



Effect of intercropping on nitrate leaching



Main results and practical implementation

Conventional farming produces high yields but often leads to environmental issues, like nitrate leaching, where soluble nitrogen (N) contaminates water. Intercropping, especially cereal-legume mixtures, offers a sustainable alternative that reduces nitrate leaching.

In October 2023, wheat and faba bean were planted as monocrops and intercrops at the University of Reading. Intercrops were sown in alternate rows at 50% of the monocrop density. In March 2024, N fertiliser was applied – 180 kg N/ha for wheat monocrop and 90 kg N/ha for intercrops and faba bean monocrop – together with unfertilised plots of intercrops and monocrops.

Soil water nitrate levels were monitored all season across all plots. Before fertilisation, all crop combinations showed similar nitrate concentrations in soil water. However, from March to June, intercrops demonstrated reduced nitrate concentrations compared to monocrops in fertilised plots, suggesting more efficient nitrogen use and lower risk of nitrate leaching.

Practical recommendations

- Use intercropping to improve N efficiency and reduce losses
- Select intercrops with complementary root traits and N requirement
- Apply less fertiliser in intercropping

Get in touch for more support!

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Benefits and impact

- Improved water quality through reduced N leaching
- Reduced fertiliser use cuts costs and lowers environmental footprint
- Potential for participation in agri-environmental schemes



Challenges (and solutions)

A key challenge is finding the optimal N fertiliser rate for intercrops that boosts yield and grain quality, while using less equivalent fertiliser than cereal monocrops and reducing leaching. Solutions may include split fertiliser applications and/or foliar applications.

