

## Green manures and winter cover crop trials in the Cotswold Rivers Catchment



Matthew Shepherd with vetch: the plant has vigorous root growth with nodules so fixes its own nitrogen too. Credit: Andrew Russell CSF.

Nitrogen is an important chemical for farmers as it is a natural fertiliser for plants. However, too much nitrogen can cause problems as it may end up being washed into our rivers where it can impact on our drinking and bathing waters and on our precious aquatic ecosystems.

Loss of nitrates to ground waters is one of the main issues on the thin “brashy” soils over limestone of the Cotswold catchment. One possible solution is to grow winter cover crops, such as vetch, radish, rye and mustard, which naturally soak up nitrogen and improve soil structure.

Andrew Russell and Sarah Howells, Catchment Sensitive Farming officers for the Thames and South East Catchment, have been working closely with two farmers to establish cover crop trial plots.

Sarah Howells says: “In late November last year we held an event at each farm to discuss the practicalities of growing cover crops and the various pros and cons.

We were joined by Matthew Shepherd, Natural England’s Soil Biodiversity Specialist, who brought along his trusty spade and gave us an insight into some of the processes going on beneath the surface. Another event was held in the spring to publicise and discuss the results of the trials.”

### The Results

Following a really mild and wet winter season, the evidence gathered from the demonstration plots has shown the winter cover crops have prevented significant nutrient loss from the thin limestone soils in the Cotswolds. All the crops were sampled for nitrogen content and organic matter by taking a 1m<sup>2</sup> of the biomass and sending it to the lab for analysis.

	Seed £ /ha	Fresh ton /ha	Ton DM per ha	% Nitrogen content	Kg N/ha
W.Turnip rape	35	27.5	3.2	3.15	123
Oil Radish Top	45	29.0	2.9	4.76	140
Forage Rye	97	17.9	2.3	4.6	105
Mustard	70	14.5	2.2	3.18	69
Stubble Turnips	30	28.2	1.37	3.42	108

### Green manure and other benefits

Some of the crops had taken up a notable amount of nitrogen and produced large volumes of organic matter, perfect for returning to the soil as green manure to improve soil structure and water-retaining capacity for the following crop.

Reducing the amount of fertiliser needed adds to the economic benefits. Other benefits include reducing erosion and loss of phosphates, increasing organic matter and improving soil structure.

“The trial plots were so successful we are going to replicate them across the rest of the river basin district in the Thames region. We’re looking forward to developing both our knowledge and that of farmers.

“We believe cover crops are the key for significantly reducing nitrate leaching over winter; and green manures will help to provide a sustainable future for arable farming” says Andrew Russell.

### Catchment Sensitive Farming

Catchment Sensitive Farming works with farmers and land managers to reduce diffuse water pollution from agriculture. It is delivered in partnership by Natural England, the Environment Agency and Defra. It offers free, practical advice, training and capital grants across 77 river catchments in England. Please visit our [web pages](#) for more case studies and information.