From Annual Nutrient Cycling Assessment to Water Management Assessment in dairy farming

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With current legislation and agricultural practice, only 15% of surface waters in the Netherlands will meet the water quality goals of the Water Framework Directive by 2027, according to the Netherlands Environmental Assessment Agency (PBL). The European Commission indicated that insufficient water quality will jeopardize future derogations of the manure application limit for grassland dairy farms, which is now 230-250 kg N per ha per year, as opposed to the generic standard of 170 kg N per ha per year. This is a serious threat for intensive dairy farming, the dominant land use type in the Netherlands; further reduction of the manure limit will inevitably lead to higher costs for manure export and treatment, extra purchase of roughage and mineral fertilizers, or to lower stocking rates. Besides, more stringent generic legislation does not take into account the different circumstances and management practices between farms. Best practice farms under favourable conditions would be unnecessarily limited, while farms with worse practices and conditions will still cause serious emissions to ground- and surface water.

In order to cope with this dilemma, we developed the Annual Nutrient Cycling Assessment (ANCA) tool that estimates the magnitude and nature of N and P losses based on farm-specific inputs and outputs. It appears that even under similar conditions dairy farms yield very different results, which proves that there is still much room for improvement of management practices. ANCA is now widely accepted as a standard for farm specific arrangements. Besides, ANCA is also used in regional programs to help farmers with more efficient nutrient management in order to reduce nutrient surpluses, as indicator to reduce nitrate leaching to groundwater or to reduce nutrient loads to vulnerable surface water catchments.

However, the relation between nutrient surpluses and surface water loads is relatively weak, because nutrient loads are mainly determined by soil and hydrological conditions. Therefore we are now working on an extension of the successful ANCA approach to soil and water management. This Water Management Assessment (WMA) tool integrates the results of ANCA, which is restricted to analysing the nutrient balance (emission or “source” risk), with both management characteristics and conditions that specifically determine the hydrological pathways to surface water (“transport” risks).