

## Newsflash KTC De Marke 1, March 2012



### What is the importance of KTC De Marke for the Dutch dairy sector?

Accurate nutrient management is a prerequisite for further development of dairy farming, particularly in the Netherlands. The amount of milk that can be produced will increasingly be defined by the extent to which farmers succeed to limit nutrient losses. On KTC De Marke innovative measures are designed and tested to minimize nutrient losses while exploring the technical limits of efficient nutrient management. In this newsletter we present an update of the main developments.

#### Task of KTC De Marke

De Marke explores options for improving farm management to minimize the ecological footprint of the farming system by reducing emissions of nitrogen (N), phosphorus (P) and carbon (C), and to make minimal use of resources such as concentrates and inorganic fertilizers. This is done by integrating knowledge from all relevant disciplines and by introducing new technology. The task of KTC De Marke is carried out in close cooperation with 16 commercial pilot farmers in the framework of the EU project 'DAIRYMAN'. Farm management on De Marke should be 10-15 years ahead of common practice.

#### Knowledge integrated into the whole farming system

Innovations must be beneficial for the whole farm, not just for one aspect. Therefore innovations are tested at the farm level. However, also specific parts of the farm are monitored to gain insight in their developments and feed backs. We distinguish soil, crops, feed, cattle and manure. The applied and transparent character of De Marke enables to integrate the expertise of specialists at the farm level and stimulates to search for joint solutions.

#### Knowledge exchange

Results of this work are shared with farm advisors and dairy farmers. Practical demonstrations on the farm and figures of the farm performance support communication about effectiveness of measures, problems and experiences. Management tools are developed, that help dairy farmers to optimize their management and to monitor their performance. An example is the 'Nutrient Cycle Guide'. De Marke supports Agricultural Schools to educate students to practice adequate nutrient management. Participating schools are CAH Dronten, Van Hall Larenstein and HAS den Bosch.

The following meetings for groups from the Netherlands and from abroad can be organised at De Marke:

- **Expert meetings**, such as a meeting on sustainable maize cropping, held in 2011
- **Excursions** for farmers, farm advisors and policy makers
- **Workshops** and **training sessions**
- **Lectures** for students

#### Framing developments by N, P en C flow schemes

To meet the requirements of the cattle, feeds are imported to the farm and thus also N and P, which are included in the feeds. After this N and P is taken up by the cattle, it may leave the farm through milk and meat or it may be included in the farm nutrient cycle: from cattle to manure, from manure to soil, from soil to crops and then back to the cattle (Figure 1). This nutrient cycle is like a porous tire. When it is filled with air to a high pressure level, the air will escape faster than at moderate air pressure. Despite efforts to plug the nutrient leaks at farms, it is impossible to turn a dairy farm into a fully closed system. Therefore, an important strategy to minimize losses is to

reduce the flow of nutrients through the system to prevent oversaturation. We do so by exploring future scenarios and distinguishing promising measures.

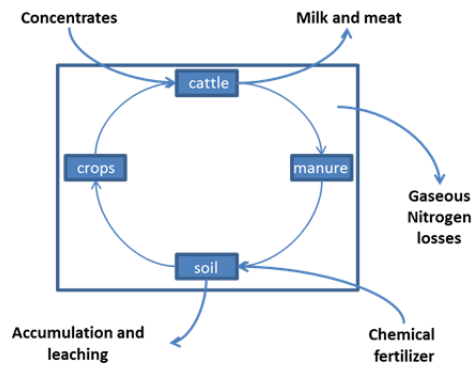


Figure 1: Nutrient flows at a dairy farm.

## Results

Improved farm management at De Marke resulted in a higher N and P utilization efficiency. The proportion of the N input to the farm that ended up in milk and meat increased from 33% during 1993-1999 to 42% during 2004-2009 (Figure 2). Consequently the farm N surplus decreased. The surplus is the amount of N and P that is not transferred in products. A lower surplus is likely to result in less N emissions to groundwater, surface waters and/or atmosphere.

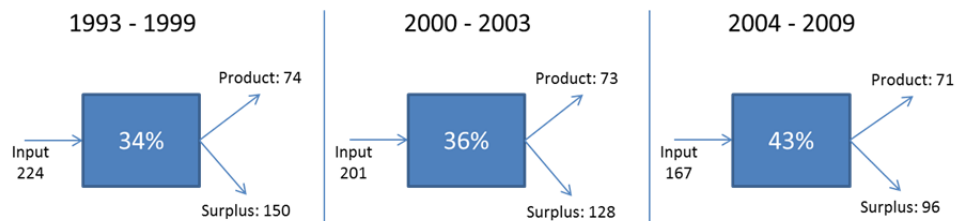


Figure 2: Nitrogen utilization efficiency at De Marke during three periods.

## Challenges for 2012

Most farms use inorganic fertilizers in addition to animal manure to meet crop N and P requirements. On De Marke, since 2004 no inorganic fertilizer N was used. Manure management was improved by optimal timing and distribution of manure supply and by application of slurry digestion. As a result crop requirements can be met with animal manure and the flow of N through the farm is reduced. An effective measure to reduce N surpluses and nitrous oxide emissions!

However, in recent years grass yields tended to decrease and also the digestibility of grass silage decreased. Probably this is caused by the tight fertilization. This may result in larger feeds import to the farm resulting in a lower farm N use efficiency. Therefore, in 2012 our focus is on:

- 1. Maximum tuning of manure N and P to crop requirements**  
 To realize this a new manure digestion system is developed. It should increase the availability of manure N and P for crops and help to make inorganic fertilizer redundant. It is to be implemented in March 2012.
- 2. Increased roughage digestibility**  
 Tests with mechanical bruising silage grass to increase its digestibility were carried out in 2011. The first results are promising and the method will be further tested.

Please read more on the project 'Cows & Opportunities': [www.koeienenkansen.nl](http://www.koeienenkansen.nl)  
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