

Practical problems with temperature

1. Cold stress for chicks under brooding
2. Heat stress for growing chicks after brooding
3. Heat stress for adult chickens

Temperature control during brooding

We mean warm environment in the house

- House temperature

How to warm up chicks?

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| 1. Use of thermostatically controlled brooder | Most effective |
| 2. Use of infrared bulbs | Effective |
| 3. Use of ordinary bulbs (manually controlled) | Less-effective |
| 4. Use of chick guard during early period of brooding | May be effective |
| 5. (Must be adjusted with stocking density and seasons of the year) | |

External arrangement

Use of curtain surrounding the house to keep the brooding area warm

1. Jute clothes are preferred under Bangladesh condition
2. Polythene sheets although used extensively in Bangladesh are highly objectionable

Temperature control during post-brooding and adult stage

- We mean ideal temperature in the house

- The challenge is heat stress in Bangladesh

Ventilation

- Ventilation plays an important role in producing a good house environment.
- To maintain the correct oxygen level and remove carbon dioxide and ammonia.
- ventilation is to get rid of the heat, water and ammonia produced.
- The build-up of ammonia is a result of inadequate ventilation.
- The acceptable tolerance level is about 10 ppm. Above that threshold, ammonia caused irritation of the mucous membranes, conjunctivitis, sub-normal feed consumption and deterioration in egg shell color.
- Humidity is the most parameter to control in poultry house. It should be kept between 65 and 75%.
- To control humidity it is necessary to regulate the ventilation according to the humidity of the outside air.
- At night, the rate of air exchange should be minimized to avoid relative humidity exceeding 75 – 80%. If necessary, temperature can be allowed to fall slightly to achieve this objective.

Table 1: ventilation Rates

Type of House	Fan Design Specifications			
	Maximum Air Requirement/bird		Minimum Air Requirement/bird	
	m ³ hr C.F.M*		m ³ hr C.F.M*	
BROODER House (0 -6 weeks)	3.5	2.1	0.5	0.3
Grower House (7 -18 weeks)	7.7	4.6	1.0	0.6
Layer House (18- end of lay)	11.0	6.5	1.0	0.6

*C.F.M. = Cubic Feet per minute

House of poultry

- ❖ Open-side house
- ❖ Open side houses rely on the free flow of air through the house for ventilation.
- ❖ The width of the house: between 30 ft. (9.8m) add 40 ft (12.8m).
- ❖ Length should be according to contentment, say 350-400ft.
- ❖ Most of the open- sided houses have a stud that is 8 ft 92.4m0 long.
- ❖ Stud represents the distance from the foundation to the roof line.
- ❖ In areas where the temperature is exceptionally high throughout the year stats, should be as high as 14 ft. (4.3m) or more.

- ❖ Most of the poultry houses in the world are conventional or open sided.

COOLING THE OPEN-SIDE HOUSE

- ❖ Long as there is some air moving, the open-side house works well in warm weather but in hot weather warm breezes may be detrimental.
- ❖ It is when the wind stops that trouble begins. The build up of heat within the building is quick and at inside temperatures of 35⁰ C (95⁰ f) and above the birds are distressed, and suffocation begins as their body temperature rises above the point of toleration.
- ❖ One or more methods of comforting the birds must be employed in such a situation.

1. Sprinkle the roof of the house

Circulating sprinklers may be installed on the roof.

In order for these to have maximum effectiveness, it is important that the entire roof be wet.

2. Sprinkle the ground area outside the house

This tends to cool the air around the house, but it also increases the humidity, a detriment to bird cooling.

3. Use of foggers in poultry house

- A variety of in house fogging systems are available, ranging from those producing large droplets with considerable wetting of birds and equipment to high pressure systems that reduce temperatures through evaporative cooling.
- The evaporative cooling systems can reduce temperatures by more than 11⁰C (20⁰F) in regions of relative low humidity.

- Air movement is important in getting benefits of fogging system.

4. Use of fan outside of or in the poultry house

- Natural movement of air over the birds helps to lower body temperature. It dissipates body heat more quickly, removes the exhaled moisture.
- Increased air movement is usually necessary during hot weather particularly when natural air movement ceases.
- Fans may be placed on the wind ward side of the poultry house to increase the velocity of air as it blows through the building.
- But when the outside temperature is unusually high, it may be better to place the fans inside the house, to blow the lengthwise of the building.
- High-speed fans are better than low-speed, regardless of where placed.

2. Environment controlled house

- ❖ A controlled-environment house is one in which inside conditions are maintained as near as possible to the birds optimum requirements.
- ❖ Doing so usually necessitates a completely enclosed insulated house with no windows.
- ❖ Air is removed from the house by exhaust fans and fresh air is brought in through intake openings.
- ❖ Artificial light, rather than natural daylight, is used to illuminate the interior.
- ❖ The houses are not heated except for brooding purpose.
- ❖ The heat from the birds is used to keep inside temperature within the range required for maximum feed efficiencies.
- ❖ Where high outside temperatures are involved, some methods of controlling the temperature inside of the house are provided.

COOLING THE ENVIRONMENT CONTROLLED HOUSE

1. Low-pressure fogging system. Fogging nozzles that operate at regular water pressures are installed throughout the house or over the bids in cages.
2. Pad-and-fan system. Exhaust fans in the house draw incoming air through a wet pad where the evaporation of moisture from the pad reduces the temperature of the incoming air.
3. Fog-and-fan-system. This is similar to the pad-and-fan system except that incoming air is drawn through a hood in which high-pressure foggers have been installed. As air is drawn through the fog, its temperature is reduced.
4. High-pressure fogging system. This special nozzle converts water from liquid to vapor form. This change has a great cooling effect on the air in which it comes in contact.

Tunnel Ventilated House

Tunnel ventilated houses use exhaust fans and curtains:

- In tunnel ventilated house exhaust fans are installed at one end of the house and curtains are provided along the sides with winches to enable them to be lowered (opened) or raised (closed) as desired.
- Large openings or inlets are provided in the opposite end wall and side walls.
- The exhaust fans draw in air through the inlets and down the length on the house.

Finger hobe

Fig.1. Design of tunnel ventilated house 400'X40' (8' high at the eaves)

- Air is drawn in through these openings and then down the house at an air speed of 350 to 400cft. This provides a substantial wind chill effect for the birds and prevents heat accumulation.
- The inlets are hooded or shuttered to restrict light flow and to enable adjustment of the direction of the incoming air.



Fig.2. Air movement through a Tunnel Ventilated house

- The exhaust fond create a negative pressure in the house by pulling more aie of the house than is allowed to come in. This forces air through the house at a higher speed.
- To achieve the desired level of ventilation the following inlet areas are required:

15-20sqft. Per 36" exhaust fan

30-40 sqft. Per 48" exhaust fan

- Typically for power ventilation, a 40' wide house requires one 48" exhaust fan per 100' of house length (or one 36" fan per 50'of house length).With fogging systems the fan requirements increases.
- The opening in the inlets and the number of fans being run will depend on the age and air exchange requirements of the birds.

- Chicks in the brooding stage require an exchange of air more than cooling, whereas growing birds require cooling by wind chill.
- The effectiveness of ventilation alone reduces with higher air temperatures.
- At temperatures above 35⁰ C (95⁰ F) ventilation alone does little, if any, good in relieving heat stress. Evaporative cooling is required to keep temperatures below 32⁰c (90⁰F).
- This design of Tunnel Ventilation is common for houses 300-600' long.