

Broiler Feed & Management Guide



CAPITAL FOODS
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1ST EDITION

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1. Introduction

Poultry production is a fast growing sector in Zimbabwe. The imposition of stringent measures on importation of poultry meat has also boosted local production with the main suppliers expanding their breeding and hatchery facilities to cope with increasing demand, 65% of which has mainly emanated from the ‘informal’ or small-scale sector. The Ross, Cobb 500 and Hubbard Flex are the main broiler breeds in the country. However, the majority of producers in this sector lack the prerequisite skills and technical know-how on the basics of broiler production and this manual seeks to address that gap in order to optimise broiler production.

Feed is the farmer’s most important and expensive input. It will represent about 70% of production costs, so it is important that a farmer buys feeds only from reputable, certified manufacturers who have the knowledge and capacity to produce good quality feeds. Farmers should be confident that their feeds are formulated by experienced Nutritionists to meet the specific requirements of their birds and that the feeds have been tested and registered by the relevant authorities.

At Capital Foods we pride ourselves on a long history of consistently producing high quality and cost effective feeds. We also manufacture concentrates, maxi packs and premixes to cater for farmers who have got their own raw materials. Our nutritionists can also formulate custom rations on request.

2. The Broiler Production Unit

2.1 The Poultry Unit Site

2.1.1 Location in relation to other poultry farms/units

The broiler unit should be located within the security fence near the farmhouse. The distance from the nearest poultry farm should be at least 1 km for broilers and at least 3 km should the farm stock layer birds. Free roaming chickens from the compounds should be restrained and not access the broiler unit. This is done to minimise cross infections from neighbouring farms or units.

2.1.2 Accessibility

The poultry farm / site must be reachable at all times. Feed and chicks will need to be delivered at various times during the year while finished products such as dressed birds or birds for slaughter will be taken off farm. It is therefore important that an all weather road should serve the farm.

2.1.3 Bio-security and disease control

Vehicles and people coming to the farm from outside may be carrying some germs. These need to be eliminated at the entrance. Wheel and foot dips must be provided at the entrance to the farm in general and to the poultry unit in particular. An all-in all-out system is strongly recommended as it minimises the risk of disease carry over and cross infections of flocks, but where a multi age system will be adopted, a strict bio security programme needs to be in place.

2.1.4 Water Supply

There should be a reliable water source for the broiler farm. The water could be from a borehole, dam or river. These sources must be able to provide water all year round. When using water from a river or dam it must be tested for suitability, and treated if need be, before being offered to chickens.

2.1.5 Electricity

The broiler operation will require electricity for lighting initially or artificial ventilation or to use automated feeding systems, in future. Thus a power supply is quite critical. It may be necessary that a stand-by generator be available in case of power failure.

2.2 Infrastructure and Equipment

2.2.1 Poultry Houses

Houses should be constructed to minimise solar heat gain, as this would cause heat stress in the birds, particularly during the summer months. It is therefore recommended that houses should be constructed in an east-west orientation. The site should be dry and therefore needs drainage to channel water away. In addition to providing accommodation to birds, the housing complex should consist of the following facilities:

- i. Office to keep records and areas to store vaccines, detergents and some equipment
- ii. Bathing and change room facility
- iii. Storage for litter material
- iv. Dead birds need to be disposed of properly to curb the spread of disease. Therefore, an incinerator or mortality pits are vital components of the poultry housing complex.
- v. Foot dips are needed at entrances

TABLE 1: FEATURES OF A HOUSE WITH A CAPACITY TO CARRY 1 000 BIRDS

Distance from perimeter fence	5m
Capacity	1 000 birds
Orientation	East – West
Stocking density	10 birds/m ²
Width	10m (9.1 m clear span)
Length	10m
Height – ground to centre ridge	3.787m
Ground to beam	2.4m
Distance between houses	At least 15 - 20m
Frame/ structure	Steel pole, gum poles
Side walls	500mm high – brick and plastered on both sides
Doors	2.250mm wide x 2000mm high – both gable ends
Slope	< 1:100
Eaves	900mm to 1200mm
Roof: Material	Asbestos or corrugated iron
Slope	15°
Insulation	White paint on outsides

2.2.2 Structural Material

If gum poles are to be used to provide the main structural frame, they need to be of sufficient thickness (at least 10 cm diameter is suggested) and spaced at 2.5 – 3m intervals. If angle iron is used, the recommended specifications are 60x60x6mm with bay spacing of 4.55m and height at eaves of 2.4m.

2.2.3 Sidewalls

Exterior walls should be built on a firm foundation (the depth required for the foundation depends on soil type). A 50mm thick concrete footing should support the base of the foundation. The sidewalls should be built to a height of 50cm above the ground and should be 115 or 230mm thick. Plastering on both sides is important to facilitate easy cleaning and disinfections.

2.2.4 The Floor

Concrete floors - 100mm thickness; are strongly recommended for poultry houses. A concrete mix of 1 to 3 concrete to cement ratio will be suggested, but the suggested mix should be verified with the cement supplier.

This concrete should only be poured after thorough ramming of the earth below. Smooth floor surface (plastic or wooden float) is recommended. The floor should be slightly sloped, as this will allow drainage during cleaning.

2.2.5 The Roof

The roof is normally of corrugated iron or asbestos sheets painted white on the outside. The white paint is to reflect solar radiation so that the interior of the house does not become excessively hot.

Small-scale farmers sometimes use thatching grass but even though it may provide a cool environment inside the poultry house, it harbours vermin and parasites, which may end up being a very big problem.

FIGURE 1: FLAT-ROOF TYPE HOUSING

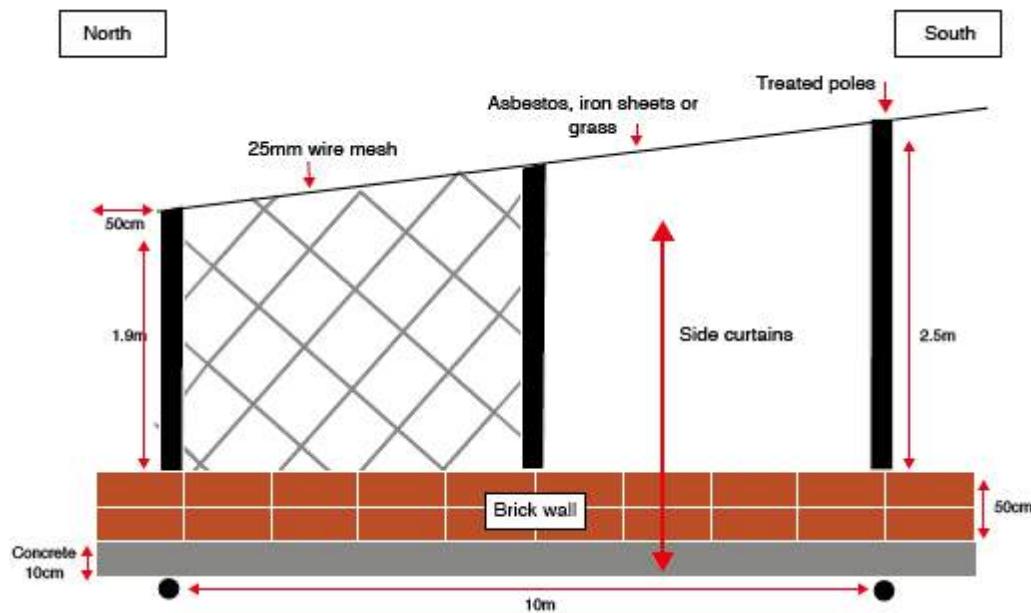
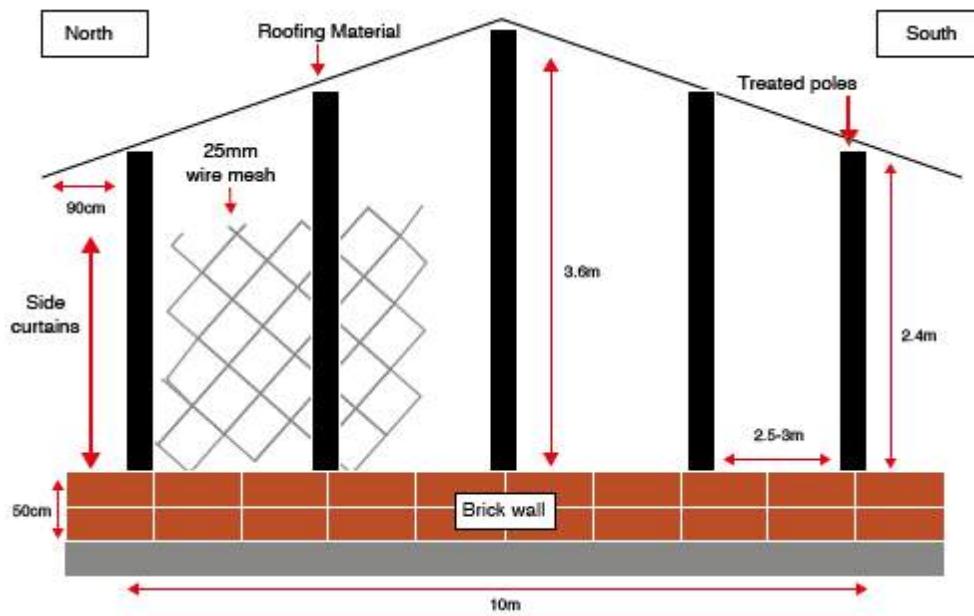


FIGURE 2: THE CONVENTIONAL ROOF-TYPE



2.2.6 Equipment requirements

• Chick Fonts (4 litres)	50 – 75 chicks per font
• Chick trays	50 chicks per tray
• Round Drinkers (standard bell)	1 per 50 – 60 birds
• Nipple drinkers	12 birds per nipple
• Round/Tube feeders	1 per 50 – 60 birds
• Automatic bell drinkers	1 per 75 – 100 birds

2.3 Broiler Chick Management

Management of broiler chicks during the first 2 weeks is critical as mistakes made at this stage are sometimes difficult to correct or cannot be reversed at all.

The following are given as recommendations to ensure better chick survival and growth:

2.3.1 A week before delivery of chicks

- Clean and disinfect cages or floor of the brooding area. Clean the building interior, attached service areas and equipment. Paint walls with white wash.
- Check to make sure equipment is working properly and is adjusted to the correct height. The correct number and type of equipment needs to be determined for each incoming batch of chicks. Any shortfalls will be detrimental to the chicks.
- Remove all the old feed from bins, hoppers and troughs. Disinfect and allow them to dry before new feed comes.
- Place rat/mouse poison where it will not be consumed by chicks
- Place fresh and disinfected litter or bedding material of 7 - 10 cm depth on the floor. Cotton hulls, wood-shavings or chopped dry grass are recommended.

2.3.2 A day before chick arrival

- Set the heating system at 32 – 33 °C at chick level
- Check water system. Adjust to proper height for the chicks to reach. Disinfect and flush the water lines.

- Position the water and feed troughs to ensure that birds have access to feed and water within 1 – 2 metres.
- When all equipment has been assembled, carry out final disinfection.
- Use Formalin 30% and Potassium Permanganate in ratio of 1 to 3, respectively to fumigate.

2.3.3 Day of chick arrival

- Pre-heat the brooding area to about 32 – 33°C and check the brooder temperatures.
- Make sure the water lines or troughs are full and the whole system is operational.
- Avoid stressing the birds during transit. Check noise, ventilation and temperature. Ideally collect day-olds during the early morning or late afternoon/ evening or during the night to reduce the dead on arrivals (DOAs) mainly due to dehydration.
- Assess chick quality at placing. Chicks should be active, have no deformities, should stand on their own, have healed navels, should be dry and should vocalise contentedly. If chick quality is lower than desired, the grower should alert the chick supplier.
- Place the chicks quickly and quietly. As the chicks are placed, trigger water cups or nipples to encourage drinking. In some situations such as small-scale production units, drinking troughs will be used instead of water cups or nipples. It will be necessary under such situations to ensure that chicks are able to drink as soon as they arrive.
- Add a water-soluble stresspack of minerals and vitamins for the first 4 to 5 days to give your chicks a boost. Capital Foods manufactures the Inovet Poultry Stress pack, which is the best option for this.
- Encourage drinking before eating. It is necessary to make sure that water is visible to the chicks especially if nipples and water cups are used.
- When the chicks have been drinking for 3 – 4 hours, feed may then be given. The feed may be placed on khaki paper, which will be suitably placed in the cage, or on the floor. Feeders must be operated at the highest level.

- Perform a crop test after 24hrs by pressing two forefingers against the birds' crop to check if the chicks are consuming the feed.
- Lighting at high intensity must be provided for the first week.

Key Points:

- **Provide chicks with bio-secure, clean and warm housing.** Avoid wind-chill.
- **Control spread of disease by using single-age, (i.e. 'all-in, all-out') housing.**
- **Spread litter evenly.**

2.4 Brooding Management

Brooding refers to the early growing period when young chicks are unable to maintain body temperature without the aid of supplemental heat. Poultry rearing comprises brooding and subsequent growing period until sexual maturity (for layers) or until the birds reach slaughter weight (for broilers).

There are 3 systems for brooding chicks and these are described as follows:

Spot brooding: No surrounds, brooding zone is well lit.

Whole house brooding: Hot air system in conjunction with fans and false ceiling.

Brooding in surrounds: Heater placed above chicks and the birds are kept close to the source of heat by surrounds, which are gradually expanded as the chicks grow.

Any combination of the above systems can be used.

2.5 Temperature Management

Young birds out of the hatchery are unable to maintain constant body temperature without supplementary heat. Thus the brooder house or facility has to be well heated to maintain a constant temperature.

If chicks have to travel long distance from the hatchery to the farm site, these warm conditions have to be provided during transportation to reduce the number of dead-on- arrivals (DOAs).

High temperatures (over-brooding) can cause pasty vents. Lower temperatures can cause pneumonia. These circumstances often result

in increased chick mortality. Suggested brooder temperature regimes are summarised as follows:

0 to 3 days		32 - 33°C
4 to 7 days		30 - 32°C
8 to 14 days		28 - 30°C
15 to 21 days		25 - 28°C
22 days +		Ambient temperature

Artificial heating is provided in a number of ways as shown in the table below:

TABLE 2: HEAT SOURCES FOR BROODING CHICKS

Type	Advantages	Disadvantages
Gas Pancake	Simple, achieves the required temperature. Not labour intensive and can easily be moved	High fire risk. Gas costs are high and not always available. Expensive to install. Fragile
Modro (coal powered)	Cheap to run. Can be used for cooling and heating	Colder at end of house. Fixed in one place. Needs a generator or electricity for the electric motors. High maintenance costs
Charcoal Burner	Cheap to run and easy to make. Can be moved	Uneven heat. Produces smoke. Fire risk.

Infra-red light bulbs can be used but these will only cater for small numbers of chicks, usually 1 per 100 is a common ratio used.

Normal light bulbs (even 100W) will not supply enough heat. High chick mortality rates have been associated with the use of such bulbs as sources of heat.

The best indicator of temperature is the behaviour of the chicks. A prudent poultry keeper is one who will not always walk away after taking

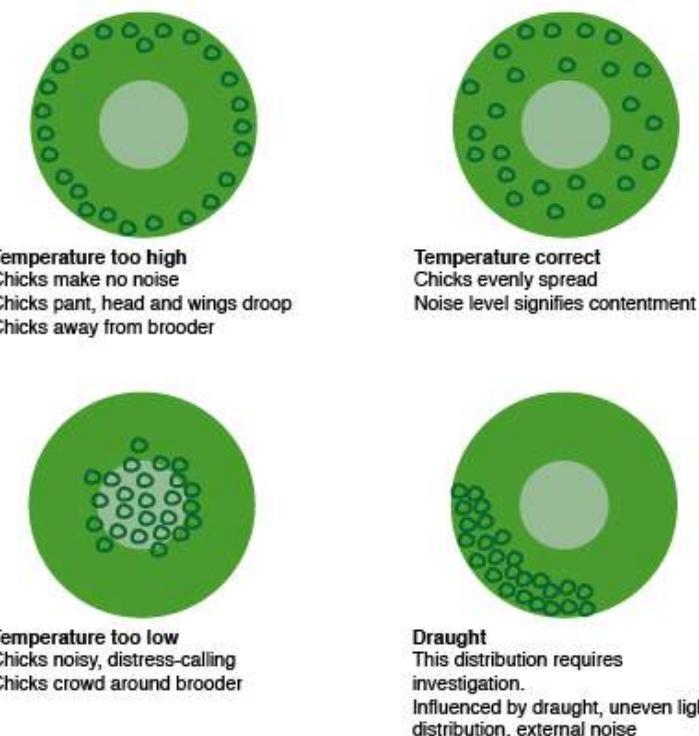
temperature readings from a thermometer without taking time to observe behaviour of the birds themselves. There can be a wide range of temperature variation between chick height and a person's head height; therefore the birds may not share your perception of the right temperature.

Often it may be necessary to take an empty sack and lie down on it so that you may feel the temperature at the level of the chicks.

When conditions are too hot, the chicks move away from the heat source, the chicks will pile up around the perimeter of the brooding area. This may result in death as a result of heat prostration or piling up. If the temperatures are uncomfortably low, the chicks will huddle close to the heat source. If the birds are unable to locate the heat source, they obey the natural instinct to get their backs against the mother hen. They therefore crawl under the other chicks. This action, if taken by a large number of chicks, leads to bunching and crowding with accompanying evils of smothered chicks and diminished thrift in the entire flock.

Comfortable chicks will spread out uniformly throughout the brooding area without any incidence of huddling shown in the diagram below:

GRAPHIC DEPICTION OF EFFECT OF TEMPERATURE ON CHICK BEHAVIOUR



2.6 Stocking density

The suggested stocking density during brooding is 30 birds/M². The table below shows the recommended stocking densities relative to the age of the birds:

0 to 3 days	30 birds/m ²
4 to 7 days	20 birds/m ²
8 to 14 days	15 birds/m ²
15 to slaughter	10 birds/m ²

2.7 Ventilation

Ventilation is the means by which oxygen is supplied and waste products of metabolism such as heat, carbon dioxide, moisture and heat are removed. Proper ventilation is important in all phases of poultry production.

Good ventilation is important for the growth of healthy birds. It supplies oxygen and removes carbon dioxide, carbon monoxide and ammonia (NH₃) from the houses. In addition, it controls the amount of moisture, thus helping to keep litter dry.

Poor ventilation has been implicated in the occurrence of water belly or ascites.

Ammonia build up in broiler houses predisposes birds to respiratory problems, partial blindness, breast blisters and depressed growth. A possible cause of birds coughing could be insufficient or poor ventilation.

Over ventilation is also detrimental to birds. This is noticed when birds move away from the wind ward side and huddle on one side. Over ventilation can cause chilling in young birds. During winter months there is need to strike a balance between ventilation and temperature control to avoid incidences of water belly.

2.8 Litter Quality

Litter (or bedding) should be evenly distributed to a depth of 7-10 cm.

Good materials of litter are chopped veld hay, wood shavings (not saw dust!), cotton hulls, and hammer milled maize stover or barley straw. Local economics and raw material availability will dictate the choice of litter material used.

- Litter should provide:

- Good moisture absorption
- Biodegradability
- Bird comfort
- Low dust level
- Freedom from contaminants
- Consistent availability from a bio-secure source

Concrete floors are preferable to earth floors since they are washable and allow more effective litter management.

It is important that the litter is kept loose and dry throughout the life of the broiler flock.

If the litter becomes caked or too wet, the incidence of carcass downgrades can increase substantially.

2.9 Water

Water is very important for the survival of birds and should be made available at all times.

The general water consumption rate is 2-3 kg water for every kg of feed consumed.

Chicks can be started with chick fonts (20 x 4 litre fonts per 1000 chicks). These should be placed close to heat sources and between feeders.

The fonts should be cleaned and sanitised at each filling.

It is important to use fresh water that has been sanitised to kill some material that can cause disease such as algae and fungi.

At 7 - 10 days old, the chick fonts should be gradually replaced with the 16 litre drinkers.

Allow at least 2cm linear watering space /bird. Where dome/bell automatic drinkers are used, there should be at least 10 units per 1000 birds.

The height of watering equipment should always be adjusted as the birds grow such that the top edge should be level with the backs of the birds.

2.10 Lighting

Broiler growing is normally done under 23 hours of continuous light and one hour of complete darkness. This is regardless of whether the type of

house is windowless or open. The dark period helps the birds to adjust to some dark conditions. This is especially important in situations where power failures are frequent. If the birds are unaccustomed to darkness, they may pile up, stampede and die when sudden darkness comes.

Research carried out recently in closed buildings has shown that intermittent lighting of 1-2 hours followed by 2-4 hours of darkness during a 24hour period significantly improves feed efficiency and reduces electricity costs. Therefore broiler producers, who have facilities that enable light control, may find this technique quite appealing.

During the first 2 weeks, chicks need a light intensity of 40-60 watts per 20m². Such a light intensity helps the young birds to get a good start from the feed and water. From 2 weeks onwards, light intensity can be reduced 15 W/20m². High light intensity after 4 weeks of age should be avoided because it can act as a growth suppressant. It may also result in carcass bruising due to over activity by the birds.

It is important that mounting of light bulbs should be evenly distributed in the poultry house. Burnt bulbs have to be replaced and all bulbs should be cleaned frequently. Dirt on bulbs reduces light intensity, increases electricity cost and fire risk.

3. General broiler management tips

By far the most critical item in a broiler unit revolves around feed. Feed accounts for between 60 –70% of the total variable costs of a broiler production enterprise. The prudent producer will therefore need a thorough feeding plan in order to avoid losses.

Broilers are normally fed ad libitum (to appetite) from day old to finishing, by which time they should have attained about 2 kgs live weight. It is important to monitor feed consumption and weight on a regular basis.

Irrespective the broiler breed one is using, the performance of the birds can be checked against standards that are shown in the table below:

TABLE 3: BROILER WEIGHT AND FEED CONVERSION

Flock age (Weeks)	Cumulative weight gain (kg)	Cumulative Feed Intake (kg)	Cumulative Feed Conversion ratio
1	0.189	0.165	0.85
2	0.480	0.537	1.07
3	0.929	1.180	1.23
4	1.501	2.116	1.39
5	2.144	3.319	1.55

Source: Ross 308 Broiler Performance Objectives 2014

Day old chicks should be fed on khaki paper laid on the floor, in feeder lids or plastic trays (1 per 100). The automatic feeders should be in place on arrival of the chicks and should be adjusted so as to rest directly on the litter.

Feeder height should be continually adjusted as the birds grow. The top edge of the feeders should be at the same level as the back of the birds. This helps to prevent feed wastage. During the first two weeks, the chicks should be given Starter Mash or Crumbles. For the remainder of the time, it is best to feed pelleted feeds.

Mash feeds however, can still be given but there is much wastage with mashes than with pellets.

Pelleted feeds have the following advantages:

- Less feed wastage resulting in better Feed Conversion Ratio (FCR)
- Optimum uptake of all nutrients, resulting in superior average daily gains.

Feeders should never be more than 1/3 full at a time as this promotes feed wastage

When using trough feeders, allow **5cm feeding space/bird**.

If using pan feeders, provide **one pan for every 50 birds**.

4. Feeding Management for Broilers

4.1 Introduction

In Zimbabwe, the Stockfeed Manufacturers Association (SMA) was established in order to promote good operating standards and to protect the public and the industry from unprofessional and unqualified operators. You would be well advised to purchase feeds only from bona fide members of this organization. Substandard feeds costs money. Always remember:

CHEAP FEED IS VERY EXPENSIVE!

Feed company representatives will take up a lot of your time trying to convince you how good their feeds are. Don't listen to them. Listen to your chickens. Your chickens will tell you very quickly if the feed you are giving them is any good. Good feed at the right price will be profitable. Bad feed whatever the price will lose you money. Watch your birds closely and at the first sign of non-performance you should immediately seek help and intervention to rectify the situation or find the cause. Our subsidiary division, INOVET Animal Health, is available to assist you with Nutrition and Veterinary Consulting and extension services.

Broilers are fed high nutrient density diets so that they achieve market weight within a short period of time usually 5 to 6 weeks. Generally, broiler feeds contain high levels of energy and protein compared to most common poultry diets. Protein is needed by growing birds while energy is required to drive the processes of life. When formulating recipes for broilers, Capital Foods nutritionists concentrate more on the quality of protein in the feed (the amino acid profile) rather than the crude protein levels. This is because a diet with high crude protein, but poor amino acid profile is not guaranteed to perform better than a ration whose amino acid balance and profile is superior. Minerals and vitamins are also required for maximal performance.

Good quality Starter diets are essential in giving birds a good foundation to reaching their full genetic potential. The quality of grower/finisher feed will determine the volume of feed and time it will take to reach the desired slaughter weight. Please talk to our company Nutritionists in order to better understand how feed works and if necessary we can design a custom feed to meet your specific requirements.

4.2 Broiler feed types

Today's broilers are capable of reaching slaughter weight far quicker than their predecessors. They have been genetically improved to

perform at very high levels and consume large volumes of feed in a short period of time. The feed has to be formulated to meet the birds' exact requirements. In old Zimbabwean tradition, most producers of broilers practised two phase feeding (feeding of 1 kg starter/ bird followed by about 3kg finisher ration/bird). However, more broiler producers are adopting the three phase feeding regime. This comprises broiler starter, grower and then finisher feed. The optimal time to switch from one feed to the next is once the bird reaches a certain weight. However, feed producers tend to simplify the feeding regime by recommending feed changes at pre-determined ages. The feed phases vary from one feed company to another. Below are the feeding recommendations for the Capital Foods diets:

- Broiler Starter:0.45 kg per bird (0 – 14 days of age)
- Broiler Grower: 1.10 kg per bird (15 – 25 days of age)
- Broiler Finisher: 1.7 kg per bird (26 – 35 days of age)

Below is an example of a feed budget for 1000 birds fed on Capital Foods:

TABLE 4: THREE-PHASE FEED FOR 1000 BIRDS

Feed Type	Age of flock	Approximate Feed Required
Broiler Starter	0-14 days	9 bags
Broiler Grower	15-25 days	22 bags
Broiler Finisher	26-35 days	34 bags

The two phase feeding programme is still in use in some sections of broiler producers. Below is a typical feed budget for 1,000 broilers fed on Capital Foods:

TABLE 5: TWO- PHASE FEEDS* FOR 1000 BIRDS

Feed Type	Age of flock	Approximate Feed Required
Broiler Starter	0-21 days	20 bags
Broiler Finisher	22-42 days	65 bags

*On Two-Phase feeding regime, though simpler, the birds consume slightly more feed and take longer to attain slaughter weight than on Three-Phase feeding regime.

4.3 Feed Maxi Packs / Macro Packs

Farmers who have got their own maize and soya meal and have capacity to mix feed at home can benefit by purchasing Maxi or Macro Packs from the INOVET division of Capital Foods. For broilers, a maxi pack is a feed pack which usually contains mono-calcium phosphate, limestone flour, salt, amino acids (lysine, methionine, threonine), feed additives (feed enzymes, growth promoters) and a mineral-vitamin premix (which itself includes a coccidiostat). INOVET produces Maxi Packs to mix into one tonne of feed on the farm. For farmers wanting to mix smaller quantities, INOVET producers 'quarter' maxi packs that a farmer can use to mix 250kg on farm.

Please call us and obtain a brochure with the current list of INOVET maxi packs and mixing instructions.

5. Bio-security and flock health

Bio-security is a collection of measures put in place to prevent disease coming into the poultry unit or preventing the spread of diseases within the poultry unit. Animal hygiene reduces the challenge on existing vaccines and prolongs their useful life as well as reduces erosion of available antibiotic resources for both animal and human use. Yet the value of hygiene is often underestimated.

A holistic approach to animal health should therefore involve a balance between stringent hygiene practices and moderate use of vaccination and medication. Animal hygiene should centre on 3 main principles:

- Eradication of pathogen in the animal quarters before animal occupation
- Exclusion of pathogens once the animals occupy their quarters
- Suppression of pathogens which evade the attempts to eradicate and exclude

Ideally, practice an all-in-all-out system (where practically possible) or at least per pen / house. After a batch has been cropped, the poultry house and ancillary equipment should be thoroughly scrubbed, washed with water and disinfected and fumigated.

Bio-security also includes controlling human traffic and vehicles into the poultry unit. **Only essential staff should enter the poultry house.**

Below are key activities in bio-security in a broiler operation:

- Fencing off the broiler site to prevent other birds or livestock from straying into the fowl runs

- Good house-keeping and prevention of pollution
- Erect vehicle wheel dips at the gates leading to the poultry site
- Provide foot baths at the entrance of each house
- Routine change of chemicals used on wheel and foot baths. This prevents pathogen resistance to chemicals used
- Provide protective clothing for staff and visitors (gumboots, overalls, gloves, hats, masks, etc)
- Rodent and pest control by clearing all vegetation in an area 3 – 5 m around the poultry house
- Routine vaccination

A strict bio-security or good management should substitute the use of treatment drugs.

5.1 Broiler Vaccination Programme

For broilers exceeding 1000 birds, it is economic to vaccinate against the following diseases:



RECOMMENDED BROILER VACCINATION PROGRAMME

AGE IN DAYS	DISEASE(S)	VACCINE	METHOD
10	Newcastle & Infectious Bronchitis	MA5 Clone 30	Dissolved in drinking water
14	Infectious Bursal Disease (Gumboro)	Gumboro D78	Dissolved in drinking water
21	Newcastle & Infectious Bronchitis	MA5 Clone 30	Dissolved in drinking water

IMPORTANT: Beginners are advised to seek professional advice on how to administer the vaccines

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Email: customercare@capitalfoods.co.zw


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Mass vaccination through drinking water is the most common method of administering vaccines to broilers. Borehole water should be used when vaccinating. The addition of water stabilisers such as chlorex, aviblue or skimmed (low fat) milk prior to the introduction of the vaccine in a common practice. This assists to bind any contaminants or residual disinfectants in the water.

If the use of chlorinated or council water is inevitable, the use a de-chlorinator to remove the chlorine before use.

Withdraw drinking water for at least 1 to 2 hours before vaccination depending on the weather. Calculate the correct amount of water to be used as follows:

$$\text{No. of birds} \times \text{age of birds (days)} \times 1.5$$

Amount of water (litres) = _____

1000

- The birds must consume all the vaccinated water (as calculated above) within 2 hours.
- Follow the instruction of the vaccine manufacturer on the packaging.
- Do not use expired vaccine
- Avoid vaccinating sick birds
- It advisable to check with the broiler chick producer on the recommended vaccination programme as some of the birds are now being vaccinated in through the eggs – in ovo (e.g. Vaxxitek or Transmune or Vectormune).

6. Summary

6.1 Broiler Management Chart

Below is a broiler management planner which summaries the main stage in broiler production:

BROILER MANAGEMENT CHART																					
DAY	1	4	7	10	14	18	21	25	28	35											
TEMPERATURE (°C)	Winter: 33 Summer: 33	32 31	30 29	28 27	28 25	25															
FEEDING	2 Phase	Broiler Starter							Broiler Finisher												
	3 Phase	Broiler Starter			Broiler Grower		Broiler Finisher														
EQUIPMENT	Hanging	1 infrared lamp per 100 chicks																			
	Feed	1 chick tray per 60 chicks				1 standard feeding trough per 50 - 60 birds															
	Water	1 chick font per 50 - 75 chicks				1 standard 16 litre manual drinker per 50 birds OR 12 birds per nipple															
FLOOR SPACE (Birds/m²)	30	20			10																
VACCINATION		Newcastle (in water)		IBD (in water)		Newcastle (in water)															
GENERAL MANAGEMENT TIPS		1. Maintain adequate & consistent temperatures 2. Ensure bedding is dry and 1-1.5cm thick 3. Provide adequate feeding space on straw paper up to 70% of floor area 4. Administer Invox Poultry Stress Pack in drinking water 5. Ensure adequate ventilation		1. Ensure adequate ventilation 2. Change to ad libitum equipment 3. Decrease to provide 1 bird per 10 m² floor space, or 10 birds/m²		4. Ensure bedding is dry and 1-1.5cm thick															
																					
 Follow our activities and LIKE us on: https://www.facebook.com/capitaloils																					

6.2 Trouble-shooting procedure in the broiler house

A systematic approach is helpful when troubleshooting performance issues in the broiler house.

Look out for the following:

- Feed: source, nutritional content, availability, consumption, distribution, palatability, contaminants, toxins and withdrawal.
- Light: intensity, uniformity of exposure, adequacy for efficient growth and development.
- Litter: material used, depth, distribution, moisture level, ammonia level, pathogen load, toxins and contaminants
- Air: availability, speed, distribution, contaminants, humidity, temperature, barriers

- Water: source, availability, consumption, contaminants, pathogen load, additives
- Space: stock density, feed availability, water availability, limiting obstacles, limiting equipment.
- Sanitation: hygiene of premises (inside and outside of house), pest control, maintenance, cleaning and disinfection practices.
- Security: bio-security risks.

6.3 Common Management Mistakes

Mistakes	Consequences / Signs
Use of water bottles or 100W light bulbs or blankets as heat sources	High early chick mortality due to chilling
High stocking density	Chick piling/crushing, Vent pecking, cannibalism, stress – more flip overs, poor flock uniformity
Excessive brooding temperature	Pasty vents, stress – wing flapping and panting, high energy bill
Cardboard boxes as brooders	Poor ventilation, crowding, only small numbers can be brood at a time
Treated wood shavings as bedding	Poisonous to birds
Saw dust as bedding	Crop impaction as birds consume it
Use of plastic sheeting for side curtains	Poor ventilation, respiratory problems, wet litter
Wet spots around drinkers or caked litter	High ammonia levels, coccidiosis/bloody droppings, breast blisters, foot problems
Using maize brans instead of maize to mix feed concentrates	Low energy and high fibre feeds, poor growth
Mixing feed concentrates by volume and not weight	Unbalanced final feed leading to poor growth
Poor lighting	Decreased feeding activity at night, poor growth, poor flock uniformity
Over-filling feed containers	Feed spoilage and wastage, reduces profit
Inadequate feeding and drinking equipment	Overcrowding at feeding, stress, poor flock uniformity
Feed and drinking equipment too high	Low feed intake, poor growth, poor flock uniformity
Feed and drinking equipment too low	Feed wastage, reduced profit, wet and caked litter

6.4 Frequently asked Poultry Questions

6.4.1 What are the advantages of using pellets versus mashes?

Chickens by nature are selective eaters and they prefer bigger feed particles. In the case of feed in mash form, the bigger particles are usually maize. In extreme cases, chickens may then eat mainly maize leaving other essential nutrients such as proteins, vitamins, salt etc. This consumption pattern may result in the bird taking the nutrients in an unbalanced form. The result may be slower growth performance and such flocks tend to reach market weight later than those fed on pellets. In the case of pelleted feed, one pellet contains all the nutrients and if it falls down, chickens can easily pick it up and therefore there is less wastage. Furthermore, the steaming and heating pelleting process makes the feed more digestible. As a result, pelleted feed is more efficient than mash feed.

6.4.2 Why do broilers mature faster in a three phase than a two phase feeding system?

Broilers are usually ready for the market in six weeks under the two phase feeding system and ready in five weeks in the three phase feeding system. Broiler nutritional requirements change every day. Ideally, we were supposed to change feed every day to meet the broiler's daily nutritional requirements. However, changing feed every day is not practically possible. The three phase feeding system is a better practical attempt to meeting these fast changing nutritional requirements although not quite. In other words, the more phases there are in a feeding regime the better. However, it should be noted that each feed change can stress the bird. Feeding of many phases requires extremely good management practices during feed change-over or the full benefits will not be realised. It should be noted that some farmers still prefer the traditional two phase feed because it poses less complications.

6.4.3 Why does Capital Foods not produce high energy density diets like some feed companies do?

High energy density (or hot) diets stimulate very fast growth to the extent of the broiler failing to cope especially around four weeks if feeding is not managed properly. A correction practice that is often applied is to limit feed intake by having a lighting programme. We have found that, quite often, workers may have problems in following the feed restriction mechanisms religiously. This may contribute to flock losses

due to ascites at a later stage. We believe in formulating diets with correct energy levels and then allow broilers eat to satisfy their energy requirements.

6.4.4 Does feed kill birds? What kills birds?

The feed really needs to be toxic in order to kill birds in high numbers and this is very rare if feed is procured from reputable and registered sources where quality checks are practised. When feed is of poor quality, there is usually stunted growth rate although severe deficiencies in critical vitamins and trace elements can cause mortality. So what are some of the common causes of bird mortality? The following are some factors that kill the birds:

- (i) **Diseases** - If no proper vaccination is done, the whole flock can be wiped out by New Castle Disease. IBD will take almost 60% of the population. Survivors are usually carriers showing different dermatitis symptoms. Other diseases cause low mortality but high morbidity.
- (ii) **Management** - This area is critical. Poor ventilation and incorrect brooding temperatures can result in bird mortality. High ammonia levels due to poor ventilation cause respiratory problems, low feed appetite and blindness. This results in stunted growth and high mortality.
- (iii) **Wet litter** - This is the main cause of coccidiosis, which may result in loss of birds if not treated early. Wet litter also causes foot pad dermatitis (burnt feet which become unsalable) and burnt breasts. Birds have problems in walking due to soar feet reducing feed intake thus eating less of the essential nutrients eg vitamins leading into deficiency symptoms and may result in mortality.
- (iv) **Poor feed** - Feed must be bought from reputable and traceable producers and not from unregistered feed mixers. Feed from informal sources is cheaper but it is false economy as the broilers will not give expected performance. Broilers will be stunted and may show nutrient deficiency symptoms (especially of vitamins and trace elements). Mortality can occur if critical nutrients are neglected in the feed formulation process.

6.4.5 Coccidiosis in the poultry house. Is it feed at fault?

Coccidiosis is basically a hygiene problem, which is part of flock management weaknesses. Litter must always be dry. Commercial broiler feed is usually medicated with a coccidiostat at prophylactic or preventative levels just to contain minimal coccidiosis challenges. Once the challenge goes above normal levels, the coccidiostat included in the feed becomes inadequate to treat the disease. In such an event,

farmers should treat the disease using the relevant drugs. Farmers should be reminded that it is not the purpose of the feed to medicate against coccidiosis.

6.4.6 Poor growth uniformity (small birds and big birds in the same house, eating the same feed). Is feed to blame?

Poor uniformity is caused by many management problems. Since broilers will be eating the same feed in the same house, there is no way we can attribute the poor uniformity to the feed. The bigger broilers are not eating feed from a different source from the smaller broilers. Common causes of lack of uniformity are managerial.

- (i) **Poor brooding** - During the first 2 to 3 weeks of age, broilers require adequate temperatures and ventilation. Low temperatures at brooding stage can cause birds to have poor uniformity
- (ii) **Space** - Birds should be given full space by 18 days of age. This is to say, birds should be stocked at 10 birds per m² by 18 days of age. Overstocking birds causes uniformity problems.
- (iii) **Inadequate feeders and drinkers** – Elsewhere in this handbook, there are recommended ratios of equipment to be followed. If drinkers and feeders are short, some birds won't have access to feed and will grow smaller compared to the rest in the house. If one uses improper equipment (plates, cups, buckets etc.), birds will not have good access to the water and feed resulting in uniformity problems.

6.4.7 My friend advised me to administer an antibiotic to my broilers from day old in order to prevent diseases. Is this correct?

Antibiotics are not vaccines, which are used to prevent disease outbreaks. So farmers should never administer antibiotics to flocks unless the birds are sick and it is recommended to use the drug. Use of antibiotics on healthy flocks can actually lead to drug resistance in the event that the flock eventually falls sick later in life. Farmers are reminded that it is advisable to administer a vitamin mineral stress pack in drinking water during the first 5 days of placement. Antibiotics are used in the event of sickness only.

6.4.8 What is the best time to collect day old chicks?

On the day of collection, you should collect chicks as soon as they arrive at the branch. The best time is when it is still cool; this is normally in the morning. Collecting day old chicks midday often causes heat stress and

dehydration which affects their growth and response to feeding. You do not want this to be affecting your chicks as they start.

Broiler farming is a business, therefore we urge you to clear your day when collecting day old chicks so that you take them straight home or to the farm

6.4.9 Should I feed Pig Concentrate or any other pig feeds to broilers? If not why?

We do not recommend that Pig Concentrate or any other pig feeds be fed to broilers. The reason is when we produce broiler feeds, we produce them according to the needs of a broiler chick to grow. Therefore pig feeds are in the same way formulated to supply adequate nutrients for pigs. You will not obtain the desired or expected growth rates and meat quality if you are to feed the wrong feed.

6.4.10 How often do I turn litter/ bedding in broilers?

We recommend that you turn litter daily. Why? When we turn, the litter is much more comfortable for the birds and it dries out quicker. You will notice that droppings will not pile up on top, creating a layer or what we call caked-bedding. If litter is turned daily, it also absorbs moisture better and will not cause foot problems for your chicks.

You will get to a stage when the moisture and dropping levels in the house rise. Therefore you add some more litter or bedding in the chicken house on top. Normally in broilers, all bedding is taken out when the birds are finished.

6.4.11 Can I keep broilers and other chickens at the same place or same house? For example layers or road runners?

Broiler chicks and other chickens must not be at the same place. We recommend that you rear one type of chicken especially when you are farming at your residence in towns and cities. The main reason is biosecurity and keeping your site disease-free. Cleanliness and disease management is best managed when one type of bird is being raised. Having multiple breeds exposes your business to disease risk and losses through mortalities. Remember cleanliness is the backbone of poultry farming!

7. Conclusion

The success of a broiler producer involves total chicken management, disciplined micro-management of the broiler operation and consistent application of best management practices. Because of the intensive nature of broiler production, attention to detail is essential. This ensures optimum performance of the birds, meeting targets on days to slaughter, overall mortality and feed conversion ratio.

8. Appendices

8.1 Branches

GOROMONZI	+263782188030	STD 1362, MAJURU SHOPPING CENTRE., GOROMONZI	forgetsaidi@gmail.com
JURU	+263739211377	STAND No. 36 &37 JURU SHOPPING CENTRE	vanwhyk20@gmail.com
BORROWDALE	+263773452674	WINCHENDON SHOPPING CENTRE, OFF DOMBOSHAVA ROAD, BORROWDALE, HARARE	mollierudo@gmail.com
RUWA, BULK SALES	+2632732847 - 50	181 MUNHONDO RD, RUWA INDUSTRIAL SITE	salesadmin@capfoods.co.zw
RUWA, FACTORY SHOP	+2632732847 - 50	179 MUNHONDO RD, RUWA INDUSTRIAL SITE	factoryshop@capfoods.co.zw
SOUTHERTON	+263774535483	NO 43 HIGHFIELD ROAD, SOUTHERTON, HARARE	southerton@capfoods.co.zw
NGEZI	+2632732847 - 50	TURF GROWTH POINT, NGEZI PLATINUM MINE	salesadmin@capfoods.co.zw
CHEGUTU	+2632732847 - 50	SHOP NO. 2, STAND NO. 56 ALEXANDRA AVE, CHEGUTU	salesadmin@capfoods.co.zw
KWEKWE	+263735839450	STAND 7614 SHOP NO 2 ROCKODOX COMPLEX, KWEKWE	mmabure90@gmail.com
GWERU	+263772914719	SHOP NO. 2, 61 - 3RD STREET, GWERU CITY CENTRE	n.elphas@yahoo.com
BULAWAYO	+263774561370	CNR 14TH AVE/J. TONGOGARA ST, BULAWAYO	agricentrefeeds@yahoo.com
ZVISHAVANE	+2632732847 - 50	STAND 5090, MANDAVA, ZVISHAVANE	salesadmin@capfoods.co.zw

8.2 APPENDIX 1: Broiler Budget Template for 100 Birds

Please fill in the boxes below with your actual costs

ITEM	Cost/ Unit	Total Cost
Day Old Chicks Costs		
Chick Price - 100 broiler Day Old Chicks		
Stockfeed - 3 Phase		
1 X 50kg Broiler Starter Crumbs		
2 X 50kg Broiler Grower Pellets		
3 X 50kg broiler Finisher Pellets		
1 X 25kg Broiler Finisher Pellets		
Subtotal - Stockfeeds		
Veterinary + other costs		
1 X 100g Vitamin Stress Pack		
1 X 100ml Chikleen or any other disinfectant		
2 X Bags Wood Shavings/Bedding		
Subtotal - Veterinary + other costs		
Total costs of 2.0 kg live bird		

8.3 Appendix 2 - Broiler Record Chart

This book and contents thereof are the property of:

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Disclaimer: Any performance figures mentioned in this manual are based on generic research data across breeds and are not a guarantee of actual flock performance. The recommendations provided are supplied without prejudice.