



# A clear solution for farmers

CATCHMENT SENSITIVE FARMING

## Cover cropping to reduce nitrate leaching: A Portsmouth Water case study

Over the past two years Portsmouth Water have been trialing cover crops ahead of spring cropping on the shallow chalk soils within Portsmouth Water’s catchment area. Two sites were chosen at Lockash Farm, West Marden to demonstrate the feasibility of growing cover crops ahead of spring cropping on shallow chalk soils.

The trial will also look to analyse the impact of cover crops on over-winter nitrate-N leaching losses compared to bare stubble and the resulting impact on following spring crop yields and gross margins adverse or otherwise.

Bare stubbles are often left over winter months become particularly vulnerable to surface water runoff, soil erosion and loss of nutrient to groundwater via leaching.

Nutrients leached from bare soils can reach groundwater aquifers in a matter of hours especially on fissured chalk soils.

Treatment number	Description
1	Conventional practice (bare stubble over winter)
2	Cover crop 1 –‘simple option’ –cereal (Oats) established using a VaderstadTop Down and Bio-Drill
3	Cover crop 2 –EFA mix: Oats &Phacelia(ratio of 9:1) established using same method as treatment 2

Winter sown cover crops will bind soil and take up nutrients as they grow, as well as improving soil organic matter levels due to the accumulation of biomass above and below ground level.

During the winter periods of 2018/2019 and 19/20 (Oct - Feb) Portsmouth Water have been trialing cover crops across two different sites using 2 types of cover crop (seen in the table above) against a control of conventional over-winter stubble.



Oats



Stubble



Phacelia & Oats

Catchment Sensitive Farming (CSF) is delivered in partnership by Natural England, the Environment Agency and Defra.

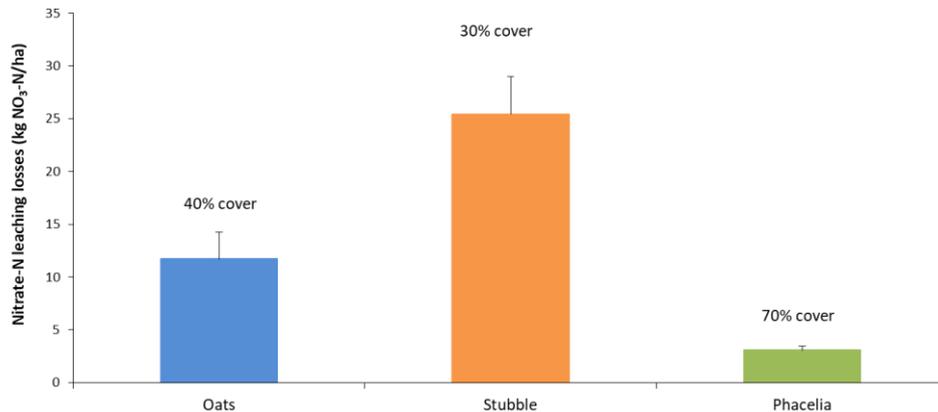




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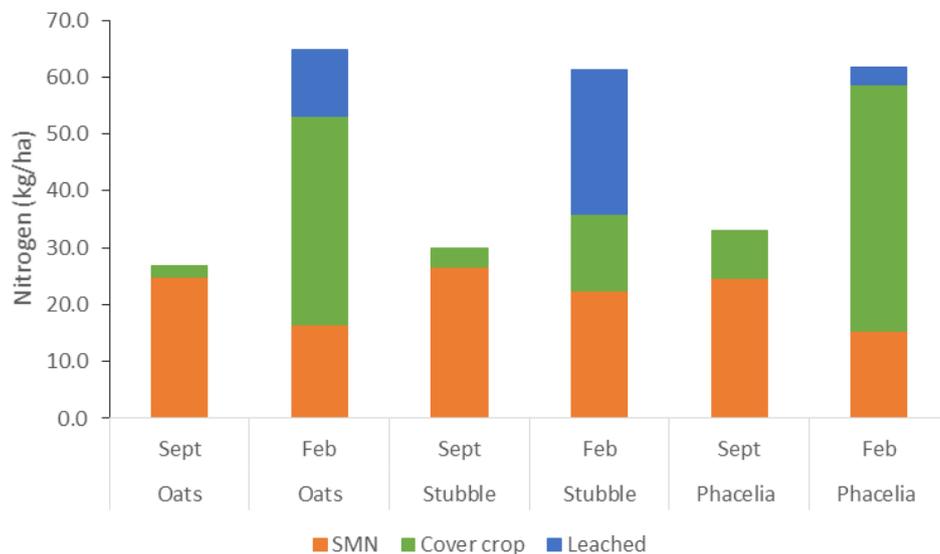
Nitrate leaching losses Oct 2019 –Feb 2020



During the measurement period, results from the 19/20 year provided evidence that with a higher percentage of ground cover minimal losses of N were observed. Trail plots left over winter as stubble saw the highest losses of nitrate to leaching of 26kgNO<sub>3</sub>-N/Ha where only 10% more cover through the establishment of a cover crop halved N leaching potential. A mix of phacelia and oats (treatment 3) showed a dramatic reduction in N leaching from the conventional over winter bare stubble.

18/19 trail - (Busto field): 10 kg/ha (Phacelia–90% cover), 30 kg/ha (Stubble –45% cover), 65 kg/ha (oats –30% cover)

Results displayed in the Nitrogen Balance graph below also showed higher N ‘recovery’ than was measured in Sept -N mineralized over winter (35-40 kg/ha)



**Next Steps**

The next steps of this trial include analysis of yield maps to determine if there are any effects on spring barley yields, also to assess spring barley grain N offtake. Portsmouth Water will also be looking at a simple cost benefit analysis taking into account gate keeper records of inputs & field operations