

3) Name: allocation to discharge unit (gaf90_nl), heavy metals

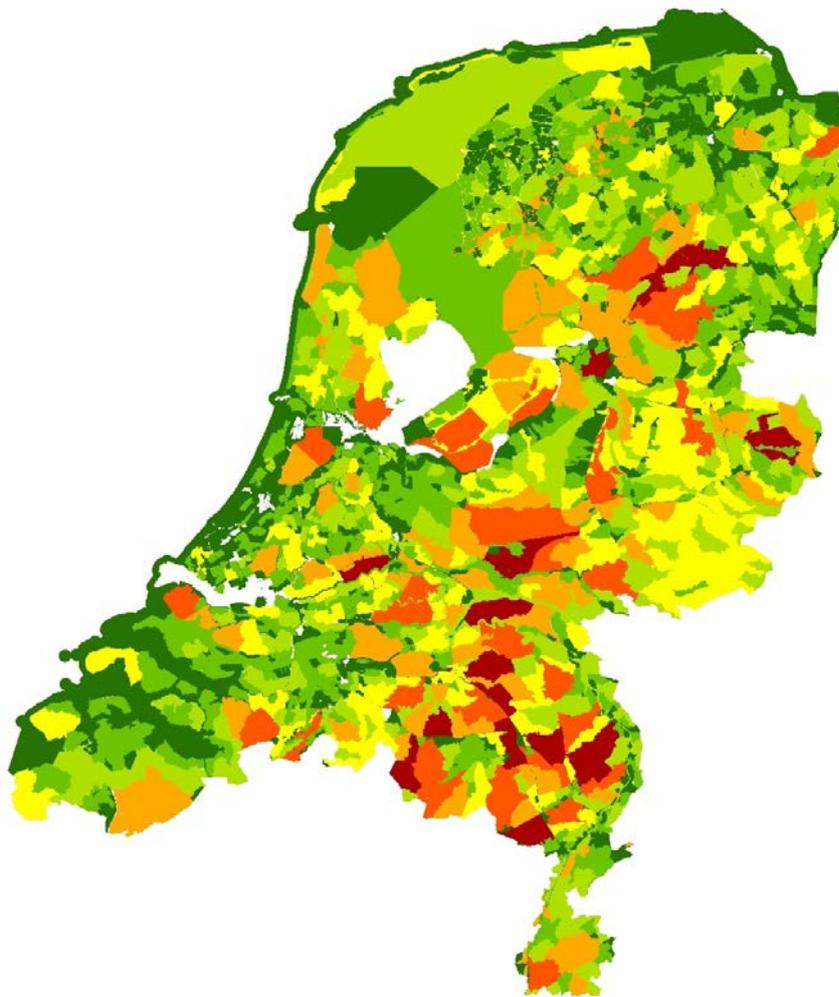
Description

A multi-component model calculates the leaching of heavy metals from soils in the rural area.

The most important ones are:

- The STONE model (see fact sheet 4) to make a schematic representation of soil properties and hydrology;
- A geostatistical model to estimate the spatial distribution;
- A chemical balance model to estimate concentrations in soil moisture, based on soil properties and the levels of metals in the soil.

The calculation uses STONE plots as a starting point. These are about 6500 spatial units within the Netherlands with each a specific combination of soil properties, land use, hydrology and heavy metal content. Based on these plots, the geostatistical model calculates a spatial distribution of heavy metal content throughout the Netherlands as a whole. The chemical balance model then estimates the concentrations in soil moisture based on empirical relationships between heavy metal content, soil properties and concentrations of heavy metals in soil moisture. The model then multiplies water discharges per soil layer and heavy metal concentrations in soil moisture to obtain total leaching. The result is the total leaching per unit per year. Discharges are a thirty-year average. To account for uncertainties, spatial units are aggregated to clusters of at least 50 km². For each of these clusters, total leaching is the same.



Example map 3: leaching of heavy metals, copper (2013)

Institutes involved

Alterra

Directorate for Public Works and Water Management - Water Service

Currency of distribution basis data

Model calculations are for 2013

Background documents

L.T.C. Bonten, J.E. Groenenberg (2008)

Factsheet leaching of heavy metals from farmland and uncultivated land

Alterra

Uitspoeling van zware metalen uit landbouw- en natuurbodems (versie mei 2016)

Alterra in samenwerking met Deltares, in opdracht van Rijkswaterstaat-WVL

Wolf et al.

The integrated modeling system STONE for calculating nutrient emissions from agriculture in the Netherlands

Environmental Modelling & Software 18 (2003) 597–617