

Good Practices

Use of Antibiotics

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The increase of antimicrobial resistance is considered to be a major worldwide threat to both human and animal health. Inappropriate and excessive use of antibiotics in humans and animals accelerates the emergence and spread of antibiotic resistance, which can spread via various routes. Food is one of the ways in which resistant bacteria are transmitted from animals to humans.

This factsheet starts by briefly describing the Dutch policy towards antibiotic usage and goes on to discuss developments in animal husbandry: the use of antibiotics, the size of the livestock population, and technical and economic results. Then, good practices in four Dutch livestock farms are described. These farms have taken measures that are obviously effective in terms of preventive health care and careful use of antibiotics, without having a negative effect on profits.

Antibiotic use policy

In 2008 the Dutch policy on reduction and responsible use of antibiotics in livestock was set up as a public-private partnership, with stakeholders from the major livestock production sectors and the Royal Netherlands Veterinary Association taking responsibility for effective measures, supervised and facilitated herein by the national government. Key elements in the approach have been:

- Monitoring of total sales of veterinary antibiotics (since 1999)
- Monitoring of antibiotic use per animal species (since 2004)
- Clear antibiotic reduction targets set by the government in 2009: -20% in 2011 and -50% in 2013 and -70% in 2015 for livestock production as a whole, in relation to antibiotic use in 2009.
- Transparency and benchmarking of antibiotic use per herd and per veterinary surgeon (since 2011)
- Improved herd health, clear responsibilities in herd health management and in prescription/delivery of antibiotics by introducing:
 - o mandatory animal health plans
 - o one contracted vet per herd
 - o mandatory periodical veterinary herd inspections.

The Dutch policy on antibiotic use in livestock is successful. In 2012 the objective of a 50% reduction of total sales, as compared to 2009, had already been realised (see Figure 1). By 2014 the sales of veterinary antibiotics had dropped by more than 58%, from 495 tonnes of active substance in 2009 to 207 tonnes in 2014. Moreover, since 2013 almost no critically important

antibiotics¹ have been used in the major livestock sectors. The reduction in use of antibiotics has resulted in lower levels of antibiotic resistance in most animal species.

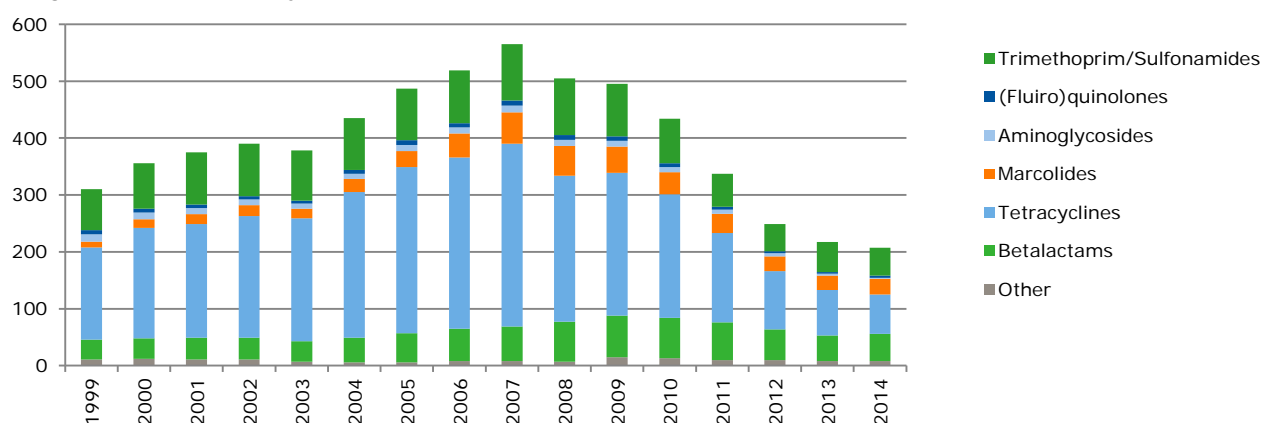
Substantial reduction in antibiotic use appears not to affect profits

Between 2009 and 2014 the use of antibiotics in Dutch livestock decreased by 58%. This does not appear to have affected farm profits. In that period the animal husbandry sector did not diminish in size. Furthermore, the average technical and economic results do not appear to have worsened. In other words, a considerable reduction in the veterinary use of antibiotics in the period 2009-2014 could be realised without any measurable adverse consequences for the technical and economic results. Non-prudent use of antibiotics in recent years has been tackled seriously. Individual farms that had a good reason to use antibiotics and unfortunately have not succeeded in reducing their usage have not yet had sanctions imposed.

Use of antibiotics

Figure 1 shows the trend in total sales of veterinary antibiotics; that is to say, therapeutic use and not the use of antimicrobial growth promoters (AGP). There has been a ban on the use of antibiotics as growth promoters in Europe since 2006. Between 1999 and 2014 there were fluctuations in the size of the livestock sectors but the total biomass of the whole livestock population has remained quite stable. That explains why the trend in the quantity of antibiotics sold per kilogram of body weight was similar to the trend in the total quantity of antibiotics sold.

Figure 1. Antimicrobial veterinary medicinal product sales from 1999-2014 in kg (thousands; excluding use of AGPs in the years 1999-2005)



Source: Netherlands Veterinary Medicines Authority (SDa)

The various livestock sectors differ in the extent to which the use of antibiotics in the period 2009-2014 decreased (table 1). Interestingly, the veal sector was already showing a decrease of around 15% in the period 2007-2009. The MARAN website (www.maran.wur.nl) provides more information on trends in the use of antibiotics in the various sectors from 2004 onwards.

Table 1. Trend in antibiotic use per sector 2009-2014 (number of daily dosages per animal year)

Sector	2009	2014	% reduction
Sows/piglets	25	11	56
Fattening pigs	16	8	50
Broilers	37	16	57
Veal calves	34	21	38
Dairy Cattle	5.8	2.4	58

Source: Netherlands Veterinary Medicines Authority (SDa)

¹ Critically important antibiotics are antibiotics that are of high importance in human health for the treatment of infection (3rd and 4th generation cephalosporins and fluoroquinolones). Ideally, the use of these antibiotics should be restricted in the human population and in livestock.

Size of livestock population

Table 2 reveals some small fluctuations in the size of the livestock sector between 2009 and 2014. The numbers of dairy cattle, veal calves and broilers increased slightly, whereas the pig population decreased by around 4%.

Table 2. Trend in animal numbers in livestock sectors in the Netherlands 2009-2014 (x 1,000)

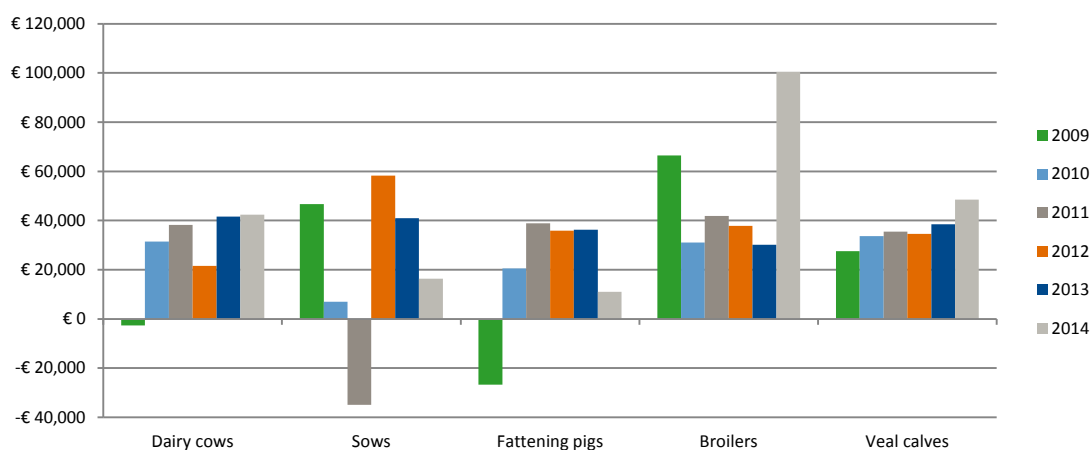
	2009	2010	2011	2012	2013	2014	% change 2009-2014
Dairy cows	1,489	1,479	1,470	1,484	1,553	1,572	6
Sows	985	984	978	938	945	953	-3
Fattening pigs	5,872	5,904	5,905	5,874	5,754	5,650	-4
Broilers	43,285	44,748	43,912	43,846	44,242	47,020	9
Veal calves	894	927	906	908	925	920	3

Source: CBS

Technical and economic results

The trend in 'family farm income per family worker' is shown in figure 2. The income per year on livestock farms fluctuates enormously mainly because of changes in output prices and the price of feed. The pig sector in particular suffered from low meat prices and high feed prices in certain years.

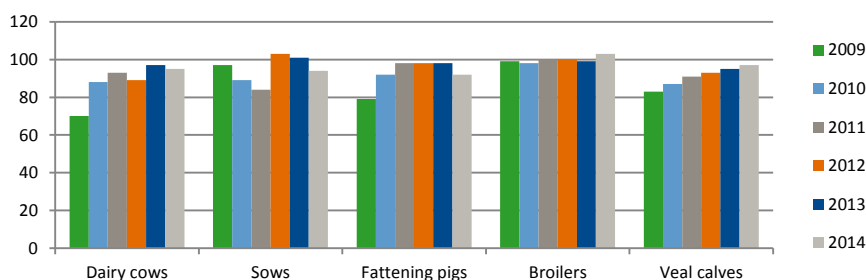
Figure 2. Family farm income per family worker 2009-2014



Source: FADN

Figure 3 shows the trends in the 'rate of return' (output-costs ratio). This profitability index indicates the revenues for every 100 euros spent. If the total costs, including calculated costs for deploying unpaid labour and capital, are not totally covered by revenues, the profitability index falls below 100. If revenues are higher than the costs, the profitability is greater than 100.

Figure 3. Rate of return (output per 100 euro costs)



Source: FADN

Most sectors show an annual fluctuation in profitability. In none of the sectors is the trend downwards. The fluctuations are the greatest for the pig sector, while a definite upward trend is only visible in the veal calf sector. It is difficult to compare sectors because of the differences in calculated costs for private labour and capital. The profitability in the dairy sector is relatively low because of the high calculated costs of land (capital).

In none of the cases has a reduced usage of antibiotics appeared to have lowered profitability.

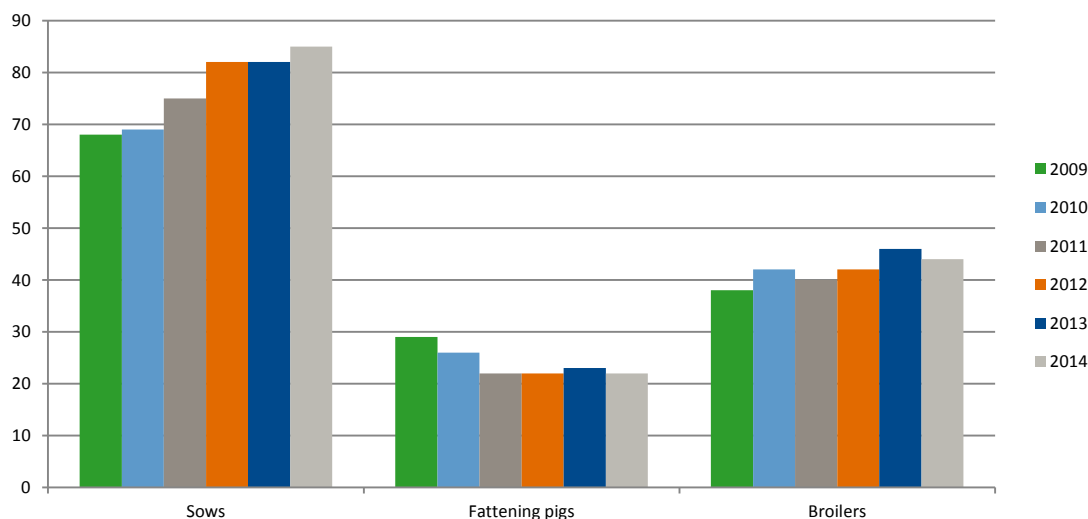
How do the farmers themselves view the situation?

A survey of 42 pig farmers in 2012 showed that 90% of them did not believe the enormous reduction in antibiotic usage was having an adverse effect on economic results. Furthermore, an analysis of the technical and economic results from 80 pig farms and 21 broiler farms showed that farms with more than 50% reduction in antibiotic usage in the period 2009-2011 did not perform better or worse than farms where antibiotic reduction was not achieved.

The following figures show the trend in some indexes which could be affected by reduced antibiotic use on pig and broiler farms in the Farm Accountancy Data Network (FADN). This European data network gathers accountancy data from farms to determine incomes and to perform a business analysis of agricultural holdings. The Dutch part of FADN is a major source of information in the Netherlands, collecting current data on a wide range of subjects from a large number of agricultural businesses that jointly represent around 95 percent of Dutch production.

Figure 4 shows that the marked decrease in use of antibiotics in sows and broilers has not led to lower animal health costs. Probably the farms had to spend more on preventive healthcare, for example, on obtaining advice and guidance from vets or on vaccination. In the fattening pig sector the annual healthcare costs showed a distinct reduction in the period 2009-2011 and they remained lower in subsequent years as well.

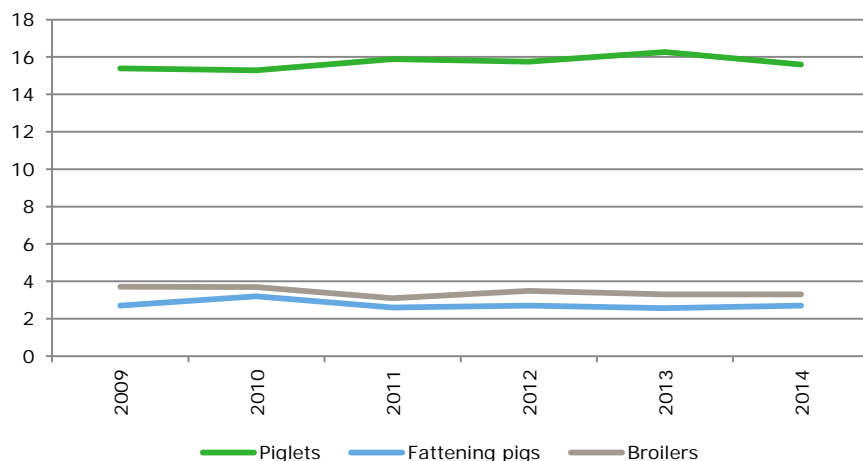
Figure 4. Veterinary costs



Source: FADN; costs in € per sow per year, per 10 fattening pigs per year, per 1,000 broilers sold

Figure 5 shows the trends in mortality. There is some annual fluctuation in each sector. For piglets there is a slight increase and for broilers a decrease, especially in 2011. This decrease was probably caused by the implementation of the animal welfare legislation, with upper limits regarding mortality and meat production for every square metre of animal housing space. In general, mortality is certainly not on the increase.

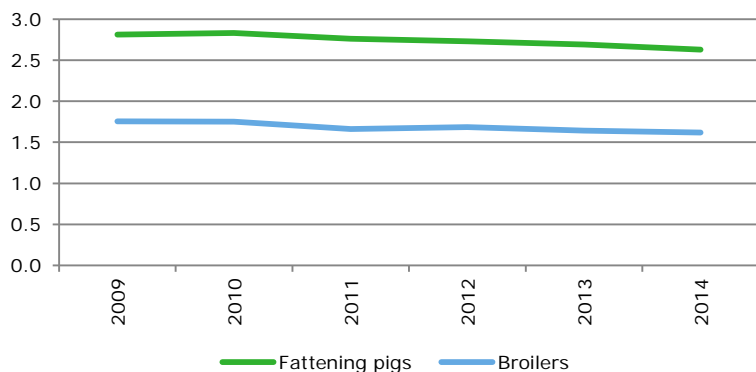
Figure 5. Mortality (%)



Source: FADN

Figure 6 shows that feed conversion for fattening pigs and broilers fluctuates but the trend is downwards and therefore favourable. Feed conversion represents how many kg of feed was necessary for 1 kg of growth in pigs or poultry.

Figure 6. Feed conversion



Source: FADN

Good Practices on livestock farms

The veterinary use of antibiotics was high on many Dutch livestock farms until 2009, when many vets and livestock farmers went into action. It turned out that on many farms it was possible to achieve unexpectedly significant improvements in animal health and a much lower antibiotic use by adopting a series of relatively simple and not particularly expensive management measures. These included checking the animal housing climate more often, giving animal behaviour more attention, improving the quality of the drinking water and applying hygiene measures.

This can also be deduced from the interesting stories ('good practices') told by two pig farmers and two broiler farmers, all of whom have achieved improvements on their farms in their own particular way. The four farms have shown they could take effective measures concerning preventive health care and careful use of antibiotics without adversely affecting farm profits.

The farms in question are typical examples of the livestock farms and management methods found in the Netherlands. The various stories illustrate that it is possible to achieve a substantial reduction in antibiotic use by applying relatively simple measures.

Successful animal health team



Pig farm Van de Nieuwelaar in Roosendaal

This is a farrow-to-finish pig farm with at least 500 sows and 4,500 fattening pigs. The piglets remain in the farm until they can be slaughtered as fattened pigs.

The farmer's vision

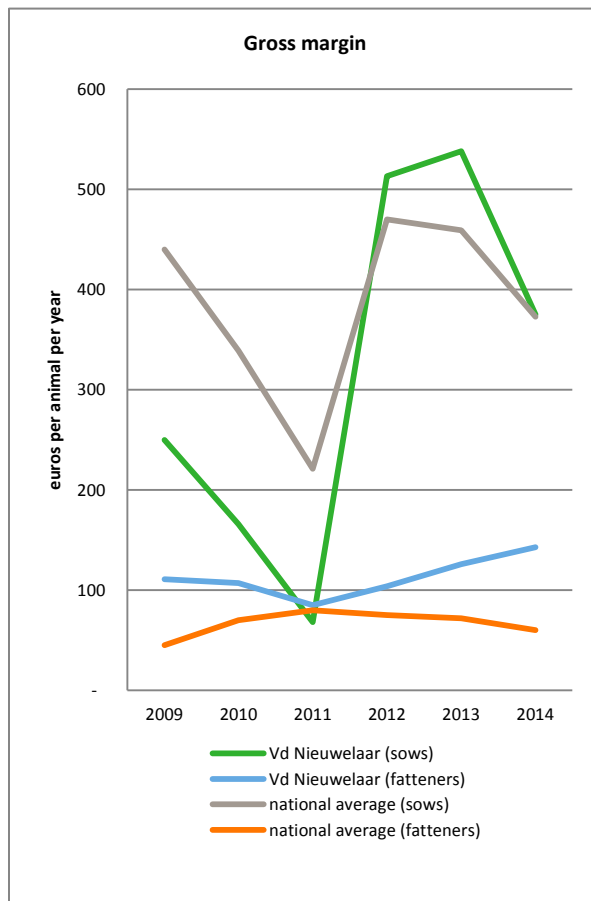
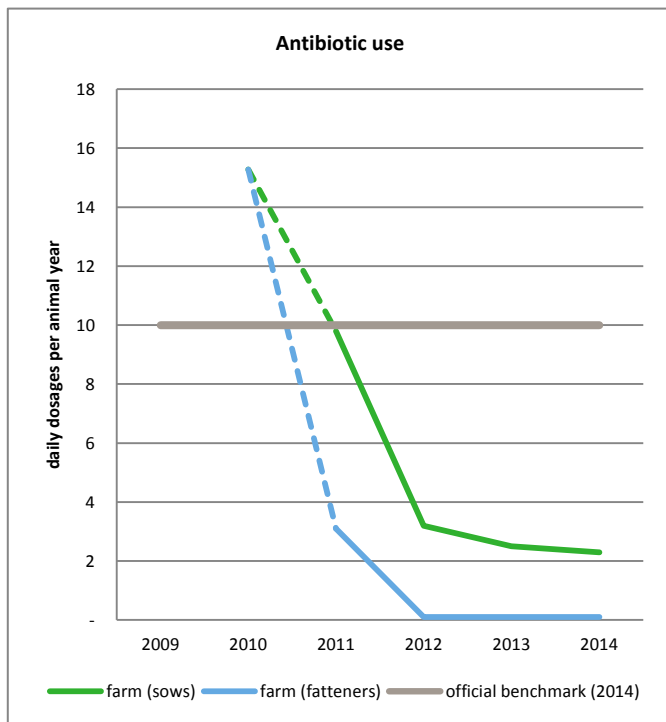
In 2011, the pig farmer began implementing improvements which would lead to reduced dependence on medication administered to all the animals via the

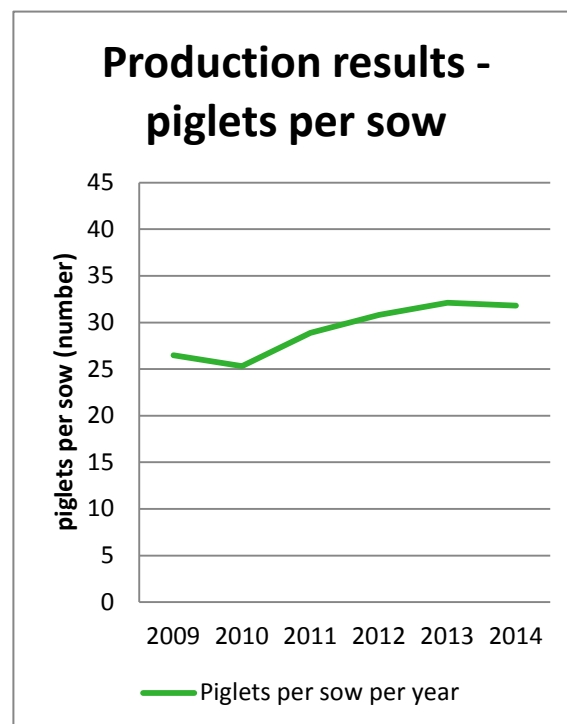
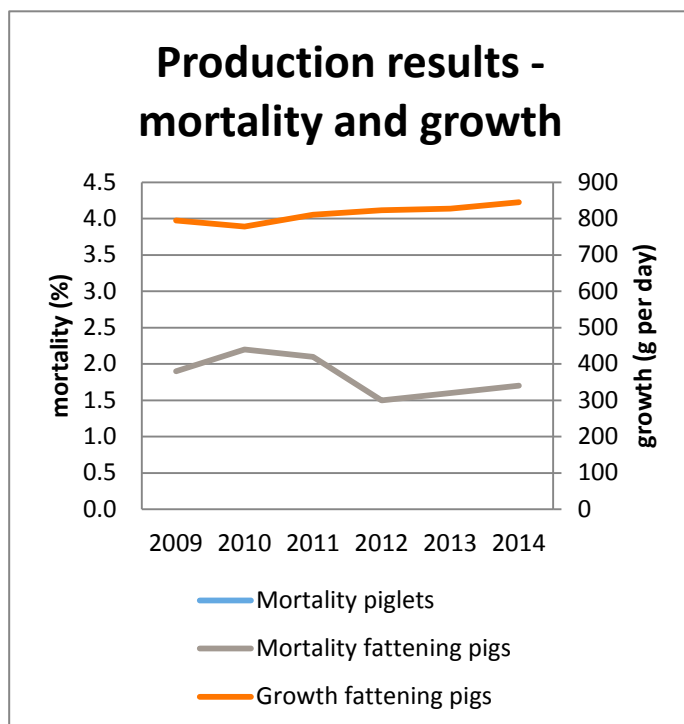
feed. For example, he took part in the project initiated by the innovation network for antibiotic-free animal husbandry. He believes it is important not to concentrate only on production but to be in contact with the general public as well. This is also the aim of the Supply Chain for Sustainable Pork (KDV) in which the farm participates.

'My aim is to produce tasty, healthy pork and to be able to look the consumers in the eye. We supply an honest product and that deserves to be recognised. That is why I'm actively involved in setting up a farmers' market in Roosendaal so I can sell my own meat there and have direct contact with the consumers.'

His own target in 2011 was to reduce antibiotic use in sows and piglets from about 16 to fewer than 5 Animal Daily Doses per sow per year. The figure shows that he had already more than reached his target by 2012.

Results





Sources:

Antibiotic use: Figure for 2009 is not available. Figure for 2010 is the overall use of sows and fatteners together. The official benchmark 2014 was laid down by the Netherlands Veterinary Medicines Authority (SDa).

Gross margin and Production results: figures from Agrovision; national average: LEI Wageningen UR/FADN.

The figures show that not only antibiotic use had lessened drastically after 2011 but also that the gross margin for each animal and the technical results were greatly enhanced. On this farm, improvements in management and animal housing have also led to lower total animal health costs (medicines plus vet fees).

Mentality change

On this pig farm there have been huge changes in mentality and practice in terms of animal health. This farmer has had some personal experience of the damaging side-effects antibiotic treatment can cause. A treatment interferes with the natural balance, giving diseases the chance to develop whereas they were never a problem before. 'You should use antibiotics only if they're absolutely essential!', Van de Nieuwelaar says.

'I can give the pigs just one " bucketful" of attention each day. How can I use that time to realise a maximum return? If you spend extra time on something for a short while, it always improves. I wanted to change things in such a way that those improvements became permanent.'

One of the most important measures introduced on the farm was to set up an animal health team consisting of the pig farmer, his wife, the employees, the feed consultant and the vet. All measures are discussed in this team and if there is agreement on a particular point then this is always put into action completely and consistently. The farm's success hinges on this way of working.

Technical improvements

Van de Nieuwelaar has invested about €20,000 in technical improvements over the last five years. The goods vehicle that comes to collect manure no longer needs to drive up to the animal housing unit but is connected up at a distance via pipework. Access routes in the farm have been altered; sows no longer have to pass through the housing for the piglets. The risk of external contacts introducing infections is further minimised by delivering the fattening pigs through special delivery pens outside the pig housing. Quarantine housing has also been installed. Young sows are delivered to this unit every 10 weeks. The annual costs of these investments amount to about €3,000. At a cost of about €1,200 per year, the team also consults a coach who helps them to analyse problems and to draw up plans for improvement twice a year. These extra costs are more than compensated for by the improved technical and economic results.

Keeping animals free of stress and infection



Pig farm Harbers in De Heurne

Mr Harbers has 1,750 fattening pigs on his farm. His aim is to produce quality pigs rather than to obtain maximum growth.

The farm has four housing units with a central corridor and a number of separate compartments. Each compartment has a half-latticed flooring, with the manure channel underneath. The feed is supplied by means of automatic feeders.

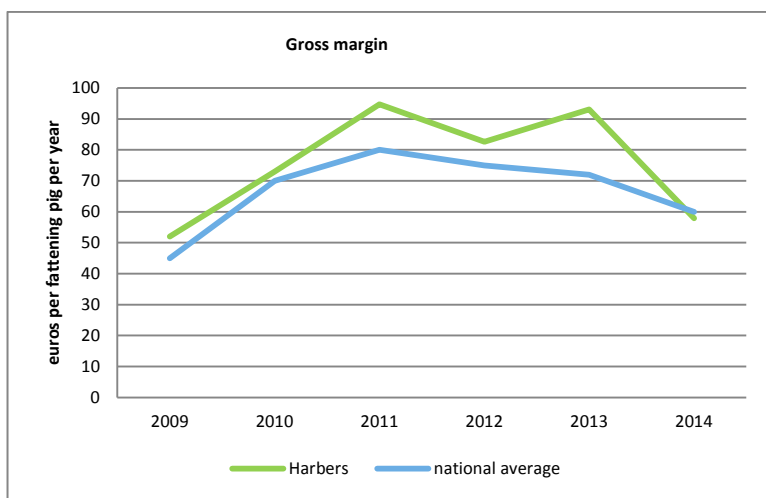
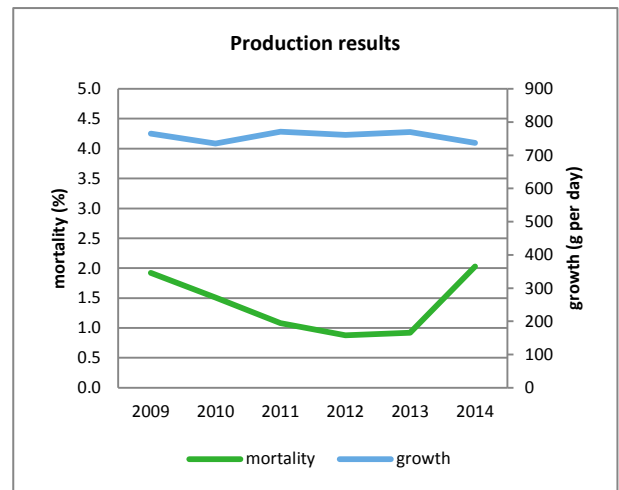
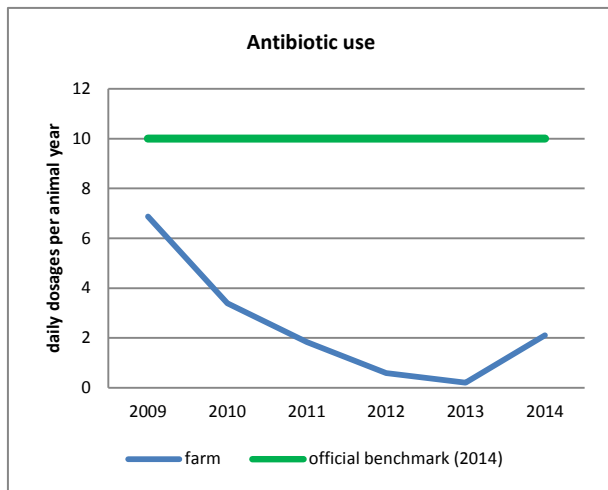
The farmer's vision

Harbers aims for an antibiotic usage of 0.1 Animal Daily Doses per animal per year. He is trying to achieve this by preventing as far as possible any infections entering the farm from outside. In addition he makes sure the conditions in which the young pigs are kept remain stable and free of stress moments, for the whole of their life cycle from breeding to finish.

'I believe the relationship and contact with the pig supplier is important. Then I know exactly what type of pigs I'm getting and how I can pamper them to give them a good start.'

Results

This farm achieves a gross margin somewhat above average, with a relatively low growth rate and little mortality. The national average for growth is about 760 gram a day and the average mortality is around 2.7%. The use of antibiotics here is very low, far below the target laid down by the Veterinary Medicines Authority.



Sources:

Antibiotic use, Gross margin and Production results: FADN. Official benchmark (2014) was determined by the Netherlands Veterinary Medicines Authority (SDa).

In 2014 both antibiotic usage and mortality percentages were slightly higher because of health problems at the breeding farms that supplied piglets. That is why vaccinations are now being given to increase resistance to, for example, respiratory diseases.

Free of infection

The farmer personally conveys the animals to and from his farm, using his own means of transport. In this way as few strangers and vehicles as possible enter his farm. The vet and feed supplier have both agreed to plan their visits to the farm directly after the weekend and are the first visitors of the day. The farmer also pays special attention to pest eradication. And as a final measure, the drinking water is acidified by adding whey.

Using one's own transport

Harbers uses his own vehicles and labour when transporting piglets and fattened pigs. The breeder and the slaughterhouse are situated nearby. Furthermore, Harbers has set aside enough time to carry out this work himself. The annual costs of his own transport including the cost of extra labour are about 20% above the average standard costs of nearly 1 euro per piglet and 2 euros per fattened pig. It also provides him with extra benefits because he can deliver 99% of the pigs in the right weight class for the slaughterhouse and because the extra biosecurity prevents infection carry-over from external sources. All this contributes to an average of €0.40 sav-

ings in health costs and 0.8% lower mortality for each average fattened pig. Harbers estimates his net benefit to be around €3,000 a year.

Stress-free

The transport time is short because the animals are picked up and delivered only a short distance away from his farm. The farmer actively ensures the animals get used to their new housing and feed system as soon as possible. For example, the animals are placed in a housing unit where the temperature is 2 degrees higher than at the breeders. During the first few days, the farmer also entices the piglets to the feed troughs by offering them the feed manually three times a day.

Rely on the animal's natural resistance

Broiler farmer in Brabant



Photo: Ellen Meinen, Agrio

This farm can accommodate 153,000 broilers, spread over 5 housing units. The production takes place in traditional housing and is aimed at the standard market. The farmer runs this farm on his own, but has external help to clean and disinfect the housing units and to deliver the animals.

The farmer's vision

The farmer wants to earn a reasonable living and meet society's wish to limit the use of antibiotics in animal husbandry. His vision is to rely on the natural strength and resistance of the animal itself. In practice, therefore, he always aims to create an internal climate that is as stable and as healthy as possible for the animals.

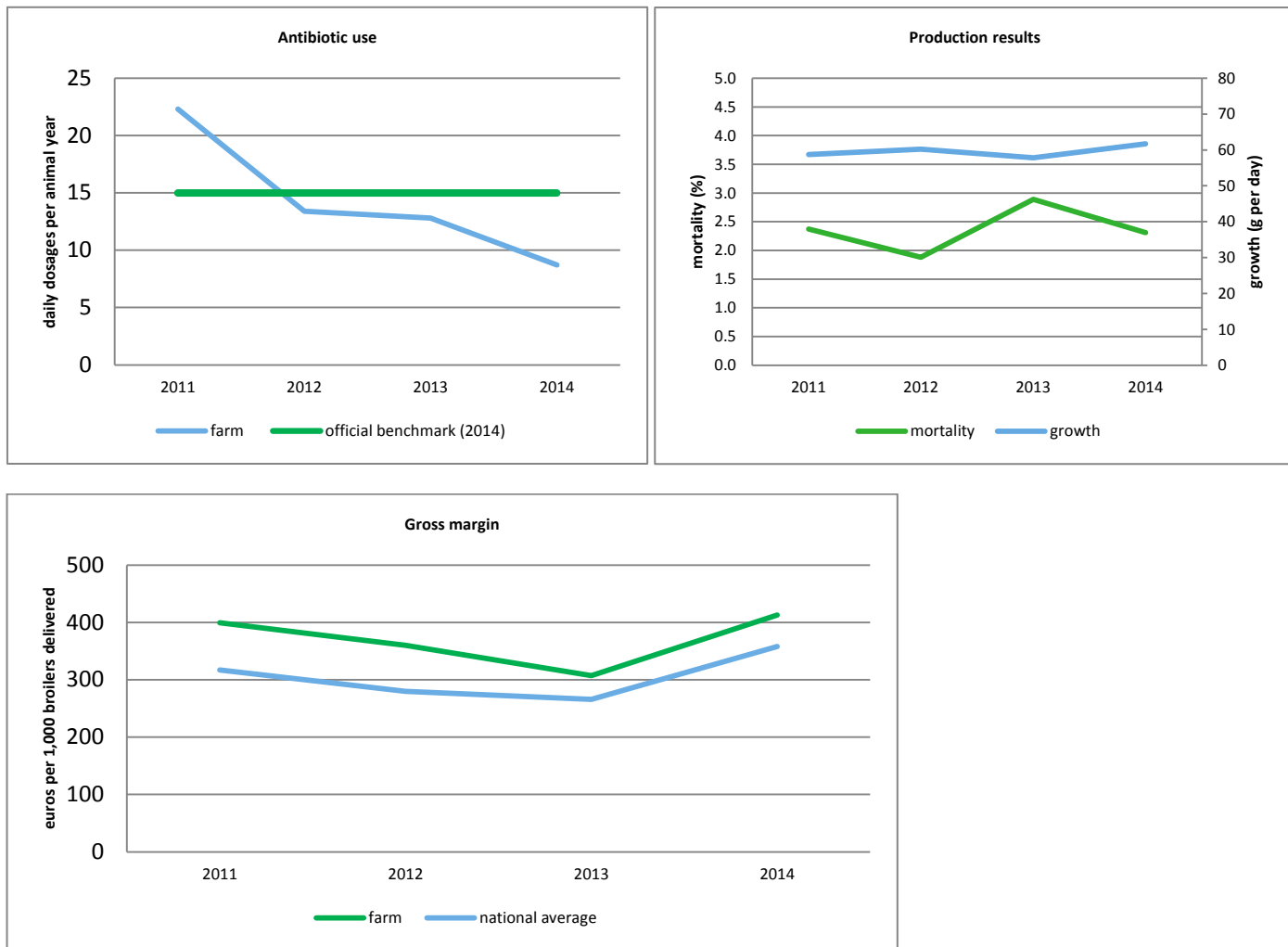
The farmer wants to produce what the market demands.

'The general public claims to believe sustainability is very important but consumers buy the cheaper cuts of meat.'

That is why he has had to decide to produce cheap meat.

Results

This farmer has managed to achieve an extremely low usage of antibiotics over the last few years (results from Avined). The farm obtains good technical results, which translate into above-average (high) gross margins. In spite of the greatly reduced antibiotic use, there has been no worsening in the technical and economic results.



Sources:

Antibiotic use: Avined; Gross margin and Production results: FADN/LEI Wageningen UR. The official benchmark (2014) is laid down by the Netherlands Veterinary Medicines Authority (SDa).

This broiler farmer does not expect that his antibiotic usage can always be zero; health problems do occur now and again. Animal welfare would then be too much at risk because of higher mortality, and this would also push the cost price up rapidly.

Measures

The farmer has chosen to invest extra money in insulating the floors, walls and roofs and in increasing the volume of the animal housing in order to achieve a temperature that remains as constant as possible. He has also invested in his own equipment (e.g. a scoop) and personnel for delivering the animals – to prevent infection carry-over from outside.

We estimate the extra costs for insulation to be around €10,000 per year, which is about 1 cent for every broiler delivered. The extra costs involved for catching and loading the broilers oneself is also estimated to be 1 cent per broiler.

To achieve a constant and healthy indoor climate for the animals, the housing unit is kept warm even when it is empty.

The initial temperature used for young animals is 2-3 degrees higher than normal. When delivering the animals, this is not done in one go, but spread out over several days; each day a small percentage of the animals is captured. In this way the farmer prevents agitation amongst the

broilers, as well as temperature fluctuations. In addition, the functioning of the air conditioning is checked regularly, including at night.

Focus on quality of day-old broilers and yield

Broiler farmer Van Harten in Fochteloo

The farm is run by the farmer and his son. They have 180,000 broilers in a standard housing system in five units.

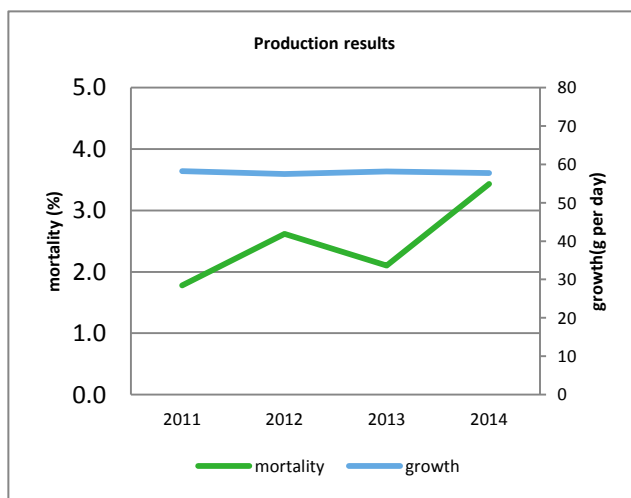
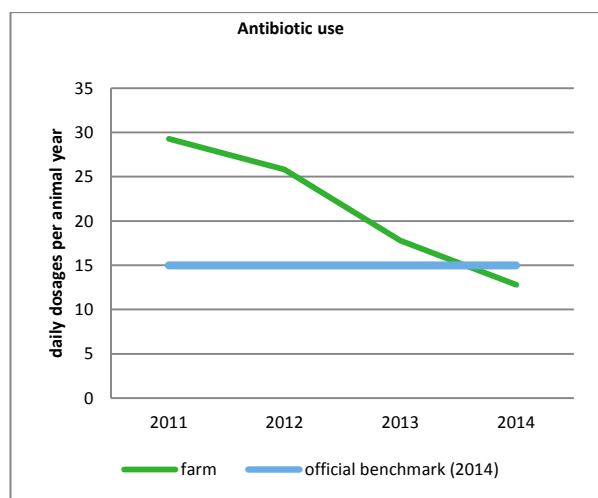


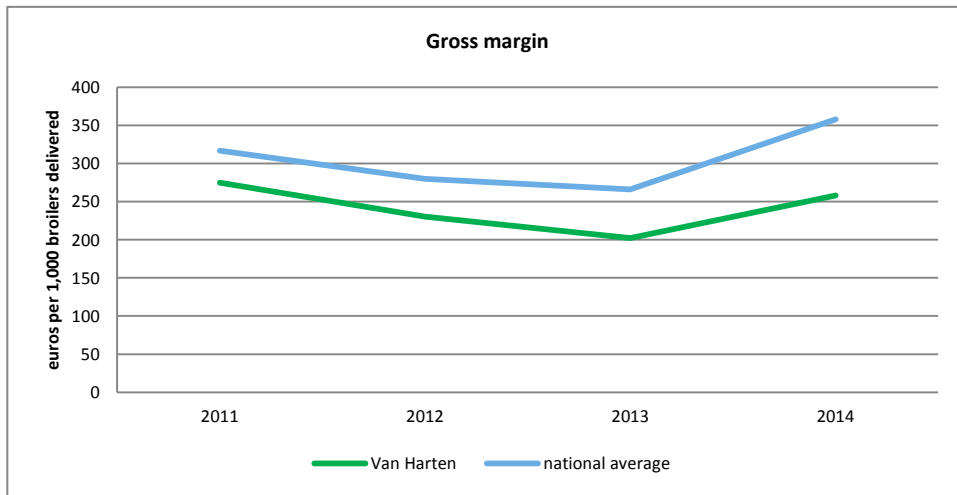
The farmer's vision

Van Harten aims to tailor his production to market demands and to do this, if possible, with fewer hours of work. Animal health laws are constantly reducing the numbers of animals that may be kept on one square metre. In order to maintain his revenue he would like to gradually increase his total area.

Results

Over the last few years Van Harten has achieved a 50% reduction in antibiotic use. In 2014 his use was lower than the national average and also lower than the targets laid down by the Veterinary Medicines Authority. The farm has achieved reasonable technical results and margins, which are a little lower than the national average but show comparable trends.





Sources:

Antibiotic use: Avined; Gross margin and Production results: FADN/LEI Wageningen UR. The official benchmark (2014) is laid down by the Netherlands Veterinary Medicines Authority (SDa).

During the last few months of 2014 there was a ban on transport because of avian flu (AI). The broilers were already heavy but could not be transported and had to remain in the housing units for a longer period. That caused health problems and more antibiotics were necessary. This influenced revenues negatively.

Alertness in hatchery choice

Van Harten believes the quality of the day-old broilers is particularly crucial for his results and his antibiotic use. During the last two years, he has been extra alert in checking the hatchery that supplied the broilers. In addition hatcheries have been monitoring breeders that supply eggs much more carefully as a result of welfare legislation which determines that mortality in broilers should not be higher than 3.5%. Van Harten does not have a permanent contract with his suppliers, so if the quality of the broilers is inadequate he can easily take his custom to another hatchery.

Clean drinking water

In addition to broiler quality the farmer believes it is essential that the animals are given clean drinking water and that there is a good internal climate in the housing units. That is why the drinking water system is regularly cleaned, as well as acidified periodically in order to reduce the pH and any bacterial risk.

The temperature in the housing units in this farm is a couple of degrees higher than the norm. Van Harten: ‘This type of broiler simply requires a higher temperature.’ The day-old broilers are placed at 35°C, after which the temperature is gradually brought down to 20° C.

Higher level management

The investments in improvements have remained extremely limited. The most important investment was the early replacement of the drinking water system. The extra costs have been estimated at about €2,000 a year (0.2 cents per broiler delivered). The farmer has concluded that the management of the whole process needs to be raised to a higher level. This will not immediately cost more time but it will require extra alertness. During daily operations, Van Harten devotes most of his attention at the moment to 3 key points: broiler quality, drinking water and internal climate.

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