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Indigenous chicken production manual



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Introduction

Indigenous chicken farming has been described variously as backyard poultry rearing, rural poultry production or scavenging. For our purpose, any flock of chicken that are kept under free-range management and on which no selection of breeds or improvement by crossbreeding has been done is considered as a flock of indigenous chicken. Indigenous chicken lay between 8 and 15 eggs per clutch depending on availability of feed. They are broody and hatch about 80% of the eggs they sit on. They attain 2-3 clutches in a year.

The few chicks that attain 20-30% maturity form most of the replacement stock. These birds, though under poor management, live within the families for many years. They form an important part of family life playing important cultural roles besides being a valuable source of protein and income.

Indigenous chicken have not attained their full production potential due to exposure to risks that militate against their survival and productivity. Constraints to production include diseases, predators and poor nutrition. Indigenous chicken can be profitable if managed well. Control of common diseases in the free-range system could improve survival rate of chicks by at least 30% while improved feeding, housing and disease control could increase survival rate to 80%.

Families could improve their income and supply of poultry products (meat and eggs) by practising a combination of recommendations given in this manual. The aim of this manual is to create awareness and interest in indigenous chicken production. The reader is encouraged to consult the Ministry of Livestock and Fisheries Development and the Kenya Agricultural Research Institute (KARI) for further information.

General management

Feeding

Birds need feeds that give the necessary elements for body functions, including growth, and egg and meat production. This is a requirement that the free-range production system does not meet adequately. To attain a balanced diet, it is recommended that in addition to scavenging, a farmer should include protein supplements from one of the recommended cheap but quality sources. This can be provided either as a pre-mix or given through cafeteria system.

Animals need carbohydrates for supply of energy and heat. In addition to kitchen waste, birds should be given feed rich in energy such as maize, millet, cassava, sweetpotatoes and sorghum.

Proteins

Proteins are body building blocks that are essential for growth and production. Feed birds on protein-rich non-conventional feed such as yeast, 'Busaa' waste (dregs [*Machicha*]), sunflower cake, heat-treated soya or ordinary beans, lucerne, peas,

lupins, fishmeal (*Omena*), dried blood, rumen content, earthworms and termites. Termites are trapped by slightly watering leafy waste such as maize stover and rubbish collected from the compound and leaving them outside for 2 or 3 days.

Minerals

Minerals are trace elements found in plant seeds and grate. Minerals such as calcium that are important for bone and egg shell formation are found in fishmeal.

Vitamins

Vitamins are necessary for growth and reproduction. The rich, yellow pigment in the skin and egg yolk of indigenous chicken indicates presence of carotenoids from fresh vegetation such as grass and vegetables, the precursors of vitamin A.

Water

Water is often not provided because farmers assume that the birds find it around the homestead. Birds drink water from ponds and open tins during the rains but it is better to give them clean and fresh water all the time at a specific place (Fig. 1). It is easy to medicate birds that drink from a central place.

Housing

Protective housing should be used in free-range poultry farming system to protect chicks from predators and bad weather. Several housing structures including the dome-shaped stick basket popular in western Kenya variably known as *Lisera*, *Liuli* or *Osero* (Fig. 2) which is ideal for daytime housing are found. Other alternatives include the stick-built *Kiduli* and standard poultry houses (Fig. 3). A good housing structure should be spacious, well lit, airy and dry, easy to clean, have perches for chicken to roost and protected from predators.

Cleaning and disinfecting

A chicken house should be decontaminated using fumes (fumigation) produced from chemicals such potassium permanganate and formaline to kill germs. The house must be tightly sealed so that the fumes remain in circulation for 18-24 h. These conditions are not possible for indigenous poultry houses. Contamination should be avoided by restricting entry into the house, quarantining all new chicken by separating them from the flock,

keeping the house clean and wiping all surfaces with one part of jik in 3 parts of water. Keep non-concrete floors smooth by smearing regularly with cow dung and dusting with pesticides such as Sevin or Actelic to keep away vermin.



Fig. 1. Give clean and fresh water in a specific plave



Fig. 2. (left) Protective housing shields chicks from predators and harsh weather. (Fig. 3) (right) Simple houses built with sticks, mud and polythene paper are easy and cheaper to construct

Breeding

Avoid inbreeding by introducing one cock for every 10 hens every 2 years.

Selection of eggs for setting

Improved nutrition can raise the average number of eggs laid per clutch by 100%. Fertilised eggs are live and successful hatching depends on how they are taken care of from laying till setting. The broad end of an egg has an air sac through which the egg breathes. Eggs should be stored with the broad end facing upwards. The egg shell is porous (has little holes which if blocked may suffocate the embryo [baby chick]). To prevent rotting, eggs must be stored in a clean and dry place. Since fertile eggs grow slowly, eggs that are more than 14 days old should not be used for hatching.

Shortening the reproductive cycle

Table 1 compares normal and shortened reproductive cycles.

Hens lay eggs earlier, doubling the number of clutches per hen per year while the improved management increases survival rates from 2-6.

Table 1. Normal and shortened reproductive cycles

Normal cycle				
Laying	Setting	Brooding	Resting	Total
15-20 days	21 days	60 days	0 days	101 days
15 eggs	10 eggs	8 chicks		2 growers
Shortened cycle				
15-20 days	21 days	0 days	10 days	61 days
15 eggs	10 eggs	8 chicks		6 growers

Serial hatching

Hens or ducks can be used to sit on eggs continuously for 2 or more times by removing chicks every time they hatch and replacing them with new eggs. If this is coupled with synchronisation, then a farmer could hatch more chicks without using an incubator. Ducks can sit on 30-35 eggs and can be used for up to 6 consecutive times.

Synchronised hatching

When hens that started laying within the same week reach broodiness, the 1st hen to reach this stage can be delayed by being given one egg to sit on. This can be repeated for the 2nd and 3rd hens so that finally all the hens are set on one day (Fig. 4). On the day of setting, all the dummy eggs should be destroyed. Chicks that

hatch on the same day fit in well with feeding and vaccination programmes. The time between the 1st hen and the last should not be more than one week.



Fig. 4. Synchronised ducks sitting on eggs

Management of chicks

To prevent high mortality, chicks must be kept in a safe, warm and clean environment and must have easy-to-digest feed at all times. Chicks may be removed from the hatching hen or duck and kept separate using the following brooding methods:

- % In a carton box with ventilation holes drilled around the upper side with wood shavings as bedding and warmed by either a lantern or by covering the top with a blanket or a clean sisal sack at night.
- % In 'Liuli' on a sisal sack or wood shavings and warmed as above. Do not use a lantern under the basket. The basket or Liuli can be taken out when the sun shines. However, the birds should be protected from very hot sun and rain.

Hens that do not discriminate chicks can be trained as foster hens. Up to 65 chicks of different ages can be brooded by such a hen (Fig. 5). When it gets cold, the youngest chicks are the 1st to go under the hen and the oldest will come later around the hen.



Fig. 5. A foster hen with chicks of different ages

Diseases

Diseases may be defined as illness of one or more of the body organs or tissues, caused by pathogens or germs. Germs (virus, bacteria) and protozoa are classified according to size. Parasites, though not germs, can cause ill health. The significance of a disease depends on the rate of infection or infestation and the number of birds that die. Death rates depend on age and nutritional status.

Protozoa

Protozoa such as *Emiria tenella* (coccidia) are larger than bacteria hence more easily visible by microscope. Outbreaks of protozoan diseases are an indication of poor sanitation and hygiene.

Prevention and control

Vaccination and isolation of healthy birds from sick ones and proper disposal of dead birds can prevent diseases.

Vaccination

Vaccination is the use of mild, live or inactivated infective agent (virus or bacteria) to stimulate production of antibodies to a specific infective agent. Antibodies are chemical substances produced within the host body. They recognise and destroy the virus or bacteria used during vaccination before onset of disease. Vaccines are prepared from the same virus or bacteria that cause the disease to be vaccinated against. They are sensitive to heat, pH (acidity) and therefore should be handled following manufacturers' instructions.

Vaccination programmes

Vaccination for indigenous chicken in a free-range system depends on age, disease incidence, severity and status of endemic diseases (Table 2).

Table 2. Disease occurrence and recommended treatment

Disease	Species affected	Age affected	Symptoms	Treatment
NCD	Chicken, turkeys & domestic birds	All	Depression, poor appetite, coughing and difficult breathing, diarrhoea, nervous signs, twisted neck and death in large numbers in a short time	Vaccination Antibiotics to control secondary infections
Fowl pox	Chicken and turkeys	All but serious at point of lay	Spreading eruption on comb, wattle nose & other featherless parts, poor appetite/egg production, depression. Deaths may result in chicks	"
Infectious Bronchitis	Chicken	All	Chicks/growers: Depression, huddling, poor appetite, coughing, gasping/difficult breathing, death. Adult: Coughing/noisy breathing, few eggs laid/with soft shells	"
Avian Influenza	Chicken and turkeys	All	Depression, coughing, discharge from eyes/nosstrils, swollen face, poor sight and feeding, nervous signs and diarrhoea	Destroy sick birds
IBD	Chicken	2-6 wk	Depression, poor appetite, unsteady walk, pecking at vent and diarrhoea	Control by vaccination

Bacterial diseases

Bacteria are minute germs that can only be seen under microscopes. They cause diseases that can be prevented through good hygiene and treated using antibiotics such as Tetracycline.

Salmonella. There are 3 types of infection caused by the Salmonella microorganism. These are pullorum disease, fowl typhoid disease and salmonellosis.

Pullorum disease caused by sub-species *S. pullorum* is fatal in chicks. It is transmitted from hen to chicks during egg formation, contamination of eggs at laying or the chicks are infected from faeces. Symptoms include dead embryo in eggs that do not hatch, chicks develop wet vents (tail) within the 1st week, whitish diarrhoea, huddling and difficulty in breathing. Mortality can reach 100% in the 1st 2 weeks.

Fowl typhoid is caused by the species *S. gallinarum* and is severe in growers and adult birds. It is spread by contamination of feed and water by faecal matter from infected birds. Symptoms include drop in egg production, egg fertility and hatchability, anorexia and dullness followed by sudden death.

Salmonellosis is caused by any other Salmonella species. It is severe in both chicks and adult birds. It is spread by contamination of eggs at laying or to both chicks and adults through contaminated feed, water and faeces. Symptoms include drop in egg production, egg fertility and hatchability, anorexia and dullness followed by sudden death.

Sanitation, and eggs and nest fumigation using formaldehyde pellets in the nest can prevent it. Broad-spectrum antibiotics such as sulphur drugs can control infections. Control is by vaccination (Table 3).

Collibacillosis is acute in chicks and chronic in adult chicken. It is transmitted through eggs to chicks and through contaminated faeces, feed and water to both adult birds and chicks. Symptoms include respiratory distress, diarrhoea and high mortality in chicks while those in embryonic infection include dead embryos in spoiled eggs. It can be avoided by maintaining standard egg sanitation and using broad-spectrum antibiotics such as sulphur and tetracycline to treat and to reduce transmission. It can be controlled by vaccinating with bacterin.

Infectious Coryza can be acute, mild or chronic. It is spread by faecal matter, aerosols or through contaminated feed and water. Symptoms include swollen watery eyes, nasal discharge, laboured breathing and drop in egg production. It can be prevented by vaccinating with bacterin in water at 10-12 weeks and 16-18 weeks. All clinically ill birds should be destroyed.

Table 3. Disease occurrence and recommended treatment

Disease	Species affected	Age affected	Symptoms	Treatment
Salmonellosis	Chicken, turkeys, ducks	Severe in chicks up to 3 months, moderate in adults	Dejection, ruffle feathers, dosing, huddle together in chicks, poor appetite, thirst, soiled vents, and high deaths	Vaccination Furazolidone sulphur drugs (S-Dime)
Collibacillosis	Chicken, turkeys, ducks	4-8 wk	Coughing, sneezing, dejection, poor appetite, poor growth	Antibiotics Furazolidone and Sulphur
Infectious Coryza	Chicken	Any age	Swollen face, sneezing and difficult breathing, loss of condition, low egg production and variable death	Antibiotics

Parasitic diseases

Parasites are organisms that live on others without benefit to the host and include worms living in the opening of organs, and lice and fleas on the external. The parasites may cause diseases, weakening the system so that other disease-causing agents thrive or transmit diseases. Worms are internal parasites that inhabit the alimentary canal and other internal organs such as proventriculus, gizzards, trachea, lungs. There are 2 groups of worms, round worms and flat worms (Fig. 6)



Fig 6. Multiple infestations by 4 species of worms

Round worms *Ascridia galli* infects both chicks and adult chicken. Eggs are laid by female worms in birds' intestines and are passed out in droppings. They mature in one week or more after which they may be swallowed up by chicken, hatch and cause fresh infection. Clinical signs include slow growth (stunted), culled feathers and drooping head, thirst, low egg production and death due to intestinal obstruction in young birds. Due to their feeding habits, it is difficult to prevent this condition in scavenging chicken.

Gape worms *Syngamus trachea* roundworms infect the trachea (windpipe) of chicken. Adult worms live and lay eggs in the birds' trachea; the eggs may be coughed out or into the oesophagus and swallowed in which case the hen passes the eggs in stool. The eggs hatch to larvae which infect chicken or enter simple carriers (intermediate hosts) such as beetles and earthworms. Symptoms include difficulty in breathing and gasping for air, hence the term gapeworm, culling and huddling and death due to suffocation. The condition can be controlled by giving Thiabendazole or *Gapex* in drinking water.

Tape worm *Raillietina tetragona* infests scavenging chicken. The worms pass eggs either as free eggs or retained in a segment. Intermediate hosts such as beetles and snails ingest the eggs or segments. The eggs develop in the host and in turn infect chicken that feed on the intermediate hosts. Symptoms include stunting, thirst, poor health, low egg production and death in young birds on poor diets. It can be

prevented in scavenging chicken by using clean containers and drenching at 3-month intervals with Albendazole and Fenbendazole.

Isolation disposal of dead birds

Do not introduce new birds purchased from markets or given as gifts directly in to the flock. Keep them separate and observe them for at least one week. Sick birds should be confined away from the rest. Carcasses should be disposed of by burying at more than 3 feet underground.

Viral diseases

Viruses are the smallest germs and cause incurable viral diseases. They should be prevented by early vaccination.

Newcastle disease is the most economically important and the only notifiable disease in chicken. It is spread by sick birds, dogs, wild birds and man. Symptoms include respiratory stress, lack of appetite, diarrhoea, nervous symptoms and high mortality. Sometimes death can be sudden without the symptoms (Fig. 7). Chicken that reach the tertiary stage showing nervous symptoms may survive but will always show lack of nervous co-ordination. The only way to protect chicken is by early vaccination.

Fowl Pox is a chronic disease in adult birds but acute and fatal among chicks and growers. It is caused by Pox virus and transmitted by mosquito bites and mechanically through broken skin. Clinical symptoms include pimples or scabs on the birds' combs (Fig. 8), wattle and eyelids, a watery discharge from eyes, difficulty in breathing indicated by whizzing sound and loss of appetite. Mortality is low in adult chicken but high in chicks and growers. There is usually a drop in egg production in laying birds. The disease can be avoided by clearing bushes or controlled by vaccinating the chicken when they are 4 weeks old by wing web stab using a needle. Follow this by examining the vaccination site after 7 days for reaction. Pox virus can survive for 10 years in the soil. Since infected chicken are predisposed to secondary infections, infected chicken should be covered with an antibiotic treatment.



Fig. 7. (left) This hen did not show signs of sickness when it was put in the basket with chicks but died of acute Newcastle disease 4 h later.

Fig 8. (right) A hen with Fowl Pox pimples on the comb

Infectious bronchitis is a contagious disease, acute in chicks and chronic in adult birds. The disease is transmitted from sick birds through faeces, contamination of litter and by air. Symptoms in adults include sneezing and watery eyes, nasal discharge, wet droppings, poor egg shell with no death unless from secondary infection. Chicks gasp and cough, breath noisily, have watery eyes and nostrils, become depressed and huddle. Mortality can be as high as 25%. It is controlled by vaccinating with multiple serotype or covering with antibiotics during outbreaks.

Avian Influenza (Fowl plague) is an acute disease in chicken, ducks, turkeys and wild birds. It is transmitted through contaminated faeces, water and air. Symptoms include respiratory distress, sneezing, sinusitis (swollen head and face), emaciation and nervous disorder. Infected birds should be destroyed and the location of infection quarantined.

Infectious Bursa Disease (Gumboro) (Fig. 9) is common in hatcheries and birds are likely to be infected by the time they are acquired. It is spread through feed, water and faeces. It affects young chicken aged 2-6 weeks. It is rare in indigenous birds. Symptoms include diarrhoea, sleepiness and depression, ruffled feathers, and trembling of the head. Mortality is between 50 and 80%. The disease causes immuno-suppression, predisposing the bird to other infections. It can be controlled by vaccinating the chicken when they are 2-6 weeks old through drinking water.



Fig. 9. Death caused by Infectious bursa disease

External parasites of poultry

External parasites infest poultry houses and breed in cracks of the buildings. The species commonly found include lice, mites, fleas and ticks, though very rare. They affect all ages of birds but are severe in chicks. They are spread by infected birds and pets.

Lice lay eggs on the feathers and suck blood from chicken, causing discomfort.

Mites do not live on the host but in cracks in the poultry houses. They suck blood from the birds at night and return to the cracks during the day. In severe infections, birds become anaemic.

Fleas suck blood from birds after which they drop and lay eggs in the litter. The eggs mature to adult fleas. They can survive for up to a month without feeding.

Prevention

External parasites can be avoided by maintaining cleanliness of the poultry nests and houses and sealing cracks in the walls and on the floors. They can be controlled by applying sevine powder, Malathion dust or actelic dust (Table 4).

Table 4. Disease occurrence and recommended treatment

Disease	Species affected	Age affected	Symptoms	Treatment
Coccidiosis	All	2-6 wk and also older birds	Depression, ruffle feathers, poor appetite, poor growth, diarrhoea with blood and some death	Sulphonamides (S-Dime) and Amprolium.
Round worms	All	Over 4 wk	Loss of condition, slow growth, littleness and diarrhoea, death in chicks	Levamisole and ascarex
Gapeworm (<i>Synagmus Trachea</i>)	Chicken, Turkeys and other species	3-12 wk not severe in older birds	Gasping for air, difficult breathing, poor appetite and condition and death	Levamisole and ascarex
Tapeworm	Mainly chicken, Turkeys	3-12 wk not severe in older birds	Loss of condition, slow growth, droopiness, inactive and littleness	Albendazole
Other worms	All	All ages	No signs of illness	Non
External parasites	All	All ages	Depression, itching and scratching sometimes-causing wounds, could be severe among chicks	Sevin powder

Record keeping

Good records on chicken feed, housing, household consumption and overall cost help the farmer to assess the level of profit. Simple benefits analysis can be done by subtracting the cost of inputs from the value of outputs.

Recommended further reading

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