

# SUSTAINABILITY

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### HOW N LEACHING OCCURS:

Nitrate leaching occurs during times of heavy or prolonged rainfall. Free draining soils are particularly susceptible to nitrate loss due to its high mobility in soil and readily leaches to groundwater. The highest risk is at the shoulders of the year in winter and early spring due to unfavourable weather and where the nitrogen is not being used by the plant due to poor crop growth.

**Source control** is often listed as a key mitigation action for nitrogen leaching. It is important to understand that Nitrogen on a farm can be deposited onto soil in many ways through fertiliser, slurry, soiled water and animal deposits.

Nitrogen in the soil can take a number of different forms, such as nitrate and ammonium depending on what you spread and also natural conversions happening in the soil through microbial activity.

**CAN** is made up of half ammonium and half nitrate, after spreading CAN a large pool of nitrate is available for leaching if unfavourable conditions occur.

**Protected urea** converts to the ammonium form of nitrogen when applied to soil. Ammonium is more stable in soil than nitrate and less susceptible to leaching due to its positive charge. Soil microbes convert ammonium to nitrate almost like a steady conveyer belt; plants take up both nitrate and ammonium as required for growth. Over supply of any nitrogen can result in leaching occurring if conditions are unfavourable. The pathway for leached nitrate is our ground water supplies via the soil, the groundwater eventually ends up in the river (receptor) and the river carries the nitrate to the estuary.

In free draining areas, nitrate can move from the soil to the river from months to years but as we move to moderately drained areas it can take up to decades.

### MITIGATION ACTIONS:

#### Improve NUE:

**Nitrogen use efficiency (NUE)** is the quantity of nutrient recovered by a crop relative to the nutrients supplied from soil, applied fertilisers, manures and ultimately how much is recovered in the end product we are selling in terms of milk, meat or crops. Efficient use of nitrogen is essential to achieving maximum crop growth and achieving a greater return on each kg of fertiliser you invest in. Current National Farm Survey Sustainability reports put Irish dairy farms at 25% NUE in terms of their ability to recover N from their N imports (feed, fertiliser etc.) via milk sales, cattle sales and grass/crop yield. With an industry target of 35% looming there is scope for improvement.

#### What can we do in 2021?

- Ensure adequate slurry storage is in place to avoid spreading in unfavourable conditions
- Soil Test and develop a nutrient management plan with your advisor
- Monitor soil temperature, provided conditions are suitable, nitrogen application should coincide with the onset of spring growth – this happens once soil temperatures reach 5.5 degrees C or above and climbing
- Ensure heavy or prolonged rain is not forecast when spreading fertiliser/slurry and don't spread if machine is tracking ground
- Adhere to buffer zones
- LESS (Low Emission Slurry Spreading) increases the amount of N recovered for slurry and allows for a reduction in applied fertiliser N
- Use of grass-clover systems. White clover can increase the tonnes dry matter grown (+ 1 – 1.5 t DM/ha) increase animal performance as it is a higher quality feed, and it can reduce the need for chemical nitrogen which increases the nitrogen use efficiency (NUE) on farms
- Calibrate your fertiliser spreader, this makes sense financially and environmentally