Reducing environmental impact in the Dutch dairy sector with ANCA-tool
(Annual Nutrient Cycling Assessment)

29-4-2021

Michel de Haan, WUR
High level of milk production (*no 12 - 15 in the world*)

Due to climate, good soil, access to concentrates, cooperatives, skilled farmers

Lots of animals in a small country

So a lot of manure with risk of impact on water quality, high ammonia emissions and GHG emissions
Dairy farming = nutrient cycling

2010: start developing ANCA
To calculate farm specific environmental performances
Financed by dairy sector and min. LNV
ANCA calculates:

1. Efficiency of feeding (conversion of N and P from feed into milk and meat)
2. Crop yields: N, P, C, energy (kVEM)
3. Efficiency of fertilisation (conversion from fertiliser and manure into crop yields)
4. Production of manure: excretion of N and P
5. Surpluses of N, P on farm balance
6. Surpluses of N, P on soil balance
7. Supply of effective organic matter (eom)
8. Ammonia emissions
9. Green House Gas emissions (CH\textsubscript{4}, N\textsubscript{2}O, CO\textsubscript{2})
Ammonia emissions

Feed, ration

Cattle (cows, heifers, calves)

N-excretion (urine + manure)

Barn

External manure storage

Fertiliser

grazing

manure (slurry, solid)

fertiliser

Grass land

Arable land
Report with formulas

https://library.wur.nl/WebQuery/wurpubs/fulltext/533905
Agreement (1 JULY 2013 – onwards):

improve mineral efficiency by using ANCA

Milk processors  Farmers union  Feed suppliers  Accountants

From 2016 onwards: ANCA is mandatory for all dairy farms
Dataprocessing with maximum automation

Data flows ANCA

Suppliers
- Feed, artificial fertiliser
- Litter
- Poultry

Laboratory
- Silage analysis
- Soil analysis

Results for
- Dairy farmers
- Advisors

ANCA (KringloopWijzer)
- Input and results

Data input
- Data hub
- Authorization

Dairy company
- Milk deliveries

RVO (Netherlands Enterprise Agency)
- Cattle (I&R)
- Manure transports
- Flicks

Dairy companies and knowledge institutions
- Sustainability and quality programs
- Research and analysis
**Key Performance Indicators:**
better management for lower costs

<table>
<thead>
<tr>
<th>Indicator</th>
<th>De Marke 2020 (3 yr average)</th>
<th>Reference group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen Soil Surplus (kg/ha)</td>
<td>100</td>
<td>125</td>
</tr>
<tr>
<td>Ammonia emission (kg/ha)</td>
<td>42</td>
<td>54</td>
</tr>
<tr>
<td>Home grown protein (%)</td>
<td>50%</td>
<td>62%</td>
</tr>
<tr>
<td>Permanent grassland (%)</td>
<td>27%</td>
<td>60%</td>
</tr>
<tr>
<td>Green house gas emission (g/kg FPCM)</td>
<td>1035</td>
<td>1162</td>
</tr>
</tbody>
</table>
Extra (financial) benefits

✦ Good performance on KPI’s in sustainability programs
  ✦ Dairy processors, Banks (interest rate), Local biodiversity projects
  ✦ On the way to planet proof: Independent environmental quality label

✦ Government: some pilots for using extra manure when low nitrogen and phosphorus surpluses

To obtain certificate

1. satisfy GENERAL REQUIREMENTS 75% satisfy these
2. satisfy ALL BASIC STANDARDS of the 3 themes 50% satisfy these
3. satisfy requirement of TOP-LEVEL STANDARDS for at least one theme 10% satisfy these
Conclusions / summary

- ANCA developed to indicate farm specific environmental performances
- Formulas scientifically described
- Dairy sector agreed to oblige ANCA for dairy farms from 2016
- Central database with maximum automation organized by ZuivelNL
- ANCA helps to improve farm management and can help to get extra financial compensation in sustainability programs
Discussion

- A mandatory system driven by the dairy sector can be successful in other countries than NL
- Without an obligation a system with a central database has no future
- The government is afraid of data input manipulation (wrong data input, on purpose), so for legislation they better use stocking rate to indicate environmental performance
ANCA is a joint effort of the dairy sector and partners