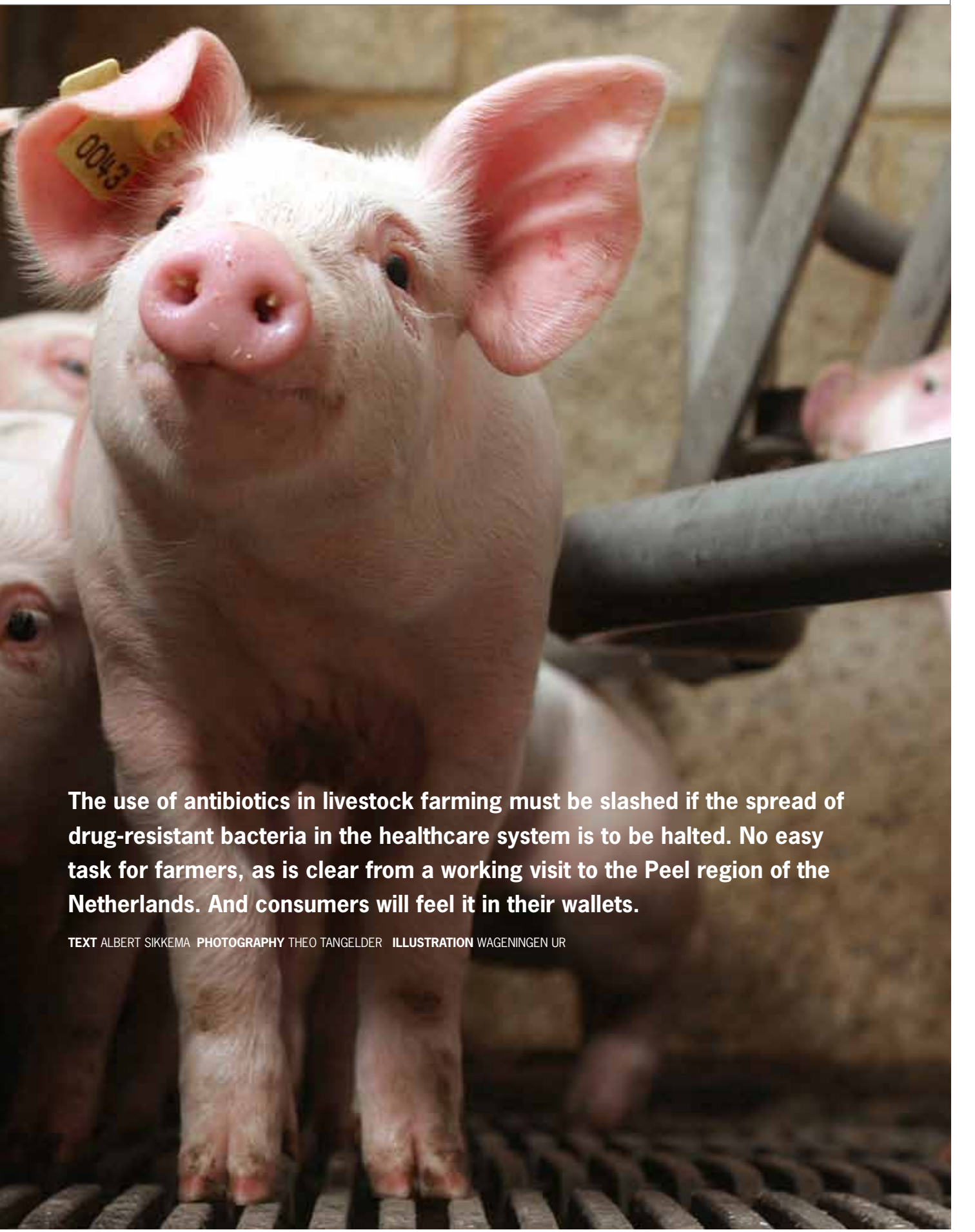
Farming without antibiotics



The use of antibiotics in livestock farming must be slashed if the spread of drug-resistant bacteria in the healthcare system is to be halted. No easy task for farmers, as is clear from a working visit to the Peel region of the Netherlands. And consumers will feel it in their wallets.

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‘There are pig farmers who cannot manage a ten percent cut in antibiotics’

Increasing numbers of hospital patients become infected with resistant bacteria that doctors are unable to treat with antibiotics. This is leading to the deaths of an estimated 100 people a year in the Netherlands and around 25,000 people in Europe as a whole. Some of these bacteria, such as MRSA and ESBL, are also found on livestock farms. The years of intensive antibiotics use in the livestock farming sector have made these bacteria resistant to veterinary drugs as well as to most of the antibiotics used in hospitals. They will not kill healthy people but they do pose a serious risk to patients with severely weakened immune systems, such as cancer patients, says Dr Jan Kluytmans of the Amphia Hospital in Breda.

MRSA (Methicillin-resistant *Staphylococcus aureus*) mainly develops on pig farms. Research by Els Broens (for which she received a doctorate from Wageningen University, part of Wageningen UR, at the end of October) shows that in recent years the drug-resistant bacteria have spread rapidly from the farms to the abattoirs via the transport of piglets and pigs for slaughter. Around forty percent of pig farmers carry the MRSA bacteria. If they are admitted to hospital they have to be nursed separately to prevent the bacteria spreading.

ESBL (Extended Spectrum Beta-Lactamase) develops mainly on poultry farms and is now spreading through the food chain. This year, Dr Kluytmans showed that ninety percent of chicken in supermarkets is infected. The bacteria are now to be found in one in ten Dutch people, compared with none at all only a few years ago. ESBL is difficult to treat as there are only a few antibiotics left that are still effective against these bacteria. There is a fear that the pathogen will also develop a resistance to these remaining drugs so that it will no longer be possible to treat urinary tract infections, for instance, that are caused by ESBL.

The use of antibiotics in livestock farming needs to be halved by 2013 if the spread of drug-resistant bacteria is to be halted, says the Dutch cabinet. But Kluytmans and other experts feel usage levels need to be reduced far more drastically in order to stem the spread of the drug-resistant bacteria. Can the livestock farming sector make that change?

80 PERCENT REDUCTION

We are off to Boekel, in the heart of the Peel peat-bog region and home to Geert-Jan van Veen. He studied Biology at Wageningen between 1983 and 1989; now he has his own pig farm with four hundred sows and ten thousand piglets. Van Veen has a letter from his vet on his kitchen table showing his antibiotics consumption over the past three years. And it turns out he has reduced his use of antibiotics by more than 80 percent. How did he manage it?

Van Veen uses antibiotics mainly during weaning, the period in which the piglets are moved from the nursery area to their own stall and switch from sow’s milk to solid food. This is a time in which the piglets’ resistance falls. Van Veen had to use large amounts of antibiotics in 2009 to fight *Streptococcus* among the weaned piglets. The bacteria were established themselves in the wounds from ear biting, and were causing arthritis and meningitis. ‘I had to take emergency measures.’ Incidentally, even then his antibiotics consumption was no higher than that of fellow pig farmers in 2009.

After that experience Van Veen made two changes. He replaced the boar used to inseminate the sows, a Belgian Piétrain, with a German Piétrain, a breed that grows more slowly but is also less aggressive. That meant a slight decrease in his pigs’ meat production but also less ear biting. He also started buying different pig feed that was more digestible for the weaned piglets. As a result they got fewer intestinal infections, which increased their resistance and meant Van Veen needed fewer antibiotics.

Until this point, he had not given any thought to reducing antibiotics consumption. That changed when his old vet retired in 2010, to be replaced by the young graduate Antoine de Vocht. ‘He questioned our use of antibiotics’, says Van Veen. De Vocht had simple tips, such as not selecting the piglets by weight after weaning but putting brothers and sisters in the same stall instead. The advantage of this is that they have already decided on the pecking order in the group so have fewer quarrels. Also, each family was allowed to keep its own feed trough when it was moved from the nursery rather than getting a new trough. ‘That helps them eat properly and keeps their intestines in working order’, says Van Veen.

This year, he and his vet did a trial to see if his farm could manage without any antibiotics. That went fine until May. ‘Then I noticed black rings around the piglets’ eyes, which is a sign of respiratory tract infections. The person I sell my piglets to also raised the alarm about their state of health. Then I went back to giving a course of antibiotics in the first few weeks after weaning.’ That is why his ‘dosage day score’ is now 4.25. The dosage day score is the number of days a year that an animal is given antibiotics; so every pig on Van Veen’s farm gets antibiotics on an average of just over four days. In 2009 his dosage day score was 25.45.

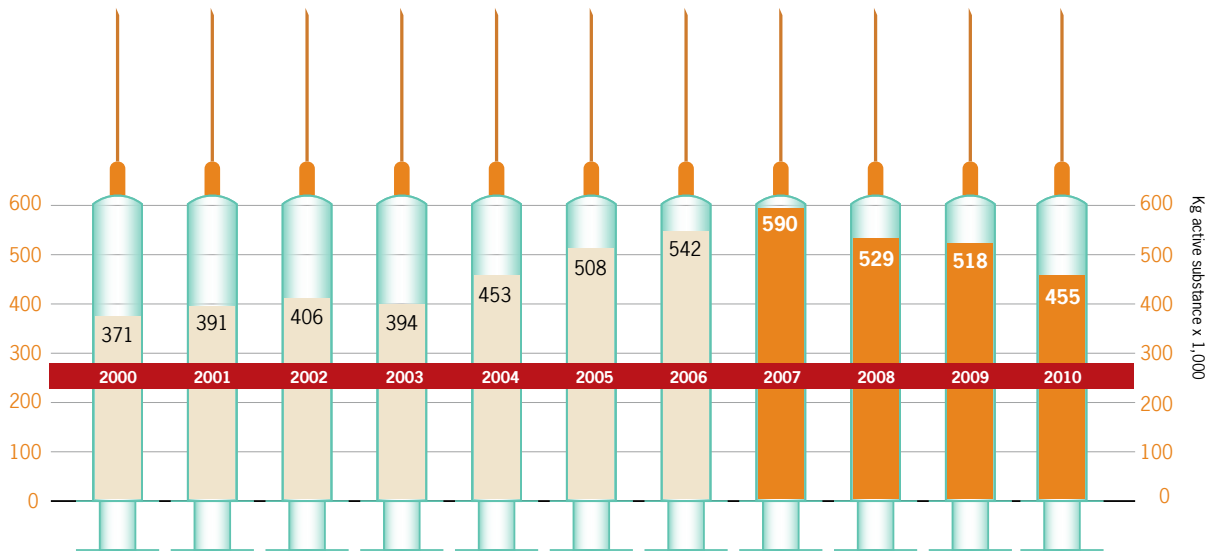
Clearly it is perfectly possible to reduce the use of antibiotics by making a few simple adjustments. But not all pig farmers will manage this, says vet De Vocht. As part of the Animal Drug Authority’s registration system, he prints out the antibiotics consumption figures every three months to discuss with the pig farmers. ‘There are also pig breeders who find it difficult to manage even a ten percent reduction.’ It is not easy to get an interview with these farmers – these days, >

FALL IN USE OF ANTIBIOTICS

The use of antibiotics in Dutch livestock farming has been falling since 2007, according to figures produced by FIDIN, the sector organization for animal drug suppliers. Total consumption fell by 2 percent in 2009 and 12 percent in 2010. The government has decided that consumption needs to fall by 20 percent this year in comparison with 2009. It looks as though this will be achieved. The annual MARAN study (Monitoring of Antimicrobial Resistance and Antibiotic Usage in Animals in the Netherlands) published since 2002 by the LEI and the Central Veterinary Institute (CVI), both part of Wageningen UR, paints a less rosy picture. While antibiotics consumption for dairy cows and pigs bred for meat has indeed fallen – which explains the reduction in kilos found by FIDIN – their use for sows and broiler chickens has yet to drop, and these are precisely the animals in which the resistant bacteria are developing.

CVI researcher and professor in Utrecht Dik Mevius is coordinating the MARAN study. Mevius is also chair of the Animal Drug Authority. This organization wants to promote responsible antibiotics use in livestock farming by measuring the average consumption per livestock sector and holding heavy users, whether vets or farmers, to account for their consumption. 'The idea is that registration should lead to improvement projects', says Mevius.

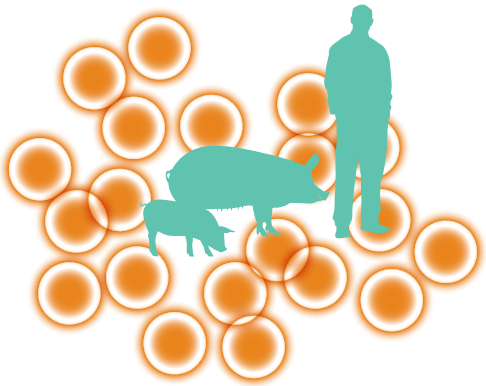
Mevius is also monitoring changes in antibiotics resistance in the MARAN study. He sees that resistance is still growing. This year, Mevius published hard evidence that the drug-resistant ESBL bacteria were spreading from intensive livestock farming to hospitals via the food chain.



‘Antibiotics measures will inevitably mean less livestock’

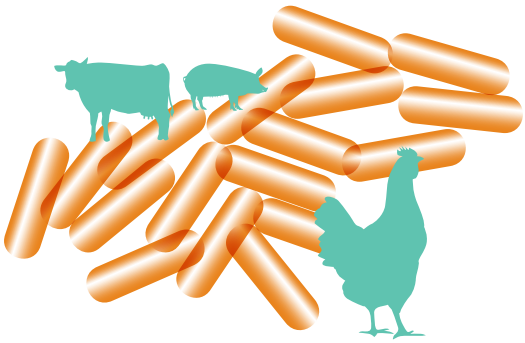
TOP THREE RESISTANT BACTERIA

The Health Council of the Netherlands says there are three groups of drug-resistant bacteria in livestock farming that cause major problems for public health.



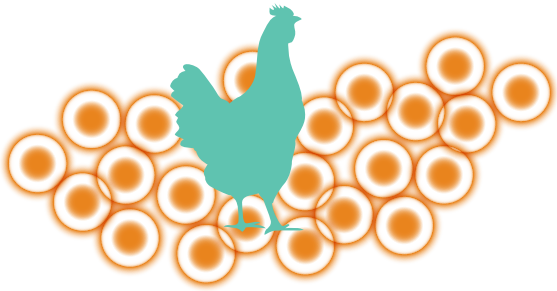
MRSA *Methicillin-resistant Staphylococcus aureus*

MRSA is also known as the ‘hospital bacteria’ as hospitals’ heavy use of antibiotics is leading to resistance. Pig farmers and their families are also becoming infected with MRSA bacteria from pigs. Last year, Denmark had the first cases of humans becoming infected with pig MRSA without having been in direct contact with pigs.



ESBL *Extended Spectrum Beta-Lactamases*

ESBL stands for a group of bacteria (found mainly in chicken but also in other kinds of meat) that produce enzymes which undermine the effectiveness of antibiotics. These bacteria spread rapidly and are not limited to hospitals; they are also found elsewhere, in particular as the cause of difficult-to-treat urinary tract infections.



VRE *Vancomycin-resistant Enterococcus*

The VRE bacteria, which leads to infections in wounds and the urinary tract, is causing serious problems in American hospitals in particular. The Health Council says the link between antibiotics consumption in livestock farming – chickens in particular were believed to be responsible for the transfer to humans – and the rise of VRE in hospitals is not as clear as was once thought.

no one wants to get a reputation for being a heavy user of antibiotics.
Even so, a profile of the heavy users is emerging. Researcher Ine van der Fels-Klerx at RIKILT, part of Wageningen UR, concluded this summer that large farms in areas with a high concentration of pigs tend to use more antibiotics than the average. These are farmers who permanently have pathogenic bacteria on their farms in combination with low resistance among their animals. Possible causes are poor quality feed, leading to problems in the intestines of the young animals, or ageing sheds in which the animals are exposed to draughts. It could also result from the breeding target; farmers who opt for fast-growing breeds with high meat production pay for this with lower resistance among the animals. Van Veen is not aiming for maximum production, which means his piglets are a bit stronger on average.

NEED FOR CHANGE

Van der Fels concluded that the will to make reductions is a key factor in cutting antibiotics use. But economics plays a role in all livestock farmers' decisions. Antibiotics are cheap. Farmers who want to make substantial reductions in antibiotics consumption often have to invest in better feed or improvements to their sheds while at the same time their meat production falls slightly. They have to spend more but their revenue drops. That is not an appealing prospect, especially given the low margins that are common in the pig and poultry sectors. Still, the time for change has come, announced the Health Council at the end of August in its recommendations to the Cabinet. The Council said preventive use, in which all animals get a course of antibiotics as a precautionary measure, should be banned. And the use of antibiotics that are essential for tackling human infections should no longer be permitted in livestock farming.

Jan Kluytmans was a member of the Health Council committee that drew up the recommendations. As well as practising as a doctor, he is also a professor of Microbiology and Infection Prevention at the VU University Amsterdam. 'At the moment the situation in the Netherlands is manageable but the problem is rapidly getting bigger.' The worst-case scenario for him is the situation that has already arisen in countries like Greece and Turkey. 'A lot of the patients in the intensive care departments there are infected with drug-resistant bacteria that are difficult or impossible to treat with antibiotics.' For instance, an MRSA strain has emerged in Greece that is even resistant to the last antibiotic doctors had available. 'We also know that the development of new antibiotics is stagnating; no new, effective drugs are coming on the market', says Kluytmans.
The problem can only be tackled by cutting antibiotics consumption in livestock farming to a fraction of the current levels in order to prevent new, resistant bacteria developing. 'Ideally we should move to a system of livestock farming without antibiotics', says Kluytmans. 'Wageningen has the know-how to achieve such sustainable farming through vaccines for animal diseases, better feed and better housing. But consumers will also have to pay more for meat, as at present the livestock sector can't switch to more sustainable methods because of the low margins. Fortunately the livestock sector has now also realized this.'

ENFORCING MEASURES

Three days after the Health Council report, the Van Doorn Commission came up with similar recommendations. This commission wrote a report for Brabant province on the future of intensive livestock farming. This commission, too, thinks the preventive use of antibiotics in livestock farming should be banned and it advocates an antibiotics blacklist.

'What makes our proposals ground-breaking is the food chain approach', claimed alumnus Daan van Doorn, former head of VION, the leading meat processing company in the Netherlands, when he presented the report. The commission wants to enforce the measures throughout the food chain. Nutreco, the main feed supplier for the livestock sector, has signed up to the new rules. Moreover, seventeen supermarket chains – including market leader Albert Heijn – have agreed to the stringent antibiotics policy. Their involvement means the costs of a stricter regime can be passed on to consumers.
Martin Scholten, director of the Animal Sciences Group at Wageningen UR, was a member of the commission. 'The agreement is that as of 1 January 2012 the supermarkets will no longer stock meat in which preventive antibiotics have been used. We want to move to antibiotics-free livestock farming in which only sick animals are treated on an individual basis. The Dutch supermarkets will be making that a requirement for all their meat, including meat from abroad. The meat processing companies will pass that requirement on to the farmers, who will only be able to supply meat if they comply with the new antibiotics stipulations.' The meat processing companies that have signed the commission's guidelines account for ninety percent of all meat produced in the Netherlands. Antibiotics use can be checked using farm audits and data provided by vets.'
'This will inevitably lead to a fall in livestock numbers', continues Scholten. 'That may not be the aim of these antibiotics measures but it is the result. The measures will lead to a slight rise in the cost of meat but the supermarkets have said they will be able to pass that on to consumers. The key factor for livestock farmers will be their healthcare management. Farms with persistently high infection levels will go under.' ■