

<https://doi.org/10.7250/CONNECT.2025.089>

# EVALUATION OF LONG-TERM NITROGEN AND PHOSPHORUS CONCENTRATIONS IN DRAINAGE FIELD RESEARCH SCALE MONITORING SITES IN LATVIA

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**Abstract** – The primary objective of the Water Framework Directive is to establish guidelines for preventing the deterioration of the status of EU water bodies and achieving good ecological and chemical status for Europe's rivers, lakes, and groundwater. To achieve this objective, it is essential to evaluate the influence of various factors on water quality. Long-term assessment of water quality necessitates regular and systematic monitoring of water status. Furthermore, analyzing water quality across different spatial scales is crucial for identifying factors influencing water quality and determining potential pollution sources. In this study, the spatial scale at the drainage field research level was investigated in greater detail. The drainage field research level encompasses the catchment area of a single drainage system, covering an area smaller than 0.8 km<sup>2</sup>. Six research sites, in which water samples were collected as part of the Agricultural Runoff Monitoring Programme, were examined: B-2, M-2, Vienziemite-2, AP-3, AP-5, and Zemg, with catchment areas ranging from 0.04 to 1.69 km<sup>2</sup>, with agricultural land accounting for 86–100 % of the total area. The study focused on analyzing long-term average concentrations of total nitrogen (TN), ammonium-nitrogen (NH<sub>4</sub>-N), nitratennitrogen (NO<sub>3</sub>-N), total phosphorus (TP), and phosphate phosphorus (PO<sub>4</sub>-P) (mg L<sup>-1</sup>) as well as identifying long-term trends using the Mann-Kendall test. The findings indicated that lowest average TN concentration (1.3 mg L<sup>-1</sup>) was recorded at the Vienziemite-2 site, dominated by perennial grasslands, while the highest average concentration (10.1 mg L<sup>-1</sup>) was observed at the B-2 site, characterized by intensive agricultural practices. The Mann-Kendall trend analysis revealed that 67 % of monitoring sites showed a decreasing trend in TN and NO<sub>3</sub>-N concentrations, while 83 % of sites exhibited an increasing trend in NH<sub>4</sub>N concentrations. Additionally, 67–83 % of sites demonstrated a decreasing trend in TP and PO<sub>4</sub>-P concentrations. This study highlights the importance of spatially explicit long-term monitoring to understand the impact of agricultural activities on water quality and to support effective water management strategies.

**Keywords** – *Agricultural water quality; Mann-Kendall test; trend analysis; water quality*

## ACKNOWLEDGEMENT

The data collection for this research was funded by the project 'Assessment of the impact of natural and anthropogenic factors on the losses of nitrogen and phosphorus compounds from agricultural lands', of the Ministry of Agriculture of the Republic of Latvia. The preparation of this paper has been financially supported by the Base Research Funding provided by the Ministry of Education and Science of the Republic of Latvia.