

Location Factors and Influencing Design of Poultry Houses

***Dr. Manjunatha Y C**

*Guest Lecturer of Zoology, HPPC. Govt. First Grade College, Challakere-577522.Chitradurga dist, Karnataka. India.

Abstract:

This article deals with which location we will select for poultry housing? How to design the poultry house for chicks? the location factors and influencing design of poultry houses like Temperature, Ventilation, Humidity, Floor, feeder and water space requirement, Light and Orientation of house and other so on.

Key Word: Poultry, Chicks, Poultry house, Egg, Temperature of poultry

Introduction:

Housing and equipments account for most of the fixed capital of a poultry farm. An unthoughtful expensive house with poor efficiency might become a deciding factor between success and failure of the farm. There is paucity of research work in designing and construction of poultry houses for tropical conditions. The recommendations given in the text books are mostly based upon the information available from western countries coupled with knowledge obtained from the experience of practical poultry farmers of our country. Hence it may be useful to visit the local poultry farmers to discuss the merits and demerits of our country. Hence it may be useful to visit the local poultry farmers to discuss the merits and demerits of the proposed house and carefully consider the suggestion given by experienced farmers. The state Agricultural Universities and such other agencies may also add to the knowledge in this regard. A well designed poultry farm would pay for itself through better production, saving of labour and avoiding disease incidence in long run.

The Poultry houses should be designed to protect birds from extreme weathers, parasites, predators and thieves to avoid the developments and spread of infections and contagious disease; to enable the poultry attendant to work efficiently without wasting time in unnecessary movements and the poultry manager should have the full control of the farm with least effort; and to save unnecessary land wastage in building and sheds.

Location of a poultry farm:

Poultry should be located in the area where there is a good market for eggs and chicken meat and at the same time common poultry feeds should be readily available at cheap rates. The farm should be well connected with roads and other modes of transportation. Electricity and water should be available at reasonable cost and ease. Poultry farm should not be constructed in a city near residential areas where it is objectionable or prohibited by law because it may not be possible to shift or dismantle permanent building on legal notice or objections.

It should be located away from the crowded areas and should have enough space for future expansion. As far as possible the poultry farm should be away from disturbances like noise, vibrations etc.

Factors influencing design of poultry houses:

Designing a poultry building involves a series of compromise between ideals and feasibility to give best economic performance. Following are the main factors to be considered:

- Temperature
- Ventilation
- Humidity
- Floor, feeder and water space requirement
- Light

- Orientation of house
- **Temperature**

Chickens, being warm blooded (homoeothermic) have ability to maintain a rather uniform temperature of their internal organs. The mechanism (haemostatics), however, is efficient only when the ambient temperature is within certain limits; birds cannot adjust well to extremes. Therefore, it is very important that chickens be housed and cared for, so as to provide an environment that will enable them to maintain their thermal balance.

The heat produced by the body is exactly balanced by the heat lost from the body in order to maintain body temperature. As bird is continuously producing heat, it is dissipated by following means; otherwise the body temperature would increase.

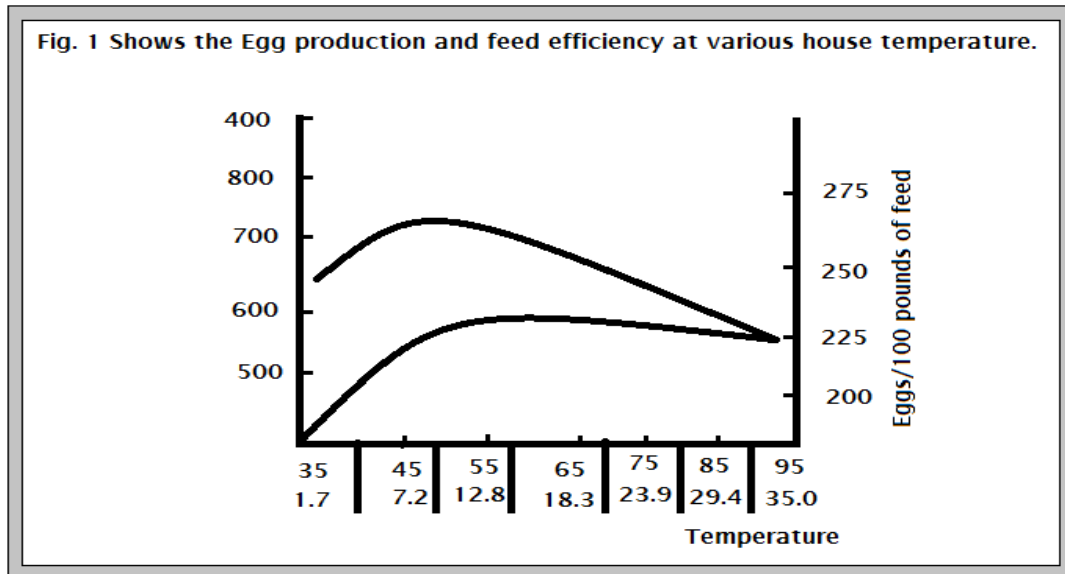
How heat is lost from the body? Heat is lost from the body by radiation when the body temperature is higher than adjacent temperature and ceases when surrounding temperature become equal or less than body surface temperature. Another way to lose body temperature is conduction when surface of the birds comes in contact with any surrounding objects—may be air or solid contact. However, air is poor thermal conductor unless it is moist. The heat lost through conduction is very low.

When cool air comes in contact with surface of the bird, the air is warmed. The heated air expands, rises and heat is carried away as the warmer air moves on. Particularly in mammals, this body heat is laden with water because of perspiration through sweat glands. There is greater cooling due to evaporation of this moisture but in the birds there are no sweat glands. As ambient temperature rises, heat loss by convection decreases but when it reaches body temperature of birds there is little loss by this method. In still air, there is none. When the air temperature is higher than surface temperature, both conduction and convection add to the body heat load.

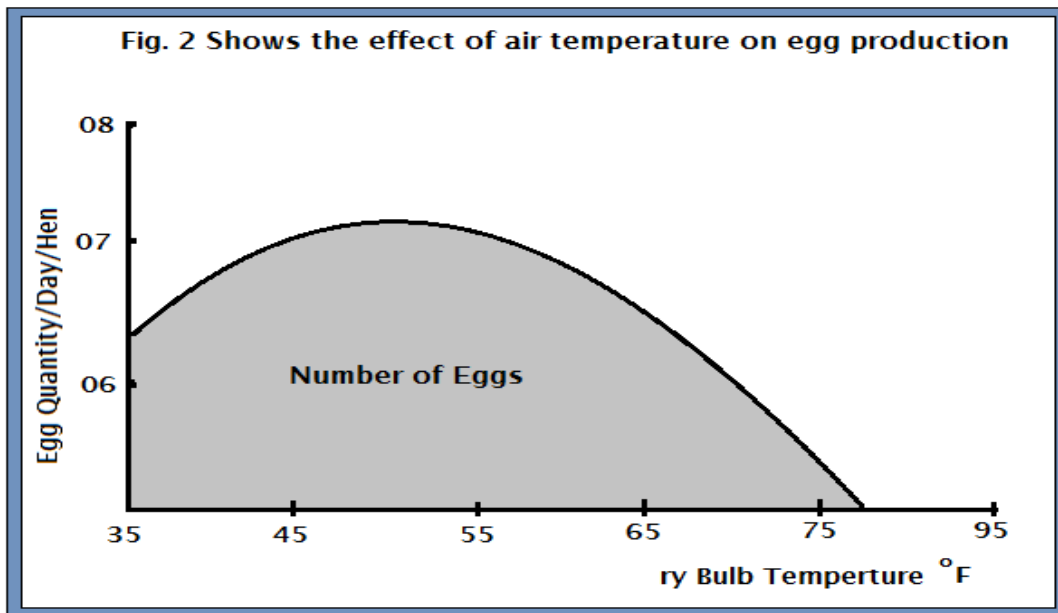
Evaporative cooling in chickens is by comparison of moisture from the damp lining of the respiratory tract. Heat lost in this way is a major factor of heat elimination from the body of the birds, When ambient temperature is high. Small amount of heat is also lost through faecal excretion and through egg production. But these losses are of minor significance.

- **Comfortable Zone**

A range of ambient temperature within which there is little or no change in heat production of birds. This is called thermo neutral range. For poultry this range is 10 to 20° C and ideal temperature is about 15° C. Temperatures from 5 to 10° C and from 20 to 25° C are also acceptable as comfortable zone. Beyond these ranges, some precautions need to be taken to avoid productivity and loss of birds. Effects of ambient temperature on egg production, feed efficiency, egg quality is shown in figure 01 is self explanatory.



Mechanism to maintain body temperature. The hen’s ability to dissipate heat is influenced by the skin temperature rather than by the deep body temperature. As the temperature of the air surrounding the bird decreases, the blood vessels in the skin contract, thus reducing the flow of blood, which in turn acts to reduce the amount of heat lost from the body. The reverse happens when the temperature of surrounding air increases. Egg quantity is shown in figure 02 is self explanatory.



When the conduction, radiation and convection are viable to remove the heat produced, the next mechanism of panting is called upon. The process of panting brings more outside air in contact with the membranes of the respiratory tract. Heat is removed from the body by incoming air as outside air has lower humidity. This is known as insensible heat loss. Panting begins at 29.4 deg C at an increase in moisture loss from the body. To compensate for this loss, the bird drinks more water to avoid dehydration. Eventually, bird drinks more water than it can exhale and the surplus water is excreted through faeces.

It is difficult for chickens of any age to withstand high temperature along with high humidity. Under both the conditions, birds breathe faster and ultimately it may not be fast enough to remove all the heat from the body. Prostration and death occur when the

body temperature rises above the physiological maximum. This is said to be the upper lethal temperature and is about 47 deg C but it is not absolute.

Feed intake decreased as the ambient temperature increased as part of adjustment to produce less heat. Similarly, movement of birds ceases in our effort to generate less heat.

- **Ventilation**

Proper ventilation requires the movement of fresh air into the building and removal of stale air out of the building in such a way to produce a healthy atmosphere in all parts of the house.

Ventilation is required in poultry house for three purposes: (1) to provide sufficient oxygen for birds to keep them healthy and in peak production. This requirement is easily met and is rarely a limiting factor in poultry sheds (2) to remove ammonia, carbon dioxide, methane and other undesired gases from poultry sheds. This also includes the removal of moisture given off by birds in their droppings, exhaled gases, spilling from water etc. To keep the humidity of the atmosphere down to an acceptable level. This is often a limiting factor in most of the poultry house, (3) to keep the temperature of poultry house down during summer.

A poultry house having height where a poultry attendant can stand will have enough air required by birds confined there. However, care should be taken during stress period particularly during heat stress accompanied with high humidity. Under such circumstances respiration rate is very high and total volume of air breathed may be eight or ten times more than required under ordinary conditions.

The amount of air movement needed to keep the litter dry in a poultry house will depend upon the air temperature inside and outside the house and also on humidity gradient inside and outside the house.

Poultry houses in most part of the tropics are open type with cross ventilation to combat the problem of heat during summer and as a result of this there may be a problem of dry litter rather than wet litter. During rainy season removal of excessive moisture from poultry shed becomes a problem when humidity inside and outside is quite high. Since the houses are open type there is not much temperature difference also. Under such circumstances excessive ventilation may not be helpful. Dampness can be reduced only by raising the indoor temperature or restricting the movement of air so that indoor temperature is raised by itself. The other alternative could be providing some kind of absorbent such as built up litter.

Ventilation is reduced during winter to avoid the loss of heat from the shed but this type of practice may lead to dampness and accumulation of ammonia and other gases, causing irritation in eyes of birds and other stress. Therefore, it is suggested that ventilation should be maintained high enough to take care of high humidity and other undesirable gases avoiding the direct draught in the shed.

The extent of Ventilation in poultry house should be a compromise between the minimal ventilation required in winter, when it is necessary to conserve all available heat, and maximum requirement of the summer, when it is required to keep the temperature as low as possible.

- **Humidity**

Correct humidity is another important factor for efficient performance of birds in the shed at different stages of life. High humidity in sheds is very harmful to birds and it may help development of pathogenic micro-organisms causing diseases in birds. Low humidity in poultry houses result in dry and dusty litter and this might lead to respiratory ailments. So relative humidity in poultry shed should range between 40 to 60 percent.

- **Requirement of floor Space, feeders and waters**

The requirements for floor space and equipment vary according to age, size and type of birds to be maintained. The bigger houses have more usable space per bird as compared to smaller house and therefore, lesser floor space per bird can be allowed in larger houses compared to small houses.

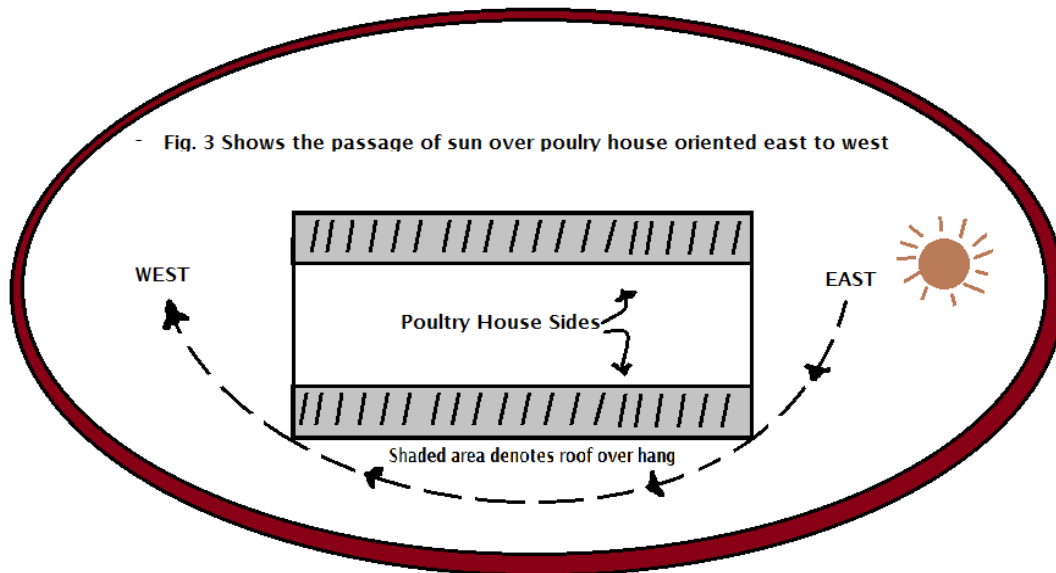
- **Orientation of House**

The effects of weather elements are strongly directional. Orientation of a building with respect to wind and sun consequently influence with forces, precipitation, temperature, and light on different external surface. Where there is freedom of space, it is expedient to orient building to achieve the maximum control over the microclimate. The broad face of a house obviously endures greater wind pressure than does the narrow dimension under the same wind speeds. This may be desirable if high temperature is prevalent but it becomes problem if winds are exceptionally vigorous or cold.

The rules which govern the relation of sunshine to site exposure apply equally to building orientation. In the Northern Hemisphere, the greatest amount of insulation is received by the east and southeast sides of a house in the morning and by the west and southwest sides in the afternoon. In summer, with increasing latitude, the path of the sun in the sky describes more complete circles so that the sun rises north of east and sets north of west; in winter the arc of the sun's visible path is shortened, and east and west exposures receive very little sunlight. Ordinarily, an east west alignment of a rectangular house provides the maximum gain of solar energy in winter and minimum in summer

- **Light in poultry house**

The visible light is only part of the radiant energy spectrum which falls between 400 to 700 Mm. Chickens appear to see better when the illumination



Conclusion:

The Poultry houses should be designed to protect Chicks from extreme weathers, parasites, predators and thieves to avoid the developments and spread of infections and contagious disease; to enable the poultry attendant to work efficiently without wasting time in unnecessary movements and the poultry manager should have the full control of the farm with least effort; and to save unnecessary land wastage in building and sheds. The poultry chicks are very sensory for human strength and Economic benefits. Hence, Location factors and influencing design of poultry houses are necessary for chicks of birds.

Reference

1. Shushila and Upadhaya: Economic zoology, New Delhi, Sara publication, 2009.
2. Shailendra Singh: Economic zoology, New Delhi, Campus books international,2008
3. Sarkar, Kundu and Chaki: Introduction to economic zoology, London, National central agency, 2014.
4. Sing R A: Poultry production, New Delhi, Kalyani publishers, 1996.
5. ICAR: Hand book of animal husbandry, New Delhi, Indian poultry industry year book,1990
6. Clutton-Brocks J: A Natural history of domesticated mammals, Cambridge, Cambridge university press, 1999