

Principles of Poultry farming

Introduction

- Fixed capital of poultry farming
- There is not much work is done in designing of poultry sheds which are suited our tropical countries.
- Better to take the suggestions from experiencing poultry farmers about the construction of a good shed.

Essentials of Poultry shed

- Protection – Severe climate, predators, parasites, Thieves
- Well designed shed avoid the development and spread of infection, diseases and useful for high yielding of eggs.
- Comfort – for high production of eggs from poultry birds, they should be provided comfortable and happy shed.
- It means that the shed must provide adequate accommodation, cool in summer, free from cold winds and worm in winter.
- The house should be east or western wind.
- The house having open in the eastern or southern side permits the sunshine to enter into room. The chickens prefers the morning sunlight.

- Convenience – the poultry shed and equipment should be located in a convenient place so as to allow cleaning and other necessary operations easily and quickly.
- Relation of other building- the poultry house not be too close to the dwelling houses. Because it creates the unsanitary condition. On the other hand it should not be too far away from the dwelling houses as it requires more time in going to the poultry house for feeding , watering and collection of eggs.
- Shady and cool environment – poultry birds suffer much in hot weather and they require cool condition during the day time. Trees planted in the western and northern side of poultry house serve as a wind break in the winter and for shade in summer. Ex guava, custard apple, lemon etc.

Location of poultry shed

1. Good market net work.
2. Good portable roads and other modes of transportation.
3. Not very close to the residential areas, religious places and prohibited by court of law.
4. Face south or east in moist localities – light.
5. Hill regions a sloping site should be selected for better drainage.
6. Electricity and water should be available at reasonable cost and easy.
7. High land with loamy soil should be selected for poultry as they provide good drainage.
8. Farm should have enough space for further expansion.
9. Farm should be located in the open space as it provides good ventilation.

Factors influencing in the design of poultry shed

A) Floor, feeder, waterer space : Small units, in commercial farms units of 125 advisable. The house should be long in east-west direction, kept dry at all times-cough, pneumonia.

B) The dampness is caused by

1. Moisture rising through the floor
2. Rains entering through the window
3. Leafy roofs and walls
4. Leaky water container
5. Exhalation of birds

C) Over crowding creates the following difficulties in poultry farming

1. Spread of contagious and infectious diseases.
2. House become damp
3. Feather picking and cannibalism may occur
4. Malnutrition of poultry birds

Floor space per bird

Fowl age (weeks)	Floor space per bird (sq. cm)
0-8	27.0
9-12	31.0
13-20	43.6
21 onwards	48-60

Feeder and watering space requirement per 100birds

Age of bird weeks	Linear feeder space (cm)	Channel type waterer (cm)	Fountain type waterer its
0-2	250	25	9 lts
3-6	400	100	18lts
7-12	750	150	20lts
13 onwards	1000	250	22lts

- B. Temperature - The poultry birds have ability to maintain uniform temperature. So they are called as warmblooded animals. It is very important factor. Needs moderate temp of 50-70 F(10-21 degree). Insulation with straw pack, cross ventilation also aids in keeping the house comfortable during the hot weather.
- C. Ventilation – movement of fresh air inside and removal stale air outside of the shed. It is necessary for the following reasons.
 1. To provides sufficient oxygen
 2. To remove ammonia, carbon dioxide etc.
 3. To keep down the temperature of shed in summer needs cross ventilation to tide over the summer heat, in winter to avoid the loss of heat from the shed.

- Humidity : Correct humidity is another imp for high production of the fowl in the poultry at various stages of life.
- Dampness – pathogenic organism – causing diseases, less humidity-dry and dusty litter-causes respiratory problems. Relative humidity in between 40-60%
- Light : light stimulates the egg production in all birds. When day length increases we can see the activity of birds in building nests, mating and laying eggs. This phenomenon is a natural process in the nature. Men has taken the advantage of this phenomenon and adopted in in the poultry birds for high production of eggs. Increase in day length- pituitary gland- release hormones of ovulation.

Principle of lighting

1. Increasing day length, advances the sexual maturity of the fowls.
2. Light effects both growing, laying birds upto 3-4 weeks.
3. Lighting has a direct effect on pituitary to release of gonadotropic hormones.
4. When total length of the natural daylight reaches 12 hrs, the hormonal secretions activated for laying of eggs. But the length of the day light is not sufficient for maximum production of eggs.

- Lighting schedule for maximum egg production:
 1. 0-3 weeks : Brooding light for heat 24hrs/day
 2. 4-20 weeks : growth period, no extra light.
 3. 20th week onwards :
 4. During 20th week : Day light + 1 hr extra light
 5. Every week : Day light +1.30mts extra light
 6. Lastly : Day light + 5 hrs extra light
total of 17 hrs of light / 24 hours
- F. Orientation of shed : weather, wind, sun

- G. Sanitation : the external parasites such as lice, fleas and mites are most harmful to poultry birds.
- They are not only transmit diseases but also hamper with growth, egg production capacity, which designing the shed one should bear in mind and major factor of sanitation.
- Such as easy cleaning and spraying. Iron frames, asbestos sheets are best roofing material. When wood is used, every piece is treated with coaltar or similar strong insecticides.

Name of the chemical	Use	Dasage
1. Alcohol (ethyl ethanol)	As skin infectants	70% alcohol
2. Boric acid	For washing eyes and other sensitive parts	About 6 % solution
3. Chlorines (Sodium hypochlorite)	<ol style="list-style-type: none"> 1. Egg dipping 2. In processing plants 3. In poultry drinking water 	<p>Generally used about 200 ppm for disinfection</p> <p>50ppm for drinking water</p>
4. Formaldehyde (gas or liquid)	<p>Effective against viruses, bacteria and fungi</p> <ol style="list-style-type: none"> 1. Used as disinfectant during out break of disease. 2. Commonly used fumigation of hatching of eggs 	<p>Liquid disinfectant 2% solution</p> <p>For fumigation use 1 part of potassium permanganate and 3 parts of formaldehyde</p>

5. Lime (Calcium oxide)	<ol style="list-style-type: none">1. As deodorant sprinkles on litter2. Disinfectant when sprinkled on floor.3. As white wash to walls	Use as direct as milk of lime
6. Phenol carbolic acid	Effective against bacteria and fungi <ol style="list-style-type: none">1. Egg dipping and washing2. Disinfectant in hatcheries and poultry sheds3. Foot bath solutions to clean concrete floor	100ppm for disinfectant 50ppm for sanitation Used as 2% or 5% solution

Management of Breeding stock and Broilers

- Health, hygiene and good management of the farm as well as the breeding stock is essential the best performance of the business.
- **1.Chickstart**
- Start on house preparation well before the birds arrive on site, paying particular attention to the brooding period which is critical to give the birds the best possible chance of maximising performance.
- The first 14 days of a chick's life sets the precedent for good performance. Stocking density should take into consideration environmental or local climatic conditions.
- Remember males will be significantly heavier than the females and should be given extra floor space to help ensure they achieve target body weight. A stringent disinfection program should be in place which is regularly monitored and reviewed.
- Pre-heating of the house is essential, ensuring adequate time to achieve the correct house temperature, ideally 30 – 31.
- Check the chicks two hours after the placement to ensure they are comfortable with their environment. On arrival the chicks should have good access to fresh feed and water, using supplementary drinkers for the first seven days.

- **2.16 to 24 week management**

- This is a critical period for ensuring that the birds have a high degree of uniformity, and are the adequate weight and in the right condition, for transfer to the production site.
- Female parents should achieve sufficient bodyweight gain between 16 and 20 weeks of age to maximise peak egg production and maintain post peak persistency.
- The rearing farm will have achieved its objective if it has provided the highest quality birds for the production farm. Broiler breeder hens come into lay in response to increases in the day length when made at the appropriate time.
- The response of the hens to light stimulation is based on their condition, body weight and age.
- Accurate weighing, good observation and handling is essential to determine when a bird is ready to respond to day light increases.
- Delay light stimulation if the flock still contains significant numbers of underweight birds.

- **3. Male Management**

- It's important to remember males make up 50 percent of the flock in achieving the maximum number of fertile hatching eggs.
- Firstly, ensure that farm managers are well trained and have sound knowledge of what makes up a quality male and how to achieve this.
- The objective is to produce and maintain quality males to ensure the highest levels of fertility throughout the flock.
- It's essential to keep the feed and body weight continually increasing but well under control. A quality male will have an upright body shape, be active and alert, show good color in their combs and vents, and not have too much or too little 'fleshing'.
- Males in poor condition should be removed while maintaining the correct ratio.
- Poor condition males will show very little colour in their combs and vents, have very little fleshing and can be observed as being 'hunched up' in their appearance. Males which are clearly overfeeding with very heavy fleshing should also be removed.

- **4. Post peak feeding management**

- Remember that the hen carries half of the genes responsible for broiler performance seen in her progeny.
- This means that females can become overweight, which may lead to problems with persistency of lay and fertility in the later stages of life. Therefore, be particularly careful in feeding the flock after peak production.
- The key to controlling female body weight is to have a good understanding of each individual flock so you know when to decrease feed.
- Periodic handling of the hens, along with weighing, is necessary to determine subtle changes in body composition, condition and body reserves of the hens as well as looking at peak production, egg mass and observing feed 'cleaning up' times.

- **5.Egg Handling**

- Good practice collecting and grading eggs, egg hygiene and storage are fundamental to maximizing hatchability and chick quality which can only be achieved when the egg is held under optimum conditions between laying and incubation.
- Remember that a fertile hatching egg contains many living cells. Once laid, its hatching potential can at best be maintained — not improved. If mishandled, hatching potential will quickly deteriorate. Nest boxes should be kept free from droppings, litter and broken eggs. Collect eggs at least four times daily.
- Be aware that egg temperatures within the nest, particularly during hot weather, may be similar to those in an incubator so regular collection is essential.
- Collect floor eggs regularly, more often than hatching eggs, which is especially important as the birds come into lay. Keep them separate from hatching eggs. Focus on quality when egg grading, have a clear idea of what constitutes a good hatching egg and disregard all others, eg dirty, cracked, misshapes, etc.
- Eggs should be allowed to cool down gradually to the farm egg store temperature

- **Broiler growth and management**

- Selection and breeding for fast growth rates in broilers form the most important processes in the world poultry industry. Male broilers achieve rapid gain from the start, and at 6 weeks of age can weigh in at 2kg (live-weight).
- Female birds will tend to grow at a slower rate but this has definite marketing advantages because overall consumer demand is for broiler carcasses of various weights. It is not the amount of food consumed but the efficiency of feed utilisation and food conversion into body tissue which underpins the growth rate.
- Broiler producers tend to plump for white feathered strains because they result in a 'cleanerlooking' carcass after processing. But there are instances where production management considerations outweigh this and coloured-feathered strains are preferred.
- Examples include broiler production in countries with high rainfall and the indigenous soil is red. In these situations, red/brown Rhode Island Reds may be the most sensible choice.
- Feather cover must be good to maintain insulation and restrict heat loss from the body, as well as minimising incidence of skin blistering which ruins marketability of processed birds.

- Many modern strains of broiler will produce yellow fat because they have been custom-bred for the American market.
- In markets where yellow fat is undesirable, producers should remove carotene and carotenoid pigments (coloured chemicals) from the ration. Similarly, factors that determine carcass quality in one country may not suit another.
- For instance, consumers in some countries may consider the body conformation, texture and taste of carcasses high quality by 'Western' standards to offer an unattractive and insufficiently chewy eating experience.
- For supermarket sales in general, breast meat should be broad and deep. Many such problems are overcome by incorporating local strains into cross breeding programmes to produce appropriate broiler parent stock.

- **Feeding Broiler Breeders (Parent Stock)**

- Producers of broiler parent stock (broiler breeders) have the sole aim of obtaining the maximum number good-quality, fertile eggs and hatched broiler chicks.
- Parent stock will clearly possess the fast growing traits required by broiler birds, but these parent birds gain weight too quickly and hens suffer reduced egg production.
- Clearly there is an obvious conflict of interests to ensure proper growth and development with maximum egg production. This problem is overcome by carefully planned feed restriction using the following guidelines:
 - • Producers must ensure broiler breeder birds attain their mature weight at 24 weeks of age
 - • Give crushed millet or maize once per day during the rearing period and increase to three times a day during the laying period. Throw cereal on to the litter. Birds scramble for the grains, exercise and burn off fat
 - • Reduce feed by 5 g a day, for every 50 g a bird registers over the optimum weight
 - • If rearing males and females separately, provide males with 30g of extra feed per day. If reared together only increase the feed by 5 g a day for each male bird.

- **Broiler Breeder Management**

- Broiler breeder production employs a system much like that used to rear laying bird chicks. Use the same vaccination programme plus administration of an avian encephalomyelitis vaccine in the drinking water when birds are 18 weeks old.
- Cull low-quality chicks (usually 3-5 per cent) at 6 weeks and use the same pattern of lighting offered to layer birds. Immature broiler breeder birds eat excessively to satisfy their inherent (custom-bred) fast growth rates.
- As a result they grow too fast and become grossly overweight. Compensatory feed restriction techniques, including reduction in daily ration, low protein, high-fibre diet; miss a day feeding, restricting time access to feed and low lysine levels, are required to alleviate the problem.
- On balance it is best to rear cockerels and hens separately at first because they have differing nutrient requirements. For instance, cockerels require higher inclusions of calcium and phosphorous.
- The sexes can then be mixed at 12 to 14 weeks using a ratio of 8-10 hens to one cockerel. All pullets and cockerels should be re-housed in laying quarters at the same time when 21 weeks of age. And with a lighting regime as for layers, broiler breeders should attain full egg production between 30 and 33 weeks of age.

- **Management of Broilers:**

- More than 30 billion broiler chicks are produced worldwide on an annual basis. Fifteen billion of these are produced in the Americas.
- Due to the poultry industry's tendency towards more intensive production practices and increased automation, the tender loving care once afforded to chickens in grow-out has been replaced with a mass production mentality.
- As a result, newly hatched chicks are often subjected to numerous stressors in the first 24 hours after hatching. These adverse effects during the critical early hours following hatch can result in an increased percentage of early mortality.
- These early stressors also influence final performance, resulting in declines in final body weights, increases in feed conversions and cost per pound of meat produced.
- Farm personal must understand that they have become the "adoptive parents" of these chicks. Without attention to details, successful and profitable grow-out is not realized.

- Biosecurity
- No health, no gain.
- The objective of any broiler farmer is to receive the highest quality chicks possible. Sick, stressed, underweight, dehydrated, or weak chicks will not perform to their genetic potential in a densely populated broiler house.
- Assuming the chicks arrive to the farm in good health, it is then essential to ensure that the broiler farm has been decontaminated as much as possible. This means that the farm has been completely washed and disinfected and that a minimal downtime has been scheduled before receiving the next flock.
- Healthy chicks can become infected and diseased soon after arrival to a contaminated, poorly sanitized farm. Successful producers recognize that losses due to disease outbreaks are greater under conditions of poor sanitation, as compared to houses that have been thoroughly cleaned and disinfected before chick placement.
- Following chick placement, everyone at the farm must adhere strictly to comprehensive biosecurity practices. Most importantly, it is essential to prevent entry of unauthorized or unnecessary visitors.

- The Most Crucial Part of a Chick's Life
- The first 24 hours of the chick's life are the most important. The farms must be ready and inspected one day prior to the chick's arrival.
- Following are some of the basic parameters that must be taken into consideration before and during the first hours of the chick's life to facilitate a good start and finish.
- Genetic Improvements
- In the past two decades, the age of processing a 4.4 pound broiler has dropped from 60 days to less than 40 days.
- This means that the first week of life of a modern, fast-growing broiler now accounts for about 20% of the broiler's life, compared with 10% just 20 years ago.
- This rapid growth rate puts even more demands on management during the first week of life, leaving the broiler grower with less time to correct to deficiencies.
- The performance lost due to improper management can not be compensated for, as there is no time.

- Air Quality
- After biosecurity, the next most important factor is to provide good quality, warm, fresh air that is rich in oxygen for the recently hatched chicks. The chick's trachea is normally irritated from being boxed and shipped in the chick trays, often for many hours.
- Chicks are often also exposed to formaldehyde gas and contaminated air during hatch. It is important to ensure that air quality is optimum for the chicks on arrival and that it does not contain unacceptable levels of carbon dioxide and ammonia.
- Excessive amounts of these irritants can cause depression, dehydration, emaciation and eventually death. Poor ventilation may result in carbon monoxide (CO) accumulation, reaching toxic levels.
- Toxicity causes an irreversible condition that cannot be corrected with additional ventilation. Maintaining acceptable air quality is an art, and can be achieved by manipulating the curtains, extractors, etc.
- The purpose is to provide fresh air to the chicks without chilling or drafting the chicks or wasting expensive heating fuel.
- The broiler farm supervisors must understand how to manage the farms to provide warm, fresh air at all times, irrespective of outside conditions. Brooding Temperature The broilers' production cycle is short.
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- The broilers' production cycle is short. For approximately one-half of their life, broiler chicks have an immature thermo-regulatory system that cannot regulate internal body temperature when exposed to temperatures outside a relatively small range.
- Thus proper brooding is critical, and optimum growth during the first days of life will be dependent on the grower.
- Management practices should be modified depending on the actual climatic conditions and local geography. However, without exception all chicks must be provided environmental temperatures from 88°F– 92° F for the first 24 hours.
- Experiments conducted by the authors (Table 1) have shown that when chicks were brooded with lower than suggested temperatures, depressed growth, higher feed conversion, increased mortality, and an average 40 index points decline occurred.
- The cost to produce a pound of meat using suboptimal brooding temperatures was increased 1.6 cents/pound. The percent mortality for the chicks brooded under suboptimal temperatures was more than 8%, with 5% due to ascites that increased when using suboptimal brooding temperatures.

- Water
- Chicks can be withheld water and feed for 100 hours or more, receiving total nutrients from their absorbed yolk sac residue.
- However, this does not suggest that feed and water intake should purposely be restricted. Ideally, the chicks should be placed at the farm and provided water and feed in less than 8 hours from time of hatch.
- Longer delays could lead to dehydration and chick weight shrinkage. If long delays are expected, there are commercial nutritive hydrants available that can be placed in the chick boxes while they are being transported to the farm.
- The water quality, purity, and temperature must be checked in advance. Contaminated water can spread disease and cause diarrhea, leading to dehydration and death in younger flocks.
- If the chicks have been in transport for a long period, providing water for the first 3 or 4 hours, and then providing feed is suggested. In other words, it is imperative that chicks be encouraged to consume water as soon as possible.
- Many managers add some sort of sweetener substance, like sugar to the water (4% solution) for the first few hours of life.

- The Chick's Microclimate
- The newly hatched chick's surroundings should be as close to ideal as possible.
- This environment should be compared with the microenvironment that is provided for recently born human babies. The area must be cozy, warm, and clean.
- It should be provided detailed attention 24 hours a day.
- Equipment Density
- Before the chicks arrive, the farm supervisor must ensure that the brooding area is completely ready and adequate for the number of chicks arriving.
- This includes having adequate floor space, feeder, space, drinker space, high quality and fresh litter material in the brooding area, etc.
- Besides being adequate in number, the proper distribution of feeders and drinkers is also critical.
- It makes little sense to receive high quality healthy chicks and then deprive them of feed and water due to lack of equipment like feeders and waterers.

- Litter Quality
- Close attention to litter conditions must be ongoing. Litter that is old, caked, wet or dusty must be replaced with high quality, fresh litter.
- In areas where litter cannot be changed after each broiler cycle due to costs for new litter, availability of new litter, or difficulty in disposing of used litter, the litter should be changed only where the chicks are to be brooded the first week, and other areas where litter is caked.
- If changing litter in the brooding area is not possible, newspapers can be placed for the first 24 hours in the brooding area. The objective is to reduce exposure of the baby chicks to high levels of contaminants for the first few hours while the immune system is still immature and the yolk stalk remnant may still be healing.
- Litter type, temperature, texture, and moisture content all could affect the ability of the newly hatched chick to survive and thrive in their new surroundings.
- Chicks can lose much of their core temperature through the skin of their legs in contact with the litter. Thus, bedding that has not been properly warmed before the chicks are placed can dramatically reduce chick survival.

- Feed and Water
- Microclimate management also includes consideration of the availability of high quality feed and water. Water should be at ambient temperature and feed particle size optimum for the chicks.
- A newly hatched chick is 85% water. When 10% of this water is lost, it becomes a cull chick, and when there is 20% dehydration, the chick could die. It is important to hydrate the chick adequately and promptly.
- This will promote feed consumption and better body weights. If water and feed are consumed in sufficient amounts and correct brooding temperature and air quality are provided, a broiler chick should be able to quadruple the post-hatch body weight by seven days of age.
- To monitor if chicks are consuming adequate feed, it is recommended to select chicks and palpate their crops. The crops should be quite full. If the crop feels half empty or empty, there must be something wrong in the management, and the above-discussed points must be reviewed very carefully.
- It is never too late to act and make corrections, but a problem must be detected before it can be corrected. Before chicks arrive, inspect the house closely to ensure proper setup.