

Evaluation of the effectiveness of nature-based solutions to reduce the impact on water quality of farmyard runoff

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Research Overview

Research gap: Limited quantification of nutrient losses from farmyard runoff and limited understanding of the effectiveness and mechanisms of mitigation systems under Irish conditions.

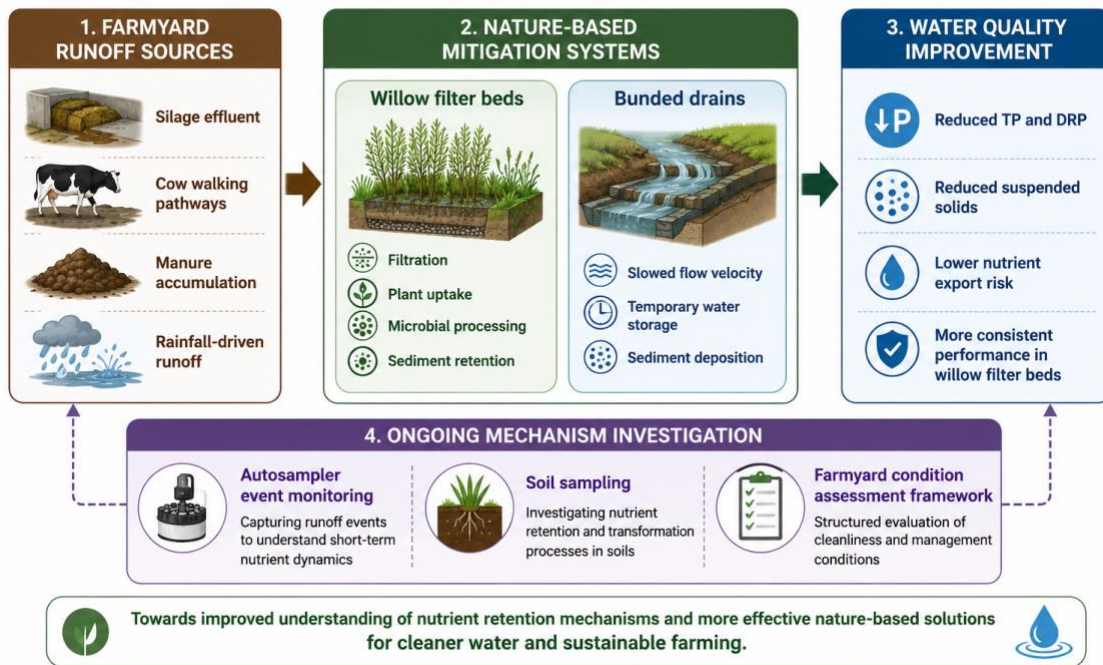
Methods Overview

- 8 farms monitored across Ireland
- Dairy and dairy-beef livestock systems
- Monthly routine water sampling
- Multiple inlet and outlet sampling points
- Autosampler monitoring during rainfall events
- Soil sampling to investigate nutrient retention mechanisms
- Farmyard management condition classification framework

Conceptual Framework

Nature-based mitigation of farmyard runoff in Ireland

From pollution sources to improved water quality and mechanism understanding



Preliminary Findings

- High nutrient concentrations were observed at inlet sampling points.
- Both mitigation systems generally reduced pollution levels.
- Willow filter beds showed more consistent pollutant reduction.
- Performance variability was observed in bunded drains.
- Results are based on data collected between September and January as part of an ongoing one-year study.

Research Significance

This study provides one of the few multi-site assessments of farmyard runoff mitigation systems under Irish conditions. By integrating water quality monitoring, event-based sampling, soil investigation, and farmyard management assessment, the project aims not only to evaluate mitigation effectiveness but also to better understand the mechanisms controlling nutrient retention within nature-based systems.

Key Highlights

- Multi-site monitoring across 8 Irish livestock farms
- Combined routine and rainfall event-based sampling
- Willow filter beds showed more consistent pollutant reduction
- Ongoing investigation into nutrient retention mechanisms using soil and autosampler data

Final Statement

Nature-based solutions show strong potential to reduce farmyard nutrient losses and improve water quality. Ongoing work aims to better understand the environmental processes driving mitigation performance under real farm conditions.