2016

Baseline data pilot farms report

Dutch-Indonesian Food Security Programme;Livestock Components (DIFS-Live)

Animal Sciences Group of Wageningen UR and partners

Improvements and innovations in broiler production

General information

Baseline general and production performance data of the pilot broiler farms within the DIFS-Live project is collected during 2015. Data from 11 broiler houses from in total 6 farms were recorded. These farms are located in the following areas; Bandung (1 farm), Bogor (3 farms) and Bekasi (2 farms). In general the broiler houses on the selected farms are open houses with bamboo slats at around 1.5 m from the ground. Two farms use 2 tier houses. Houses are heated with manual coal heaters or gas heaters. All houses use natural ventilation, however, 3 of the broiler houses are equipped with vertical recirculation fans. Water is provided via automatic bell drinkers (6 houses) or via a manual water system (5 houses) and feed is provided by manual feeder pans.

General data and production performance data are presented in Table 1 and are discussed into more detail below.

General data

Stocking density

The stocking density of the pilot farms is on average 10.5 chicks/m2 (range between 8.3 and 13.0 chicks/m2). This is almost 50% lower than the stocking density of farms located in Europe. This difference is caused by the fact that under tropical circumstances a higher density is not applicable. A higher stocking density in natural ventilated broilers will result under these circumstances in severe heat stress with devastating effects on mortality.

Production period

The average production period on the pilot broiler farms is 30 days with a range of 24 to 33 days. In daily practice all farms harvest the chicks during a 5 to 7 days period. This is a significant lower production period compared to European standards. This is mainly due to the market situation; where in Europe most broilers are cut up and sold in different parts (filet, legs, wings, etc.), broilers in Indonesia are normally sold as whole birds. Slaughtering chicks at a young age results in an inefficient production model because the efficient growth potential between 3 and 6 weeks of age is not totally utilised. Chicks' growth between 0 and 30 days (4.3 weeks) under ideal circumstances is about 1,665 gram (55 g/d) and between 30 and 42 days (1.7 weeks) their growth is around 1,252 gram (104 g/d). Under Indonesian circumstances birds are slaughtered between 24 to 33 days which means that the efficient growth period is not used.

Cleaning period

The cleaning period between two flocks in broiler houses in Indonesia is on average 2.5 times higher than in Europe. Cleaning of the houses in Indonesian is done manually by the farm staff and costs more time than when this is done by professional and specialised cleaning companies. This extended cleaning period is also caused by periods of low market prices for broilers. Under those market conditions farmers decide to wait with starting a new flock until broiler prices increase.
The number of cycles is quite low and inefficient due to the shorter production period and longer cleaning period. An Indonesian production cycle costs on average 56 days (30 days production and 26

days cleaning period). This means that in one year 6.5 production cycles can be conducted, resulting in an occupancy rate of 53%. In Europe, a production period is on average 47.5 days (40 days production and 7.5 days of cleaning) resulting in 7.7 cycles per year and an occupancy rate of 83%.

Production performance data

Slaughter weight

Average slaughter weight of the broilers of the pilot farms in Indonesia is, compared to the Cobb standard at the same age, 22% lower compared to broilers of farms in Europe. This huge difference in productivity is caused by the high temperature (and high humidity). Broilers subject to high environmental temperatures exhibit many behavioral changes which allow them to re-establish heir heat balance with their environment. Broilers intend to rest more during periods of heat stress resulting in a lower feed intake. Some birds will stand quietly while others simply crouch near walls or waters. Usually, their wings are spread away from their body for cooling purposes and to reduce body insulation. Within the bird, blood flow is diverted from certain internal body organs such as the liver, kidneys and intestines to dilated blood vessels of the peripheral tissue (skin) in order to facilitate heat loss. Hyperventilation or “panting” increases during periods of high environmental temperature. Panting requires increased muscle activity and this result in an increased energy requirement which is associated with heat stress. Therefore, decreased energy efficiency is related to high temperatures.

Mortality

Broilers raised in the broiler pilot farms showed a higher mortality (+58%) compared to broilers raised in broiler farms located in Europe. The main reasons for this higher mortality rate are:

- Heat stress problems caused by the tropical climate
- Poor bio-security resulting in a higher disease pressure
- Ideal climate for development of pathogens
- In general, a low level of broiler management
- Moderate water quality (and system)

These factors all lead to a higher disease pressure which easily results in primarily and secondary infections with sometimes excessive mortality levels.

Feed intake/DOC

Feed intake per day old chick is 22% lower than under more ideal circumstances. This is related to their physiological adaptation to heat stress. The reduction in feed intake results in a decrease in the daily intake of nutrients responsible for growth. However, fewer nutrients to metabolize means less heat produced by the body. Thus, even though growth is slowed, the broiler can now more easily cope with the heat because of the lessened need for heat dissipation. As already mentioned, heat stress also leads to a lower feed intake due to the change in behaviour (lower activity).

Feed Conversion Ratio (FCR)

The efficiency of conversion of feed to body weight is depressed due to the heat stress issue. Birds that suffer from heat stress have a less efficient metabolism due to a higher need for energy for panting.

Table 1 Baseline general and production performance data[1]

Item	Pilot farms[2]	Standard	Difference
General data			
Stocking density (#/m2)	10.5 (8.3-13.0)	18-22[3]	-48%
Production period (d)	30 (24-33)	35-45[3]	-25%
Cleaning period (d)	26 (14-30)	5-10[3]	+253%
Production performance			
Slaughter weight (g)	1338 (1041-1549)	1705[4]	-22%
Mortality (%)	6.0 (2.9-10.2)	2.5[3]	+58%
Feed intake/DOC (kg)	1.91 (1.39-2.37)	2.46[4]	-22%
FCR (kg feed/kg BW)	1.52 (1.23-1.85)	1.44[4]	+6%

[1]Data collected in 2015

[2]Average and range between brackets

[3]Field data Europe

[4]Cobb management guide 2015

Production Index

Broiler integrators and producers in Europe, Africa and Asia use a "Production Efficiency Factor" (PEF) to compare the live-bird performance of flocks. This value incorporates daily body weight growth (or live weight), liveability and feed conversion efficiency. Sometimes also the slaughter age of the flocks is used. In this memo we use the EPEF (European Production Efficiency Factor). This calculation is formulated as follows: (% survival rate * average grams gained/day) /FCR X 100.
It is concluded from Table 2 that the production efficiency factor in Indonesia compared to Europe is around 30% lower.

Table 2 Baseline values for EPEF calculations[1]

Item	Indonesian	Europe
Mortality (%)	6.0	3.5
Body weight growth (g/d)	44.6	63.6
FCR (kg feed/kg BW)	1.52	1.55
EPEF	276	396

[1]Slaughter age at 30 (Indonesian) or 36 days (Europe)

Conclusions

The conclusions of the comparison between the data of the broilers of the pilot farms in Indonesia compared to data of broiler farms located in Europe are:

- Stocking density is almost 40% lower;
- The utilization of the pilot farms is much lower (53 vs. 83%);
- Production is much lower due to heat stress and high pathogen;
- Production efficiency is 30% lower.