

## 13. ANCA

FAIRWAY partner: Koos Verloop (Wageningen University and Research, NL)



### Brief description

Annual Nutrient Cycling Assessment. The ANCA (Dutch: KringloopWijzer) is a farm specific tool to analyse nutrient flows within dairy farms (cycling from feeds, to herd, to storage, to soil, to crops and back to herd) and emissions by losses from this imperfect cycle. It covers nitrogen, phosphorus and carbon.

|                                                                             |                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Contaminants covered (e.g. nitrate, pesticides etc.)                        | N, P, C related emissions                                                                                                                                                                                                                                                                                                                                           |
| Intended end users (e.g. farmer, water quality manager, policy maker)       | Farmer, farm advisor, policy maker, milk industry                                                                                                                                                                                                                                                                                                                   |
| Level of expertise and/or training required                                 | User must have some technical understanding of dairy farming. One day training required                                                                                                                                                                                                                                                                             |
| Geographical resolution (e.g. field, catchment, national)                   | Farm scale to aggregated crop.                                                                                                                                                                                                                                                                                                                                      |
| Temporal resolution (e.g. daily, annual, long-term).                        | Annual                                                                                                                                                                                                                                                                                                                                                              |
| Real-time component (e.g. live weather data, soil moisture data feeds etc.) | None                                                                                                                                                                                                                                                                                                                                                                |
| Number and type of mitigation measures included                             | No explicit measures included. However, it shows the performance and is a starting point to decide on changes in farm management that may result in lower surpluses.                                                                                                                                                                                                |
| Platform (e.g. paper-based tool, phone app, bespoke software).              | Bespoke software/internet tool<br>Dutch and English                                                                                                                                                                                                                                                                                                                 |
| Frequency of updates                                                        | Once a year                                                                                                                                                                                                                                                                                                                                                         |
| Cost/availability                                                           | Freely available for registered dairy farmers                                                                                                                                                                                                                                                                                                                       |
| Number of users or number of copies distributed/downloaded/purchased        | Dairy farmers (16,000) are obliged to use this tool.                                                                                                                                                                                                                                                                                                                |
| Links to demo material and other relevant information (e.g. user guides).   | <a href="https://www.mijnkringloopwijzer.nl/">https://www.mijnkringloopwijzer.nl/</a><br><a href="https://webapplicaties.wur.nl/software/ancadairy">https://webapplicaties.wur.nl/software/ancadairy</a><br><a href="https://www.wur.nl/en/article/Annual-Nutrient-Cycling-Assessment.htm">https://www.wur.nl/en/article/Annual-Nutrient-Cycling-Assessment.htm</a> |
| Additional comments                                                         | Developed for the dairy sector, project Cows and Opportunities                                                                                                                                                                                                                                                                                                      |

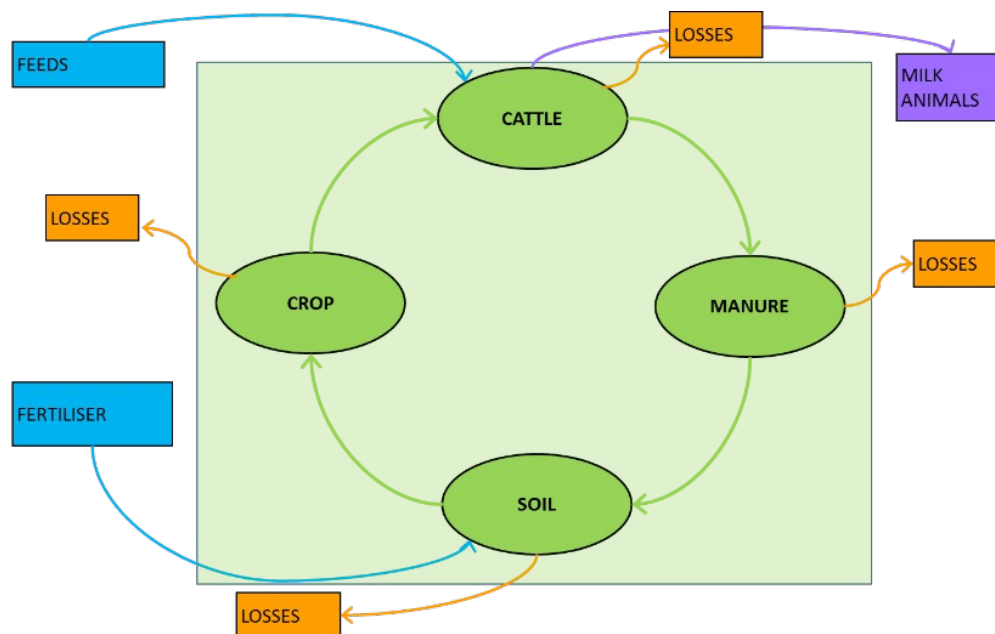
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| <b>ANCA</b><br><b>FAIRWAY partner: Koos Verloop (Wageningen University and Research, NL)</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |
| <b>Input data required to run the DST</b>                                                    | Year, personalia, farm feeds purchased (input/output/change of stocks), farm organic/artificial manure (i/o), type of housing, farm agricultural area, land use (ha grassland, maize, arable land), soil type, number and breed of cows and young stock <1 yr, > yr, milk production farm (delivered), cows exported from farm, artificial fertilizer applied, volume of manure storage, method off application of manure and artificial fertilizer, volume of maize silage stored, change of stocking rates silage, contents of grass and maize silage, number of days that cows are allowed to graze/hours per day, legumes, P status soil.                                                                                                                                                                                                                         |                                                                                     |
| <b>Outputs (including links to water quality and economic or financial aspects)</b>          | It assesses soil surplus of N and P on farm level and further specified for grass and maize and other arable crops. N surplus on the soil balance can be used as indicator for both losses to surface water and groundwater. The model outcomes help dairy farmers to demonstrate towards authorities and the dairy industry that they have produced their milk in accordance with sustainability standards.                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                     |
| <b>Age/provenance of supporting data used to develop the DST</b>                             | <b>Experimental farm de Marke (1993) and Cows &amp; Opportunities (16 farms, 1998)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                     |
| <b>Country-specific calibration or data requirements (including restrictions on use)</b>     | <b>Yes, in particular concerning conversion of energy into gain of body mass, reproduction and milk of cattle.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                     |
| <b>Details of validation and testing</b>                                                     | Validated with records of Cows & Opportunities (16 farms)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                     |
| <b>Date developed/released (or planned release date)</b>                                     | First version 2008. Current version released 2020                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                     |
| <b>Author/developer names and affiliations</b>                                               | Oenema, Schröder, Sebek, De Haan and Aarts. WUR, Animal Science Group & Wageningen Plant Research.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                     |
| <b>Member state(s) where developed</b>                                                       | <b>NL</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                     |
| <b>Member State(s) where currently used</b>                                                  | <b>NL, Flanders</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                     |
| <b>Key publication references</b>                                                            | <p>           Aarts, H.F.M.; Haan, M.H.A. de; Schroder, J.J.; Holster, H.C.; Boer, J.A. de; Reijs, Joan; Oenema, J.; Hilhorst, G.J.; Sebek, L.B.; Verhoeven, F.P.M.; Meerkerk, B. (2015). Quantifying the environmental performance of individual dairy farms - the Annual Nutrient Cycling Assessment (ANCA). In: Grassland and forages in high output dairy farming systems. - Wageningen: Wageningen Academic Publishers (Grassland Science in Europe) - ISBN 9789090289618 - p. 377 - 380. <a href="http://library.wur.nl/WebQuery/wurpubs/514477">http://library.wur.nl/WebQuery/wurpubs/514477</a> </p> <p>           Report available at <a href="https://edepot.wur.nl/533905">https://edepot.wur.nl/533905</a> (in English)<br/>           Report available at <a href="http://edepot.wur.nl/370323">http://edepot.wur.nl/370323</a> (In Dutch)         </p> |                                                                                     |

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Any other useful information (e.g. screenshots of DST input/outputs)



### Use in practice

ANCA is meant as an advisory tool but from this year (2017) dairy farmers are obliged to report their farm performance using ANCA. Many projects on improved farm management totally rely on ANCA. Farmers involved in these projects amount to about 300-400