

## Broiler Farm Size in Relation to Sustainability Aspects

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Broiler farm size and sustainability

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### Summary

In the Netherlands the number of broiler farms has been reduced by 50%, while farm size doubled between 1990 and 2008. A debate on the positive and negative aspects of large farms emerge. Many entrepreneurs in the broiler sector use increase in scale as strategy to reduce production cost. However, a critical reflection on the process of scaling up is needed. We investigated various aspects of broiler farm size with three farm sizes: small (fewer than 60,000 birds), medium (60,000 to 120,000 birds) and large (more than 120,000 birds). .

The study shows that:

- profitability (revenues as % of total cost) is higher on larger farms
- gross margin (revenues over feed and chick cost) is higher on larger farms
- larger broiler farms have a higher labour productivity (kg broiler live weight / hour)
- larger farms more often have certified low ammonia emission poultry houses
- there is no clear relationship between mortality and broiler farm size
- there is no significant relation between the level of medication (antibiotics) and farm size

The size of a broiler house and the equipment used is not related to the farm size. As a result there is no influence of farm size on the physical and social environment of the broilers.

Our conclusion is, that larger broiler farms have some clear economic advantages. There is no evidence that there is a negative relation between farm size and animal health and animal welfare.

### Introduction

According to the agricultural census, there were 700 farms with broilers in the Netherlands in 2008, keeping a total of 43.3 million broilers. Of these farms, 340 are specialised broiler farms. A specialised broiler farm is a farm where more than two-thirds of the income is gained through broilers. Table 1 shows the development of the specialised farms between 1985 and 2008. The number of broilers declined by 45% between 1985 and 2008. In the same period, the number of broilers on these specialised farms increased from 22.1 to 29.3 million (+33%). The average number of broilers per farm increased from 35,483 to 86,257.

Table 1 Development of the number of specialised broiler farms.

	1985	1990	1995	2000	2005	2008
farms	624	618	596	540	371	340
broilers (x million)	22.1	24.7	27.3	33.7	29.7	29.3
broilers / farm	35,483	39,931	45,800	62,458	79,983	86,257

A debate is currently taking place in the Netherlands regarding increases in scale in agriculture. Questions that need to be asked in this respect are; what are the driving forces behind increases in scale, how have developments progressed over the past 15 years and what are the positive and negative effects of scale increases.

## **Method**

The goal of the study was to map out a variety of aspects relating to the scale of broiler farms. These aspects relate to economics, the environment, animal health and animal welfare. The study was carried out by a team of researchers at Wageningen UR, making use of the relevant literature (van der Meulen et al, 2010). Quantitative research has also been done on the basis of data from the Dutch agricultural census and international data from Eurostat. The data from LEI's Farm Accountancy Data Network (FADN) was also analysed. The study measured farm size in terms of the number of bird places. This measurement method was chosen as it is commonly used in practice. During the study, the farms were divided into categories: small (fewer than 60,000 birds), medium (60,000 to 120,000 birds) and large (more than 120,000 birds).

## **Driving forces**

When describing the driving forces of scale increases, it is impossible to separate them from the development of intensification and specialisation. The most important driving forces in scale increases are (Bont, 2007):

- Cost reductions. Entrepreneurs try to reduce costs by means of scale increases. At a given market price, profitability can thus be increased.
- Automation and other forms of innovation. Thanks to new technology, the amount of labour required per bird has been reduced.
- Chain partners. The broiler farmer acts as a link within the production chain. Suppliers (such as compound feed factories) and buyers (slaughterhouses) are becoming larger and larger, and are also putting pressure on primary farms to increase the scale. Larger farms are given discounts on feed. Slaughterhouses charge a supplement for small numbers of broilers, or may even refuse to do business with small farms.
- Low market prices. Through competition, liberalisation of the global market and the market power of supermarkets and industry, the market prices are under continual pressure. The entrepreneur responds to this by increasing scale in order to be able to make an income with more birds.

## **Economics**

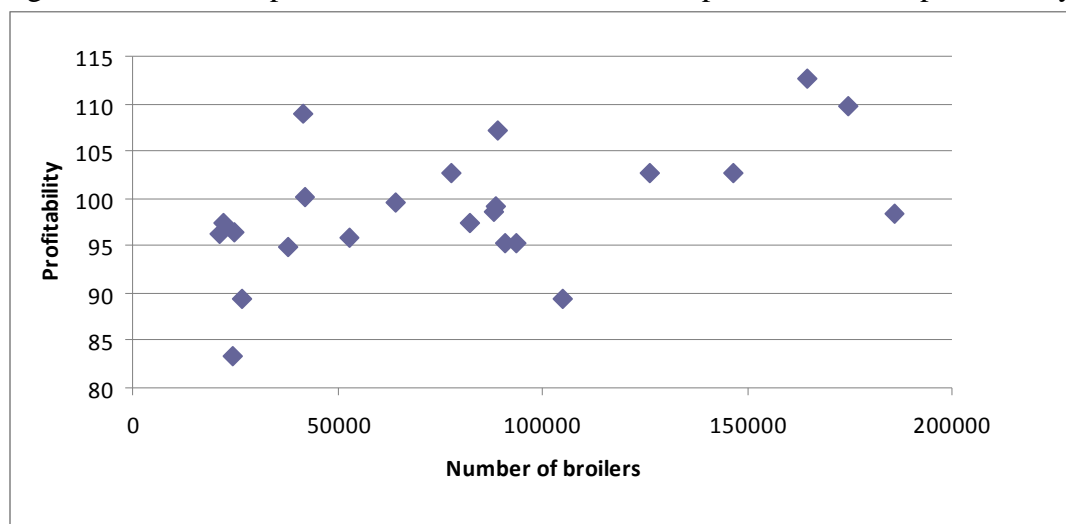
The key figure of profitability presents the relationship between revenues and costs on a farm. The costs include costs calculated for the use of unpaid labour and equity capital. This key figure is calculated annually for all farms participating in the FADN. Figure 1 presents the profitability of 27 specialised broiler farms in 2007 in relation to the size of the farm. Figure 1 shows that profitability on the larger farms is greater.

Another key figure in measuring the economic result of a company is the 'feed margin'. The feed margin is calculated as the difference between the revenues from the sale of the chickens and the costs of feed and day-old chicks. Besides the revenues, this also includes the main cost items (combined: 70 to 75% of the total costs) of a broiler farm. This is more a global indicator of the economic result than the profitability. Conversely, the feed margin of a larger number of farms is known through external sources. The results show that the feed margin per broiler for small farms was €0.502 in 2007. For medium-sized and large farms, it was €0.525 and €0.540 per broiler respectively.

Labour productivity is an important economic factor. Labour productivity is the annual weight delivered divided by the number of hours worked. A study by Vermeij et al (2009) involved an analysis performed on the basis of 93 questionnaires. On smaller farms,

production was 408 kg per hour, on medium-sized farms 535 kg and on large farms 638 kg per hour worked. Translated into monetary terms, the production costs on small farms is €0.01 higher and on large farms €0.01 per kg weight lower than average.

Figure 1. Relationship between the number of broilers per farm and the profitability in 2007



Source: FADN of LEI

### Environment

Relevant environmental factors include ammonia emissions and mineral excretions. The legal standards for ammonia emissions are expressed in grams of emission per bird place per annum. No relationship with farm size is included in the statutory regulations. An indirect effect of the farm size is included, however. Larger farms have a greater tendency to invest in low-emission systems, sometimes in combination with extending the business. An analysis of figures on the basis of the agricultural census 2008 demonstrate the following: the proportion of bird places with low-ammonia emission housing systems is 10% on small farms, 16% on medium-sized farms and 29% on large farms. In principle, the excretion of manure and minerals does not differ between large and small farms (van der Peet et al, 2008).

### Bird welfare and bird health

Van der Fels (2008) carried out an analysis among a broad group of researchers from Wageningen UR regarding the opportunities and risks for animal welfare, animal health and food safety on large farms. The conclusion was drawn that the size of the farm does not necessarily have an influence on the characteristics of the bird or on the direct physical and social environment in which the birds are kept. Particularly for the broiler sector, the size and layout of the broiler houses is not related to the size of the farm. In other words, the layout of the broiler houses within the Netherlands is very uniform and larger farms simply have more housing of more or less the same standard dimensions.

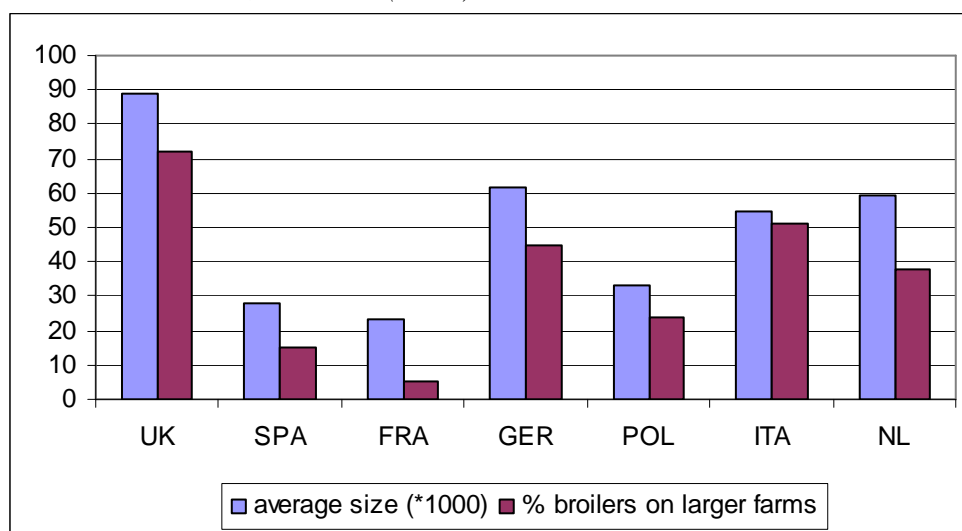
If the mortality can be taken as an indicator for bird welfare and bird health, a quantitative analysis is possible. The mortality percentage of three groups of farms is calculated on the basis of the data drawn from LEI's Farm Accountancy Data Network. The average loss for the groups of small, medium-sized and large farms in 2007 was 5.1%, 4.2 and 4.3% respectively.

Antibiotics are used in the broiler sector to cure and prevent disease problems. The use of antibiotics in livestock farming has been investigated by Bondt & Puister (2009). Their research shows major differences between the antibiotic use at different farms. However, it was not possible to demonstrate a link between the level of the use of antibiotics and the size of the farm.

### International comparison of farm size

Figure 2 presents a summary of the size structure in the most important EU poultry-producing countries. In the United Kingdom, the average farm size is significantly greater than in the Netherlands. The average farm in Spain, France and Poland is smaller than in the Netherlands. The average farm size in the Netherlands is fairly similar to that in Germany and Italy. In these countries, approximately 40 to 50% the broilers is kept on larger farms (i.e. farms with more than 100,000 broiler places).

Figure 2 Average farm size (all professional farms) and proportion of broilers on farms with more than 100,000 birds (2007)



Source: Eurostat, processed by LEI.

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