

## Summary

- Excess winter rainfall (EWR) data (up to the 28<sup>th</sup> January 2015) indicates that the majority of the UK has experienced average rainfall so far this winter.
- Nitrate leaching losses are likely to be close to average over most of the country.
- The relatively mild autumn and early winter provided good growing conditions in most areas.
- Early drilled, well established crops are likely to have taken up useful amounts of soil nitrogen (N).
- Soil N supply levels are likely to be *higher* than average where well established crops have taken up significant quantities of soil N.
- Updated EWR maps will be issued in late March.

## Excess winter rainfall

- Excess winter rainfall (EWR) is the amount of rainfall that drains through the soil leaching nitrate (and sulphate) that was present in the soil following harvest of last year's crop.
- So far this season, EWR has been close to the long term average over most of the country.
- Figure 1a shows the map of EWR up to 28<sup>th</sup> January 2015.
- For comparison, Figure 1b shows the 30 year average (1981-2010) EWR for the over winter period up to the end of January.

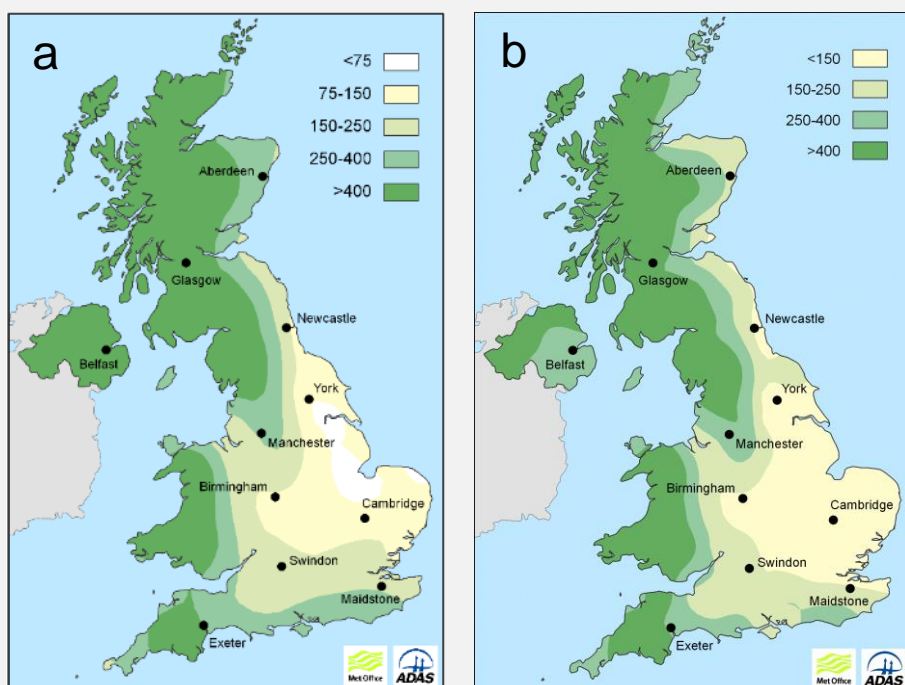


Figure 1. Excess winter rainfall: (a) up to 28<sup>th</sup> January 2015 and (b) long term average - up to end of January

## Assessing spring soil nitrogen supply (SNS)

- SNS (i.e. soil mineral N + estimate of N in the crop + estimate of soil mineralisable N) can be assessed using the Field Assessment method described in the Fertiliser Manual (RB209) or by soil and crop sampling and analysis.
- Spring SNS largely depends on soil mineral N levels in autumn 2014, autumn crop N uptake and over-winter nitrate leaching losses.
- EWR data indicates that the majority of the UK has experience average rainfall so far this winter.
- The mild autumn and early winter period provided good growing conditions in most areas.
- Soil nitrogen supply levels are likely to be *higher* than average where well established crops (i.e. oilseed rape) have taken up significant quantities of soil nitrogen.
- Higher than average soil N levels can also occur on individual fields where:
  - Regular or high application rates of organic materials have been used.
  - The previous crop failed or gave poor yields.
  - Grass has recently been ploughed out.
  - Where leafy high N crop residues have been incorporated (e.g. sugar beet tops, brassica residues etc.)

## Early spring nitrogen

- Field inspection will be important to judge the need for early spring N applications.
- Apply up to 40 kg/ha N on cereals and up to 100 kg/ha N on oilseed rape to thin or backward crops between mid/late February to early March when soil conditions allow.
- Do not apply N fertiliser if the soil is waterlogged or frozen. This can increase the risk of nitrate losses to water and is not allowed in Nitrate Vulnerable Zones (NVZs).
- Delay N fertiliser applications to:
  - Cereal crops with lush canopies (i.e. shoot numbers over 1200/m<sup>2</sup> by spring).
  - Oilseed rape with a Green Area Index (GAI) over 2 (i.e. >75% ground cover). Digital photos can be used to estimate GAI (e.g. use [www.totaloilseedcare.co.uk](http://www.totaloilseedcare.co.uk)).
  - Where high readily available N organic materials have recently been applied.

## Sulphur applications

- Don't forget sulphur fertiliser where needed. Sulphur is important for crop yield and quality. If sulphur is limiting, applied N fertiliser is used less efficiently.
- Sulphur deficiency is most common on light and medium textured soils.
- Use a water soluble sulphate containing fertiliser for rapid and effective uptake. Apply sulphur fertiliser in the spring, usually with the first N application.
- Defra's Fertiliser Manual (RB209) recommends:
  - Oilseed rape: 50-75 kg SO<sub>3</sub>/ha in late February to early March (but can be delayed until late green bud where sulphur deficiency is slight/moderate).
  - Grass: 40 kg SO<sub>3</sub>/ha before each cut.
  - Cereals: 25-50 kg SO<sub>3</sub>/ha in in early March to early May.

## Fertiliser prices

The cost of fertiliser and value of the crop are important factors to consider when planning fertiliser N applications:

- The price of ammonium nitrate (AN) was £250-260/tonne last autumn.
- The breakeven ratio (BER) is the cost of N fertiliser : the price of grain/oilseed (both in pence/kg).
- Fertiliser Manual (RB209) recommendations are based on a BER of 5:1 for cereals and 2.5:1 for oilseeds.
- Based on a cereal price of £140/t (14p/kg) and AN at £250/t (72p/kg N) the BER is 72/14 = 5.1. Based on an oilseed rape price of £270/t (27p/kg) the BER is 72/27 = 2.7.
- Most 2015 cereal crops are likely to have a BER close to 5 and oilseed rape crops a BER close to 2.5, so N adjustments are not likely to be needed for most crops.

## Applications of organic materials

- The NVZ closed spreading period for high readily available N organic manures (i.e. slurry, digestate, liquid digested biosolids and poultry manures) ended on 31<sup>st</sup> January.
- However, if you apply high readily available N liquid organic manures between now and the end of February the application rate must be below 30 m<sup>3</sup>/ha.



*If you use organic materials, assess the crop available nutrient supply and reduce manufactured fertiliser use accordingly*

## Nutrient management software

- The PLANET software can be used to help farmers with field level nutrient management decisions and to assess compliance with the NVZ regulations.
- MANNER-NPK can be used to assess the crop available nutrient supply from different organic material types.

**PLANET**  
NUTRIENT MANAGEMENT

**MANNER**  
-NPK

- Download PLANET and MANNER-NPK for free from [www.planet4farmers.co.uk](http://www.planet4farmers.co.uk)

# Soil sampling to assess Soil Nitrogen Supply (SNS)

- Estimating SNS is an important step in determining crop N requirement and must be completed for all fields in a NVZ before any N is applied.
- SNS = soil mineral N + estimate of N in the crop + estimate of mineralisable N.
- SNS can be assessed using the Field Assessment Method (FAM) described in the Fertiliser Manual (RB209) or by soil and crop sampling and analysis. The FAM is based on 'look-up' tables of soil type, previous cropping and over-winter rainfall.
- Soil sampling and analysis for SMN can provide a more reliable estimate of the SNS than the FAM.
- Soil analysis is most worthwhile in fields where large and unpredictable soil N residues are suspected.
- It is less valuable in fields where N residues are expected to be low.
- See HGCA Topic sheet 115 for advice on when to sample.

## For best results when sampling:

- Sample before any spring N fertiliser or organic manure is applied. This will usually be between January and March.
- Sample in 3 layers (0-30, 30-60 and 60-90 cm) and from at least 15-20 points in the field. Bulk soil from each layer, thoroughly mix and take a representative sub-sample for analysis.
- Keep the soil samples cool (but not frozen) and send to the laboratory so they are analysed within 3 days. Analysis should include nitrate-N and ammonium-N.
- An assessment should also be made of the amount of N that will be released during the season due to mineralisation.
- Mineralisation tends to be greater where soil organic matter is high or where there is a history of organic materials or grass.
- In these situations a commercial measurement of Additional Available N (AAN) gives the most useful prediction of mineralisation.
- At the time of sampling, it is important to also estimate how much N is in the crop (Table 1). This can be a significant amount for advanced crops.
- A well established early drilled oilseed rape crop with a Green Area Index (GAI) of 2.0 may contain up to 100 kg N/ha.

## Target fields should include:

- Where organic materials have been regularly used.
- Following crops leaving lots of leafy or N-rich crop debris.
- Where grassland has recently been ploughed out (but not in the first year after ploughing).
- Fields where lodging has been a problem, or after a poor or failed crop.
- Selected 'indicator' fields to assess seasonal variation and check on how SNS on a farm compares to that predicted by the Field Assessment Method.

**Table 1. Estimate crop N using number of shoots for cereals or Green area index (GAI) for oilseed rape**

Cereals (shoots/m <sup>2</sup> )	Crop N (kg N/ha)
500	5-15
1000	15-30
1500	25-50
Oilseed rape (GAI)	Crop N (kg N/ha)
0.5	25
1.0	50
2.0	80-100



*This oilseed rape crop near Hereford sampled on 21<sup>st</sup> January contained 45 kg N/ha*

- Digital photos can be used to estimate oilseed rape GAI, for example [www.totaloilseedcare.co.uk](http://www.totaloilseedcare.co.uk)