Cover crops for water protection

Maize fields can be a significant source of soil erosion in the winter due to heavy rain and bare soils. All maize fields must be actively managed to reduce the risk of soil, nutrient and agrochemical loss to the environment during the winter.

Sowing a cover crop once the maize crop has been harvested can be an effective way of providing green, over-winter cover. Cover crops have seen an upsurge in interest in recent years. They offer numerous advantages to both arable and livestock producers, including:

- Prevention of soil erosion
- Building organic matter and boosting soil health
- Pest and weed suppression
- Improved resilience of soil to flood/drought and increased workability of soils
- Retention of soil nutrients such as nitrogen and phosphorus

The retention of soil nutrients is highly dependent upon the date at which the cover crop is established. This is the main challenge with maize, which is generally harvested in early October, or later in some cases.

Although cover crops following maize are unlikely to reduce nitrate leaching by as much as those following combinable crops, due to their later sowing date, there are other potential benefits. If a grass species is chosen, extra forage in the form of grazing or a silage cut can be taken before drilling maize again the following spring. Even if the forage isn't utilised, cover cropped fields often dry quicker in the spring, allowing machinery to travel on them earlier.

Within the counties of Dorset, Wiltshire and Somerset, Wessex Water is working with the Maize Growers Association to research and promote ways of reducing the impact of maize on the environment. They recommend that for a cover crop to be most effective at reducing nitrate leaching and preventing soil erosion, producers must:

- Establish the cover crop as soon as possible following harvest of the previous crop and no later than 15 September if following a combinable crop, or 15 October if following maize
- Not destroy the cover crop until 1 February if going into spring cereals, or until 1 March if going into maize
- Use species from the Wessex Water approved list, at the minimum seed rates specified

Table 1: Wessex Water approved species for cover crops following maize*

Species	Estimate of N capture in above-ground material (kgN/ha)	Minimum seed rate (kg/ha)	Approximate seed cost (£/kg)	Approximate seed cost (£/ha)
Italian ryegrass	30-60	40	1.50-2.50	60-100
Westerwolds	30-60	40	1.50-2.50	60-100
Barley	20-50	100	0.40-0.60	40-60
Oats	20-50	125	0.40-0.60	50-75
Forage rye	30-60	75	0.60-1.00	45-75

*The Wessex Water approved list of cover crops is continually revised and updated as understanding of cover crops evolves.

Wessex Water trials during 2015/16 on seven South Dorset farms found that the average reduction in nitrate leaching from sowing an Italian ryegrass cover crop was 32kg/ha, when compared with leaching from control strips of bare maize stubbles.

Undersowing

Undersowing, where a cover crop, typically ryegrass, is broadcast into the growing maize as the leaves of the maize touch across the rows has proved less successful in local trials carried out by Wessex Water. Local producers have found that it often needs 'topping up' with more Italian ryegrass after the maize has been harvested. The success of undersowing is dependent on:

- **Seed positioning**: getting enough seed-to-soil contact and drilling it accurately enough that you get good ground coverage but not too close to the maize plant
- **Timing**: too early and the undersown grass does well but the maize suffers, or the grass fails due to herbicides; too late and the grass fails due to shading by maize

With this in mind, Wessex Water and Catchment Sensitive Farming are currently running trials to compare the effectiveness of different methods of undersowing and post-harvest crop establishment. If undersowing can become more reliable it will become an effective means of mitigating the soil and water issues caused by maize crops, especially where a late harvest is unavoidable.

Further information on growing maize can be found in the BRP manual Growing and Feeding Maize Silage for Better Returns.

Further information on the Maize Growers Association can be found on their website.