



Resilient Cropping

Nitrate Leaching

Nitrate leaching is a naturally occurring process, it occurs when nitrate leaves the soil in drainage water. Nitrate is soluble and mobile. It is no problem when it is within the root-zone, but once it gets into the ground water and other fresh water bodies it is an environmental pollutant.

Nitrate levels in fresh water have become an important indicator of pollution and they are the focus of national and regional government strategies to improve water quality. Farmers must understand the risk of leaching and manage their crops to minimise losses from their land.

The amount of nitrate leached is governed by two factors:

Nitrate levels in the soil + Drainage from saturated soils

Most crops prefer to take up nitrogen as nitrate. Having an available supply of nitrate when the plant needs it is an asset for the crop. Having too much nitrate in the soil can be a liability.

Farmers can reduce leaching risk by matching their fertiliser applications to the crop demand. Split applications are a less risky option. In regions that get dumps of rainfall during spring and summer, a slow-release fertiliser may be the most economical solution.

Winter Leaching

Winter is the most likely time for leaching to occur and the time when regional council monitoring picks up peaks in nitrate levels at their test sites. There are two reasons for this

Examination of regional weather records show that winter is the most likely time for prolonged wet periods and saturated soils.



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There may be reserves of nitrogen well down in the soil profile. A Crop & Food survey of maize crops found that the average soil mineral N at 60 cm depth at the start of winter was 130kg N/ha. This nitrogen is at risk of loss especially if the land is being left fallow over winter.

Summer Leaching:-

Nitrate movement during the period when the crop is growing quickly is not necessarily a problem.

Many arable crops are deep-rooting and are able to reach nitrate from depth. Wheat and maize are good choices for "mop-up" crops for nitrates that have moved down through the soil profile.



Steps to reduce the risk of nitrate leaching

- Test soils at 2 depths; 0-30cm and 30 – 90 cm.
- Use a crop calculator to work out how much nitrogen to apply to the crop. Crop calculators like the wheat calculator and AmaizeN work out the most economic rate of nitrogen for the crop based on a predicted yield and the soil nitrogen reserves from your soil test. These calculators estimate yield by considering the long term weather patterns for your region and your soil type.
- Manage your crop so that it can use as much of the nitrogen supply as possible. Good soil structure and irrigation management is important for reaching the crop's potential yield.
- If possible avoid leaving land fallow. This may be a challenge with late harvested maize grain crops where it is too late to establish grass or a winter cover crop. It is risky to graze the crop debris on winter-fallow, maize ground as animal urine adds an additional nitrogen load. Winter cultivation can also increase leaching risk because it stimulates mineralisation.

Reference: Arable update 29 and Crop & Food Research report – Land management for Grain Maize.

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