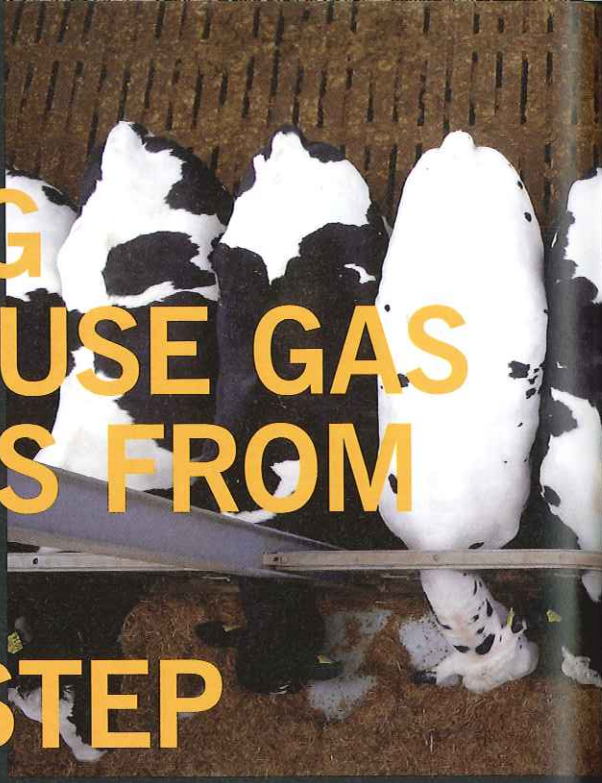
TEXT **Berrie Klein Swormink**



LOWERING GREENHOUSE GAS EMISSIONS FROM COWS, STEP BY STEP

Cattle farming contributes to global warming, among other things, because of the methane released by ruminants. Researchers at Wageningen are looking for ways to reduce methane emissions. It's happening in little steps.

Greenhouse gases are compounds that lead to the sun's heat radiation being retained in the earth's atmosphere. Cattle farming accounts for a big part of the global emissions of those greenhouse gases. Methane from the stomachs and intestines of ruminants – notably meat cattle but also dairy cattle, sheep and goats – makes up about one third of those emissions.

Worldwide, there are various ongoing research projects into the possibilities for reducing greenhouse gas emissions in cattle farming. "In the past twenty years, we have seen that much can be accomplished by making production more efficient. The Dutch cattle farmers have diminished their methane emissions by, on average, 17% per kilogram of milk since 1990," says Theun Vellinga. As a researcher at the Animal Sciences Group (ASG), he is on loan to the UN's Food and Agriculture Organization (FAO) for a year. One of the things Vellinga is working on is refining the calculations for greenhouse gases emissions from international cattle farming. "We were able to lower the methane emissions per kilogram of milk through increasing the milk production per cow and a different food regime. Cows get more corn silage relative to twenty years ago. This starchy corn lowers the amount of methane formed in a cow's rumen."

Vellinga stresses that it is not as simple as concluding

photo: ANP

Feed

"Wageningen UR distinguishes itself internationally with a model that simulates the methane emissions of dairy cattle," explains Jan Dijkstra, researcher at the Animal Nutrition group of Wageningen UR. "That model can also be combined with the necessary research involving live animals. The past years have shown repeatedly that research into methane reduction cannot be based on laboratory results alone."
Dijkstra is moderately positive about the possibilities to achieve lower methane emissions through the diet. "There has been research into several feed additives in recent years. In most cases, the methane reduction is small. However, more research is often needed. Enriching cattle feed with tannins may, for example, offer possibilities. Not only for reducing methane production, but also to lower the nitrogen losses via the urine of the cattle. The addition of certain fatty acids to the feed may help as well."
In any case, the composition of the cows' feed appears to offer the best chance, Dijkstra feels. "Large gains are still possible, certainly when you look at it from an international perspective. Roughly speaking, having less structure, more starch and more refractory protein in the feed results in lower methane production."

'PASTURES FIX CARBON, WHEREAS ARABLE LAND RELEASES CARBON AND LAUGHING GAS, A STRONG GREENHOUSE GAS'

that increasing the starch by adding corn silage to the cows' diet lowers the release of greenhouse gases. "Growing more corn takes place at the expense of pastures. Converting pastures into arable land is highly disadvantageous from the viewpoint of greenhouse gas emissions. Pastures fix carbon, whereas arable land releases carbon and laughing gas, a strong greenhouse gas. Converting pastures to land for corn at least partly cancels out the advantage of more corn in the cattle's diet. We are looking into whether the disadvantages of this land conversion may even exceed the positive effects of changing the cows' diet."

Other possibilities

Vellinga and Dijkstra also expect that further optimization of the production will help diminish the methane emissions per kilogram of milk. Vellinga: "The biggest opportunities are found for enterprises with a relatively low production per animal. A lot is also to be gained by lengthening the cows' lives. That is also economically of interest to the cattle farmers."
New possibilities may emerge in addition to improving the diet and optimizing production, according to Dijkstra: "There is ongoing research in New Zealand and Australia aimed at rendering animals immune to methanogens, the microorganisms that convert hydrogen and CO_2 into methane. So far, the results have been very limited." So-called reductive acetogenesis may also push back methane production in a cow's rumen. Acetogens are microorganisms that convert CO_2 and hydrogen into acetic acid. "We haven't yet succeeded in culturing acetogens that survive in a cow's rumen. Genetic selection is the third direction that may offer possibilities. Selecting cows for metabolic efficiency may help reduce methane as well. ASG is looking for genetic properties that would allow easy typing of animals with a high metabolic efficiency."

Info: theun.vellinga@wur.nl, jan.dijkstra@wur.nl