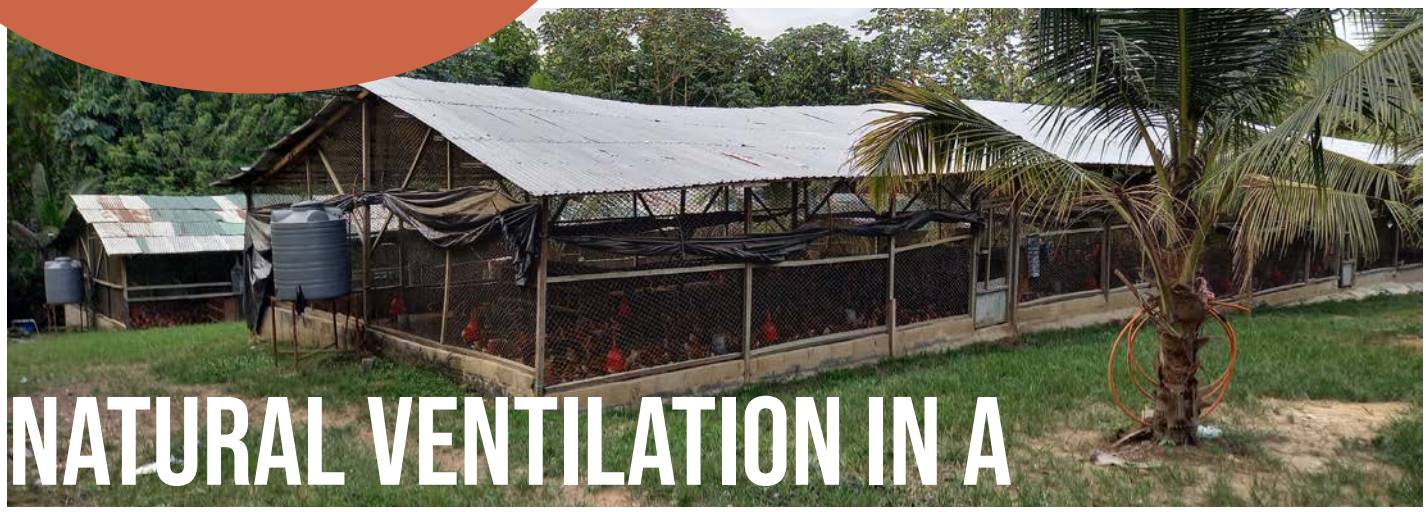
NOVOFOCUS



NATURAL VENTILATION IN A POULTRY HOUSE

WHY IS VENTILATION IMPORTANT?

Ventilation in a poultry house supplies fresh air that is essential to sustain life. Ventilation air removes excess heat, moisture, dust, and odour from the building and, at the same time, dilutes airborne disease organisms. However, it is a challenge since poultry houses are different and ventilation requirements change with time of day, season, temperature, humidity, wind, bird age and density.

WHAT IS NATURAL VENTILATION ?

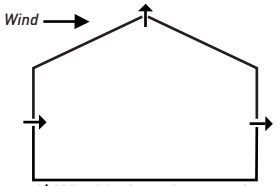
Natural forces such as winds and thermal buoyancy resulting from differences in indoor and outdoor air density drive outdoor air through purpose-built building opening.

An effective natural ventilation system in a poultry house relies on the laws of physics to generate air movement. In particular, two important concepts are the facts that warm air rises and that warm air holds more moisture than cold air.

There are two types of natural ventilation occurring in buildings:

- Wind driven ventilation (1)

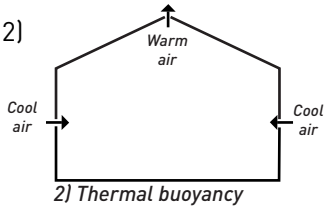
Wind driven ventilation arises from the different pressures created by wind around a building or structure; and openings being formed at the perimeter which then permit flow through the building.



1) Wind induced natural ventilation

- Buoyancy-driven ventilation (2)

Buoyancy-driven ventilation refers to the process by which movement of air is primarily induced by the buoyant force resulting from temperature differences.



2) Thermal buoyancy induced natural ventilaton

TARGET AIR QUALITY GUIDELINES

For as long as birds are present in the house, parent or commercial stock, it's necessary to ventilate a minimum, no matter what the outside weather is.

• Oxygen %	> 19.6 %
• Carbon Dioxide (CO2)	< 0.3 % / 3000 ppm
• Carbon Monoxide	< 10 ppm
• Ammonia	< 10 ppm
• Inspirable Dust	< 3.4 mg/m3

MEASURES TO BE DONE

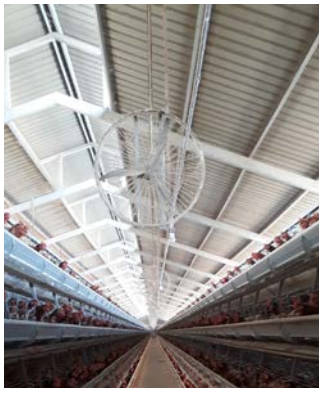
- Roof designs and building insulation
- The design of major openings for ventilation (side windows, ceiling opening, front and back doors)
- The building orientation (long side of the house, perpendicular to the prevailing winds)
- Type of birds inside (pullets, layers, broilers, different heat product from them)
- The outdoor water (humidity level, quantity of rain, fog ...)
- All factors influencing the results of the ventilation process, additional fans ...

NOVOGEN

NOVOFOCUS

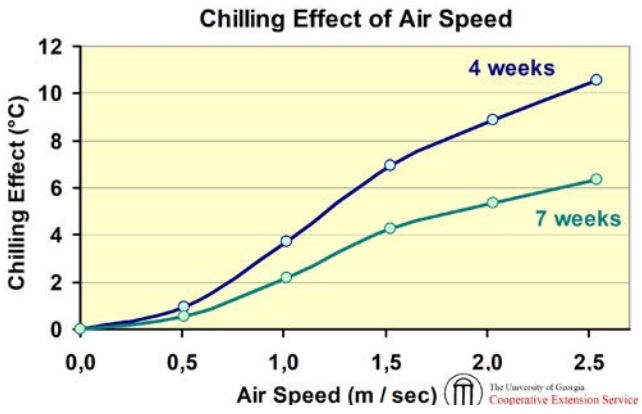
MANAGEMENT IMPROVEMENT

- Modify the roof design, more inclination and greater internal volume. During warm and hot weather conditions, the usage of ridge opening for ventilation is very limited because the buoyancy effect is low due to similar indoor and outdoor temperatures.
- Roof insulation is crucial. In the construction terminology, this refers to thermal resistance per unit area with a minimum R-values of 9 in the walls and 12 in the ceilings are suggested. Planting tall trees to provide shadow on the roof can also be efficient to reduce high temperature, but it also important to avoid stopping the prevalent wind.
- During winter season, employing pocket curtains can help ensure a minimal exchange of air.
- The use of circulator fans inside is very important to remove the moisture and ammonia.
- Using perch in floor system helps in dissipating the heat from the birds.
- The maintenance of the side curtains is essential, utilise steel cable, winches and pulleys to manage the opening.



Additional fans

- Opt for white curtains in hot country and use an extra protective curtain to shadow the side of the farm.
- Effect of the wind speed to the birds



- Remove out the manure as soon as possible to prevent excessive humidity and avoid producing extra moisture. In cage systems, refrain from accumulating too much manure to maintain adequate airflow around the birds and minimize the wind chill effect.

CONCLUSION

Natural ventilation has many advantages, such as lower cost, lower maintenance and lower electricity consumption. But it also has some disadvantages. Natural ventilation is more challenging, particularly in terms of temperature control. It also requires regular replacement of open coverings (allowing rain/snow/sun to enter the building) and a large building footprint.

There are a few possibilities to manage the natural ventilation in a poultry house apart from having a well-designed house prior to construction. Maintaining a good sanitary or biosecurity conditions even in open house is crucial to obtain a good pullet's body weight and hen's production. Healthy, strong birds are better equipped in handling stressful conditions. A minimal investment such as installation of additional fans in tropical areas will certainly improve economic returns. Regular monitoring of birds' behaviour and adjusting the ventilation several times of the day can be effective during intense heat stress.

For more details, you can consult our web site with the nutrition guide & all the management guides, and our NovoCenter.

novocenter.novogen-layers.com

NOVOGEN