e.g. dogs stealing eggs) contributes to low productivity of the flock. Thus it is important for a farmer to provide safe and clean nesting options for his/her hens.

Very hot or cold conditions can make plastic or tin nest sites too hot or too cold and kill the chicks.

Any nesting material should be removed and burnt after every brood to kill parasites and get rid of diseases. This is especially important for houses made out of grass or wood. Below are some options.



Nest options

4.3 Health interventions

Farmers need to understand clearly the difference between vaccines and antibiotics as confusion is common and leads to resistance and bad decisions on treatment. Also understanding agents like insecticides and dewormers is important.

4.3.1 Vaccination

Most chicken diseases and parasites spread between chickens. Farmers that have healthy flocks must be very cautious of bringing in new chickens from elsewhere as it is likely they will bring in new parasites or diseases with these chickens.

Protecting an animal from cold and wet conditions helps prevent stress that can lead to disease. Proactively treating and deworming can help the animal fight off diseases if it is not carrying a large load of parasites. Vaccinating is the best way of preventing diseases. Newcastle vaccine is commonly available and essential. This has to be done before the animal is exposed to the disease.

If your animal is sick it could be caused by a variety of problems, most commonly one or a combination of the following: a viral infection, a bacterial infection, internal or external parasites or poisoning. Observation (appearance, history, appetite, temperature, respiration and other clinical symptoms) can be used as tools for identifying a disease.

Although antibiotics are the only effective intervention that can be used against certain conditions, they must be used at the right dosage, and farmers must take into consideration that the overuse of antibiotics is a common and growing problem because they are often used as a cure all and used indiscriminately and improperly. This has also led to widespread antibiotic resistance in diseases.

4.3.2 Types of agents

1. A **virus** is a small infectious agent that replicates only inside the living cells of other organisms. Viral infections in animals provoke an immune response that usually eliminates the infecting virus. Immune responses can also be produced by vaccines, which confer an artificially acquired immunity to the specific viral infection. **Antibiotics have no effect on viruses.**
2. **Bacteria** also cause sickness in animals. Bacterial infections are illnesses that occur when harmful forms of bacteria multiply inside the body. **They can be treated with various types of antibiotics.** Often bacteria and viruses work together in making an animal sick, so one injects antibiotics to combat secondary infections caused by bacteria to help the goat get healthy enough to fight off the virus.
3. **Parasites** are organisms that live on or in a host and get their food from or at the expense of their host. Parasites can cause disease in chickens.
4. **Protozoa** are small single celled organisms which are common in soil and dirty water. They can occur as parasites in the gut of birds and cause, for example, coccidiosis.

The most common and problematic internal parasites are worms and flukes. The most common intervention is an oral dewormer. Different dewormers are used to treat different species of worms and flukes. In order to be most effective with these, a farmer needs to be clear what worm it is. An ash filled bath lets chickens remove parasites naturally.

The most common and problematic external parasites in chickens are ticks, fleas, lice and mites. Some of these are spread in homestead environments between domestic animals. There are a number of insecticides for these external parasites.



Examples of ash baths for chickens, to rid themselves of external parasites

4.4 Chicken 11-point check

A visual examination of the chicken is important to check for problems with the chicken.

What to look for		Look at	Looking for what	Reference
Head 	1	Around eyes	Mites, lice, pox	8.1-8.4
	2	Comb	Anaemia, pox	6.2 and 7.1
	3	Tongue	Hard tongue	2.1.1
	4	Beak	Deformities, pox	7.1
Body 	5	Body		8.2-8.4
	6	Under wings	Mites, ticks, lice	8.2-8.4
	7	In between feathers		8.2-8.4
	8	Breast	Body condition	1.1
Rear 	9	Cloaca	Diarrhoea, soiling, deformation	6.1, 6.3-6.5
	The temperature is taken here and should be 42°C			
Feet 	10	Feet scales	Scaly leg mite	8.1
	11	Under foot	Bumble foot	6.6

5. Treatment

5.1 Good hygiene practices

- Always wash your hands with soap and water before and after treating and handling birds. A hand disinfectant can also be used.
- Always use fresh sharp needles where you can
- Needles should be sterilised as often as possible with boiling water for steel needles
- Any animal waste e.g. pus, blood, feathers or flesh, should be disposed of by burning, burying or at least be thrown in a pit toilet to prevent the spread of infection.

5.2 Basic vet kit and medicines

- Cooler bag – for keeping medicines cool and out of the sun
- Chicken book
- Skim milk powder – mixed with water to boost Newcastle vaccine
- Antibiotic – for treating coccidiosis
- Dewormer – for deworming chickens
- Temperature gauge
- Vacuum flask – for keeping vaccines in a cold chain
- Iodine spray – for treating chicken pox sores
- Karbadust – for external parasites
- Black polish – for treating chicken pox sores
- Newcastle vaccine
- Syringe for dosing



5.3 Storage of medication, expiry dates and withdrawal periods

Read the instructions that come with the product you buy, because they contain important information about using it such as dosing rates, whether it is safe for birds as well as how it should be stored.

Storage

Check storage instructions on medicine:

- Does it need to be refrigerated?
- Does it need to be kept in a cool, dark place?
- Most vaccines need to be kept refrigerated – do not keep them in a freezer where there is ice as it will kill the vaccine which will then not work.



Expiry dates

- An expiry date is the date when the product has become too old to work properly.
- When you buy a medicine or dewormer or dip – check the expiry date!
- Do not keep drugs beyond their expiry date as they will stop working properly.
- Either share products with other farmers or buy smaller quantities.



Withdrawal periods

With many drugs, you must wait for a given number of days or weeks after administering the medicine, before you slaughter for meat – this is known as the withdrawal period and is always given on the instruction pamphlet. If you eat the meat or eggs before this time you will absorb the medicine.

5.4 Cold chains

A cold chain is a temperature-controlled supply chain. Where vaccines are concerned, it is important to keep the medicines in the correct temperature range until they are used. All medicines, however, need to be kept at appropriate temperatures and kept away from direct sunlight.

1. A cooler bag can keep medicines cool for up to an hour without an ice pack. If using a cooler bag, it is advisable to use an ice pack in order to keep medicines cool for about two hours.



2. Ice packs should be used with cooler bags and when transporting medicines.



3. A flask can keep medicines cool for up to four hours.



4. The bottom part of a fridge maintains a temperature of +3 to +8 degrees centigrade. The freezer part (depends on configuration) is -5 to -10. Vaccines and medicines can be kept in the bottom part of the fridge but not in the top part of the fridge.



5. This is not a fridge it is a freezer. No medicines should be kept in this.



PART 2

Diseases, parasites and problematic conditions



6. Diseases

6.1 Newcastle Disease (Paramyxovirus)

Symptoms	Prevention
<ul style="list-style-type: none"> • Newcastle disease outbreaks lead to many chickens dying. • The chicken fluffs/ruffles its feathers and appears to 'have its coat dragging on the ground'. • The chicken looks sleepy (lethargic/listless) and does not eat. • The chicken has difficulty breathing and gasps. • The head and neck are swollen. • The chicken has greenish diarrhoea. • The chicken may have its head twisted backwards onto its back. • Normally the sick chickens will die after 3 or 4 days. 	<p>The biggest constraint to homestead chicken production is Newcastle Disease. Newcastle Disease is caused by a Paramyxovirus that occurs in a range of types (or strains) of widely variable strength (virulence). Sometimes, the strain of virus that is present will cause very few deaths in chickens; at other times, the virus strain involved may cause many deaths (losses of up to 90% can be experienced).</p> <ul style="list-style-type: none"> • The only way to reduce or prevent deaths from Newcastle Disease is to vaccinate your chickens against the disease. • If households are within built-up areas or if there are in an area where there are commercial chicken farms or points of sale (e.g. pension pay points), all the chickens in the household flock (and any new chicks) should be vaccinated monthly. • In more remote, less settled areas where there is less risk of infection, vaccination can take place every three months. <p>Vaccination against Newcastle Disease can be done in four ways:</p> <p>By eye dropper – with this method, the vaccine is more effective, but you need to catch each chicken and place the drop in an eye which can be difficult and time-consuming. ND La Sota vaccine can also be applied as an eye drop if mixed with 30ml sterile water (you can also use bottled water – but still not sparkling). You then apply a drop per eye (one eye per chicken).</p> <p>By spray – this usually is used in broiler production where the chickens are in a closed shed. A fine mist of vaccine mixed with water is sprayed over the chickens. The spray is absorbed into the nostrils, throat and eyes. Unless the birds are in a closed environment, this method is difficult to implement.\</p> <p>Through drinking water – this is effective for households with large flocks because you do not have to handle each chicken, but they need to be starved of water before the vaccination to make sure they drink the treated water. WE RECOMMEND THIS FOR HOUSEHOLD CHICKENS BUT IT MUST BE DONE PROPERLY!</p> <p>By needle – This method means that each chicken needs to be caught and injected which can be difficult and labour intensive (see next page for recommended vaccination schedule).</p>

Recommended vaccination system

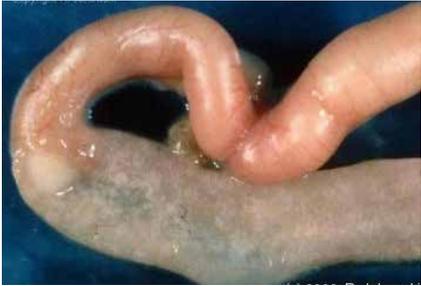
- 1. Transporting and storing the vaccine:** Store it in a closed steel vacuum flask with some ice in it until you get home or to the office, put it in a refrigerator at 2–8°C. **DO NOT STORE IT IN A FREEZER!** If you are going into the field to work with farmers, transport the vaccine in the steel thermos flask with some ice in it. The vaccine should never be out of a fridge or cold flask or in direct sunlight – not even for a few minutes.
- 2. Preparing the water before adding the vaccine:** The water needs to be left in an open plastic container such as a dish or plastic drum for at least an hour before you add the vaccine, the water must be clear and clean. **DO NOT USE A METAL BOWL OR CONTAINER!** Put in half a cup of skim milk (fresh or pasteurised) or two tablespoons of skim milk powder into the bowl of water. This stabilises the water and boosts the vaccine.
- 3. Adding the vaccine to the water:** Put the glass bottle containing the vaccine pill under water. While under water, pull out the rubber stopper and rinse until the vaccine has dissolved out of the bottle.
- 4. Distributing the vaccine to farmers:** This mixture must then be decanted into farmers' containers. The mixture must be used up within 4 hours of mixing. Once the mixture has stood for 4 hours or more, the vaccine will be destroyed and it will not protect the chickens against Newcastle Disease.
- 5. Transporting the vaccine mixture:** A 2-litre container of vaccine mixture will be sufficient for most home flocks. The vaccine should be carried in a glass or plastic container. It must be put inside a bag (preferably a brown paper bag) to avoid exposure to direct sunlight, which can kill the vaccine.
- 6. Giving the vaccine mixture to the chickens:** As soon as the farmers get home, they must give the vaccine mixture to their chickens. They must not use a metal container but can either use a plastic bowl or local options such as a cut tyre or a grinding stone. It is important to starve the chickens of water overnight so that you can be sure that they will drink the mixture quickly. Starve the chickens of water by locking them up overnight without any water so that they drink the vaccine mixture quickly.



6.2 Fowlpox

Description	Prevention	Management	Treatment
<p>Sores/swellings occur on the wattles, comb and skin of the face. They start as a pale spot and become yellowish and swollen before drying out to form a thick dark scab. Swellings around the nostrils can cause a nasal discharge. Sores/swellings on the eyelids may cause complete closure of the eyes. Fowl pox can also develop in the mucous membranes of the mouth and this called wetpox or fowl diphtheria.</p> 	<p>Prevent the disease by vaccinating with fowl pox vaccine.</p> <p>Use a syringe to mix the diluent (fluid) and the vaccine and then dip a 14/15 gauge needle into the vaccine mixture and shallowly pierce the skin on the outside of the chickens thigh (to a depth of 3 mm). It is recommended that birds be vaccinated in the first few weeks of life and again at 12-16 weeks. Older chickens can also be vaccinated. Vaccination should result in life long immunity. Isolate sick birds to prevent spread of the disease.</p> <p>Do not vaccinate during, or shortly after, an outbreak of the disease.</p>	<p>Exclude fleas and mosquitoes from the environment as they are the vectors that transmit the disease between chickens.</p> <p>Apply carbodust in the sleeping areas and where they "sand-bath".</p> <p>Apply carbodust to standing water to control mosquitoes.</p>	<p>There is no treatment for fowl pox but a farmer can use an iodine spray or black shoe polish (which contains iodine) on the sores to help them dry out and to prevent secondary infections.</p>

6.3 Coccidiosis

Description	Prevention	Management	Treatment
<p>This is due to an infection in the gut, which results in bloody diarrhoea. The birds are also listless and not interested in eating or drinking. Coccidiosis will kill chickens if left untreated.</p> 	<p>The organisms that cause coccidiosis are always present in chicken flocks so it is hard to treat or manage.</p> 	<p>Coccidiosis can be set off by stress and nutritional problems so try to avoid these.</p> <p>The water must be kept clean. Wash water containers regularly.</p>	<p>Treat sick chickens with an antibiotic powder mixed with water.</p>

6.4 Fowl Cholera

Description	Prevention	Management	Treatment
<p>Infected chickens are hot and shiver. Slimy mucous comes from the mouth. They have watery diarrhoea with specks of blood in it. Chronic cases show symptoms of a cold and develop swellings of the joints of the wings and/or legs and the wattles. Lameness and drooping of a wing may result.</p> 	<p>Vaccination and isolation of the sick chickens to prevent spread to healthy chickens.</p>	<p>Rats carry this disease so prevent rats in the chicken cages/houses</p>	<p>Treat infected chickens with an antibiotic powder mixed with water.</p>

6.5 Gumboro

Description	Prevention	Management	Treatment
<p>This disease is also known as Infectious Bursal Disease and causes inflammation of the cloaca. Chickens have watery diarrhoea and soiled vent feathers. Gumboro results in a weakened immune system and the infected chicken will show signs of secondary infections.</p> 	<p>Vaccinate against Gumboro.</p>	<p>It is spread in the faeces so keep infected birds separate and prevent healthy chickens coming in contact with the infected faeces (practice biocontrol)</p>	<p>Treat the secondary infections with antibiotic products such as Consumix plus or Coliprim.</p>

6.6 Bumblefoot

Description	Prevention	Management	Treatment
<p>The chickens become lame in one leg and the pad of that foot is found to be swollen and painful. A brownish corn is usually found over the centre of the swelling. Pus may come from the side of the corn.</p> 	<p>Bumble foot often develops in wet or moist environments and is initiated by cuts in feet which provide entry to bacteria. General cleanliness is important. Keep infected chickens separate from the rest of the flock.</p> <p>Dispose of the pus properly if you clean the foot in order to prevent spread.</p>	<p>General cleanliness in the area where the chickens roam is important. This includes preventing contamination of the area with pus from abscesses on other animals.</p>	<p>Remove the corn and clean the wound with iodine or salt water to remove the pus.</p> <p>Spray the cavity with wound spray and cover it if possible to keep it clean. Inject 0.5 ml long acting oxy-tetracycline such as Terramycin LA into the chicken's upper leg muscle.</p> <p>Burn the pus and the corn to prevent spread to other chickens and disinfect any tools you have used.</p>

7. Internal parasites

7.1 Roundworm

Description	Prevention	Management	Treatment
<p>The chickens may not be growing properly or may show signs of anaemia (pale wattles and combs). There may be worms in the intestine when you slaughter the chicken. There may also be signs of diarrhoea. Severe infestations can lead to death of the chicken.</p> 	<p>Treat whole flock twice a year with a dewormer. Commercial products are available for poultry such as the Bayer product Flubenol, which is a broad spectrum product for pigs and chickens. You can also use products registered for pigeons or ostriches. Some rural farmers try putting pieces of aloe in water to control worms.</p>	<p>Prevent the buildup of manure in the chicken house or in the area where they roost. Keep your chickens healthy by feeding them properly so that they are not susceptible to parasites.</p>	<p>Catch and dose individual chickens that show signs of being infected with worms. Deworming can also be done in the drinking water if you are treating the whole flock.</p>

7.2 Tapeworm

Description	Prevention	Management	Treatment
<p>Tapeworms, also referred to as cestodes, are flat, ribbon-shaped, segmented intestinal worms belonging to the cestode family. They are commonly found in the intestinal tract of backyard or free range chickens worldwide. Unlike roundworms that live freely in the intestinal tract, tapeworms anchor themselves into to the wall of the small intestine using hook-like mouthparts. Tapeworms won't actually cause physical damage to the intestinal wall, however by taking all the nutrients away from the bird, it is still damaging to their health, resulting in stunted growth/weight loss, nutrition deficiencies, and increased risk of infection or disease.</p> <p>Once the tapeworm has matured into an adult, it sloughs off part of it's segments which also contain eggs, which gets passed out of the intestines and into the chicken's feces and contaminating the surrounding environment. Intermediate hosts will consume the sloughed tapeworm and its eggs, where the eggs will grow into larvae, and the cycle repeats itself.</p> <div style="display: flex; justify-content: space-around;">   </div>	<p>Treat whole flock twice a year with a dewormer with active ingredient Albendazole often there are no registered products but treatment registered for ostriches will work.</p>	<p>Prevent the buildup of manure in the chicken house or in the area where they roost. Keep your chickens healthy by feeding them properly so that they are not susceptible to parasites.</p>	<p>Catch and dose individual chickens that show signs of being infected with worms. Deworming can also be done in the drinking water if you are treating the whole flock.</p>

8. External parasites

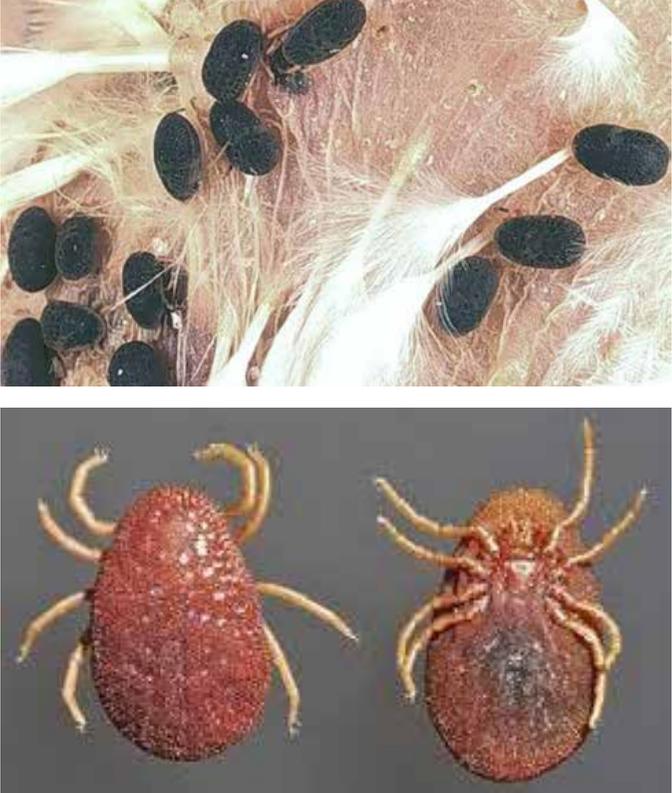
8.1 Scaly leg mites (*Knemidocoptes mutans*)

Description	Prevention	Management	Treatment
<p>Scaly leg mites burrow underneath the scales on the feet and legs causing roughness and lameness.</p> 	<p>Mites are spread by contact so it is important to treat and isolate the infected chickens.</p>	<p>Houses or cages should be cleaned regularly and, if possible, disinfected.</p>	<p>Rub Benzyl Benzoate over the legs. This can be bought at chemists where it is known as Ascabiol, which is usually used for treating scabies in children.</p>

8.2 Chicken mites (*Dermanyssus*)

Description	Prevention	Management	Treatment
<p>Red mites are very small and can appear blue or red after feeding on chicken blood. They infest houses, often hiding in cracks.</p> 	<p>They are carried by chickens, so buying infected chickens can cause infestation of your flock. Wood ash can also be placed in an old tin bath for the chickens to 'bath' in to reduce parasites.</p>	<p>Houses or cages should be cleaned regularly and, if possible, disinfected.</p>	<p>Dust the chickens with Karbadust or similar. Put the chicken in a packet/bag with its head sticking out. Put Karbadust in the bag/packet and shake it gently to dust the bird thoroughly.</p>

8.3 Tampan Fowl ticks (*Argus persicus*)

Description	Prevention	Management	Treatment
<p>The bird is pale/ anaemic and is often paralysed. It has red spots where the tampan has been feeding. Tampan only feed at night so cannot be seen on the chicken in daylight, which makes them hard to identify.</p> 	<p>Do not buy new chickens from infected flocks. Wood ash can be placed in an old tin bath for the chickens to 'bath' in to reduce parasites.</p>	<p>Houses or cages should be cleaned regularly and, if possible, disinfected. The tampan hide deep in the wood so the house or cage needs to be thoroughly cleaned.</p>	<p>Dust the chickens with Karbadust or similar. Put the chicken in a packet/bag with its head sticking out. Put Karbadust in the bag/packet and shake it gently to dust the bird thoroughly.</p>

8.4 Avain Lice (Menopon gallinae)

Description	Prevention	Management	Treatment
 <p>Ruffled feathers falling out from all over the body. They can be found crawling on the bird at the base of the feathers but are fast-moving so soon move out of the light when feathers are parted. They spread from bird to bird by direct contact and clumps of eggs are usually found at the base of the feathers below the vent</p>	<p>Do not buy new birds from infected flocks. Wood ash can be placed in an old tin bath for the chickens to 'bath' in to reduce parasites.</p>	<p>Houses or cages should be cleaned regularly and, if possible, disinfected.</p>	<p>Dust the bird with Karbadust or similar. Put the chicken in a packet/bag with its head sticking out. Put Karbadust in the bag/ packet and shake it gently to dust the bird thoroughly.</p>

9. Eating Disorders

9.1 Cannibalism

Description	Prevention	Management	Treatment
<div style="display: flex; flex-direction: column; align-items: flex-start;">   </div> <p>Where the chickens have nutrient deficiencies, the farmers will notice that their chickens' feathers are looking untidy and not smooth. Cannibalism has been linked to deficiencies in protein, sodium and phosphorus. They hang their wings and are listless. They will often start cannibalizing each other. Normally this starts with them pecking feathers of other birds and then pecking at the wounds that form.</p>	<p>Chickens need to eat more than grains like maize or sorghum especially if they are to be confined. They should be given access to protein sources. See pages 13-14.</p>	<p>If chickens are confined, feed them a diet of sufficient protein and other nutrients. See section on nutrition.</p>	<p>Separate chickens that are being pecked to allow them to heal as once they are being pecked other chickens will start pecking them.</p>

9.2 Egg eating

Description	Prevention	Management	Treatment
<p>Laying hens will become calcium deficient if they do not get calcium supplements either artificially or in their diets. The most common symptom of this is when the hens start stealing or eating eggs of other chickens or of their own. Once hens get into this habit, they can often not be rehabilitated and will need to be culled.</p> 	<p>Chickens should be given some form of calcium supplement during and after laying.</p>	<p>Feeding boiled eggshells to hens can help prevent egg eating behaviour. A calcium replacement has to be given to their diet. Bone meal can also be given as a supplement that chickens can peck at as they need it. Although eggshells fed back to chickens are a common intervention, these eggshells need to be boiled or burnt, otherwise the chickens will recognise the taste and start cannibalising eggs.</p>	<p>Chickens have to be culled.</p>

PART 3

Marketing and management decisions



10.1 Marketing and management decisions

Most homesteads have small flocks of indigenous chickens. With increased management, this can change rapidly and flocks of 100-150 chickens are often built up. The farmer needs to decide how many chickens would be optimal for the flock, given how expensive it becomes to feed chickens. The farmer can then make decisions about household chicken and egg consumption spread over the year versus how much of the surplus to sell.

10.2 Managing the flock numbers

The family should decide how many hens and roosters they need to meet their household needs or marketing aims. Chickens cost money to keep because when there are a lot of them they cannot rely on scavenging and the family must supplement them with food. When flocks grow, they are also likely to get sick more often and thus more money must be spent on medicine. So, the family must decide how many hens they need to supply eggs and to produce chicks. Then they can work out how many roosters they need (1 rooster for 10 hens). All other roosters should be sold as soon as they reach a good size as they just cost money to keep. Older hens and roosters also become less productive and fight with each other as they get older so the family should replace them once they are more than 2 years of age. They might need to keep records to know how old their chickens are. With minimal improvements, a flock of 5 good hens and a rooster could produce 50 marketable offspring per year (5 hens x 2 hatchings x 5 chicks raised/batch).

10.3 Producing a more marketable chicken

Because of their flavour and texture, the meat of household chickens is highly sought-after even in big towns and cities – people are prepared to pay well over R150 for a chicken! If small farmers have such a market, it makes it worthwhile to feed them properly. If there is a demand by the market for certain types or colours, then the family can try to select for these characteristics. They can keep hens and roosters that have the favourable characteristics and get rid (slaughter or sell) the ones that do not. Over time they will produce more of the favourable types of chickens.



10.4 Improving egg and chick production

Besides feeding their hens properly so that they increase the number of eggs they lay in a year, here are some interventions that can ensure that a family gets more high quality eggs from their flock.

10.4.1 Collecting and marking eggs

The family should collect eggs on a daily basis so that they have eggs to eat and fresh eggs to put under a hen that becomes broody. If eggs are left in the nests, they sometimes go rotten before a hen incubates them, and sometimes they are eaten by dogs. The family can put marks (for example a star with a pencil) on the eggs to help them manage them. For example, when they see a fresh egg in the nest, they can mark it. The next day when there is another egg in the nest, they can take out the one that has a mark and store it indoors. They can then put a mark on the new egg so that they will recognise it the next day. In this way they will know which eggs have been laid each day. This means that they can remove the older eggs and leave the freshest one so that the hen continues to use the same nest. The family can also write on each egg the date when it is laid. This will help them to always eat the older ones first. It will also allow them to give a broody hen a set of fresh eggs that are more likely to hatch.

10.4.2 Producing unfertilized eggs

Some people prefer eggs that have not been fertilized by a rooster. A family can produce eggs without a rooster but this would require confining the hens and providing all their food needs. It might be better to keep commercial layers if the family plans to produce unfertilized eggs.

10.4.3 Improved storage of eggs

It is best to store eggs in a cool place. Eggs that are to be eaten can be kept in a fridge but if the family plans to use them for hatching then they should just keep them in a cool room. If the family is selling eggs, they need to be sure that they are fresh and of a high quality. It is possible to check for freshness by placing the eggs in a container of water and seeing how they float. Fresher eggs float well, old eggs less well, while rotten eggs will not float at all.



10.4.4 Keeping chicks alive

Chick mortality is often a major impediment to production efficiency. A number of interventions can be implemented by a farmer who wants to prevent these mortalities.

Taking the chicken and chick out of the flock and keeping it inside the hut at night will prevent mortalities from exposure and protect against predators. This can also be done by putting them in the cage or covered enclosure.

Separating and feeding the chicks a high protein feed, whether homemade or bought, will decrease the mortalities substantially. Farmers however need to be careful of not feeding for too long as this reduces the farmer's profit margins.

Creep feeding chicks using a bottle with cut out holes that only they can reach into is also a method that prevents the rest of the flock eating the expensive protein feed.



Chick enclosure and preparing homemade chick feed

11. Record-keeping

Record keeping allows the family to monitor their flock. They can tell whether their flock is growing or shrinking and will know exactly how many eggs they are getting and how many chickens they are selling or slaughtering. They will know what challenges they are experiencing and will know exactly how many chickens are dying or being taken by predators. The family will also have a record of what it is costing them to keep their chickens. Examples of a monthly chicken record sheet and a daily egg record sheet are provided on page 44.





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