

TILLAGE

Spring 2013

Best crop establishment practice



Practical

Timely tips for spring seedbeds

Big Picture

Taking control of soil erosion

Case studies

Coping with horrific autumn 2012

Insight

Making the most of cultivator drills



Cut erosion to protect soils and reduce pollution

Soil erosion at Cobrey Farms in spring 2008

UK soils are some of the most fertile in the world, so growers should do all they can to keep them within fields, urges Steven Bailey, Catchment Sensitive Farming's Severn River Basin coordinator.

and degrades what soil remains in the fields, he points out.

"Even where it looks as though soil running down a slope has been retained, for example by a hedge, a lot of the fine particles – the clay, silt and organic matter –

"Rivers and drains blocked with silt increase flood risks," she adds. "And sediment suspended in water can make it less suitable for abstraction."

"We can't keep on thinking there's plenty more soil," she says.



Deeply eroded channels, as here in Shropshire 10 years ago and Herefordshire three years ago, are not unknown in the UK. Many fields have suffered significant soil run-off this season, notes Steven Bailey.

Even without the anti-pollution pressure of the EU's Water Framework Directive, which the CSF project was set up to address, it makes economic sense to avoid soil erosion and run-off. Soil lost in this way carries away valuable nutrients leaving the rest of the field less fertile, he explains.

Deep gulleys caused by erosion are not confined to foreign countries, stresses Mr Bailey. "They do occur here and they're happening more often, probably because the weather's changing and because some soil organic matters have dropped too low."

Channels deep enough for a man to hide in standing upright have been eroded through light land in Shropshire and Hereford within the past decade, he notes.

A less dramatic but more common sight is soil washed out of fields through gateways by heavy rain, especially during root harvesting. This sediment causes traffic hazards, risks water pollution

will have disappeared with the water along with plenty of nutrients."

According to the Environment Agency, soil erosion is estimated to cost the country £45m a year of which £9m is represented by lost crop production.



Steven Bailey, Catchment Sensitive Farming's Severn River Basin coordinator.

Silt from eroded fields eventually finds its way into streams and rivers. This smothers aquatic wildlife, reduces biodiversity and interferes with fish spawning, warns the EA's Anna Hall.

"As US President Roosevelt once said 'A nation that destroys its soil destroys itself.'"

Phosphate on soil particles eroded from farmland pollutes watercourses and triggers algal growth, adds Mrs Hall.

Today about 70% of the UK's rivers would not meet the Water Framework's tougher limits on phosphate content which should be aimed to be met by 2015, she notes.

Although much of that phosphate comes from sewage effluent, just over a quarter of it nationally is estimated to arise from farming, much of it through soil erosion and run-off.

"Soil isn't the only pathway, but if we can look after our soils we'll be going a long way towards reducing the problem," she says. "Farmers can make a difference."

There is plenty of advice available to help them do so through a network of CSF officers, partners and contractors (see panel overleaf).

Catchment Sensitive Farming

CSF is a joint project between the Environment Agency and Natural England, funded by DEFRA and the Rural Development Programme for England.

It was launched in 2006 covering 40 river catchments but has since been extended to 75, notes Natural England's Philippa Mansfield.

Through the project farmers in those areas can get free visits and advice on how to reduce the risks of water pollution occurring through their activities, she explains.

At its heart CSF advice homes in on 'The Big Three' measures:

- Reducing the source of pollution
- Breaking or slowing pollutant pathways
- Protecting/buffering the receptor (eg stream/river/pond/lake/groundwater)

Since 2006, 6200 holdings covering over 1m ha have received soil management advice through direct farm visits and other events, notes Dr Mansfield. Subjects covered include:

- Alleviating compaction
- Preventing erosion and run-off
- Pathway control
- Cultivations eg min-tillage

Capital grants of up to £10,000 covering up to half the costs of capital works to mitigate diffuse water pollution from agriculture are available to farmers in CSF catchments through the project, she adds.

"Since 2007 the CSF Capital Grant Scheme has funded 4,200 projects worth £33.3m."

Items to reduce soil run-off include sediment traps, swales with check dams and relocated and re-surfaced gateways.

"At first it was very difficult to tell if CSF was having an effect on water quality, but we're now starting to see some very strong evidence of improvement."

Monitoring of sediment, nutrients and micro-organisms from animal manures in rivers has shown reductions in pollutant concentrations for more than half the pollutants in six out of nine CSF catchments.

"Over 60% of farmers visited have taken up our advice and implemented it."

To spread its messages wider CSF joined forces in 2011 with AHDB to offer information on the latest research and best practice on soils at a local level via 70 advice materials including the Environment Agency's 'Think Soils' and other guidance promoted through a new web portal:

www.ahdb.org.uk/projects/Soilsmanagement.aspx.

To find out if you are in a CSF catchment and make use of the free advice and grants go to:

www.naturalengland.org.uk/csf

SOIL EROSION

- Soil and nutrient loss
- Road traffic hazard
- Watercourse pollution
- £45m/year cost
- Wildlife impacted
- CSF aims to help
- Capital grants available

Case study – Specialist grass waterways counter sandland erosion

Not so long ago erosion threatened to severely curtail operations on one west-country farming business. Now, with specialist help, it plans to continue producing its high value crops without damaging the environment.

John Chinn runs Cobrey Farms near Ross-on-Wye as a family partnership with his wife Gay and sons Henry and Christopher. They own 500ha there and rent another 600ha within the area and in Suffolk.

The main arable enterprises are asparagus, blueberries, and salad potatoes.

Unfortunately much of the light land is prone to erosion, notes Catchment Sensitive Farming officer Kate Adams.

"Cobrey Farms has a long history of diffuse pollution, chronic sedimentation resulting from a combination of intensive agricultural practices and a red sandstone soil which is susceptible to erosion via surface water run-off.

"In the past it has been prosecuted for a sediment run-off incident from potatoes."

After heavy rain in summer 2007 Natural England and the Environment Agency challenged Mr Chinn to control the unacceptable levels of soil erosion and diffuse pollution coming from particular 'high risk' asparagus



John Chinn, Cobrey Farm near Ross-on-Wye

fields or stop growing the crop.

Consequently, in early 2008 he approached Cranfield University for help in finding a way to overcome the problems.

A detailed topographical and field survey was conducted by Cranfield's Rob Simmons and Ian Truckell, and an appropriate and effective solution was designed and installed.

It came in the form of all new fields of asparagus and blueberry crops being laid out with the rows orientated so that any run-off ends up in engineered grassed waterways. These are designed to transfer run-off at non-erosive speeds to watercourses or water

storage structures.

Grassed waterways are essentially inefficient channels which slow the run-off to allow sediment to settle, increase infiltration and reduce run-off volumes.

To reduce land-take and provide immediate protection from the erosive forces of rainfall and run-off, the waterways can be lined with a geotextile. A bio-degradable product, Erosamat, a woven mat of either jute or coir, is laid over freshly sown grass to create what Dr Simmons describes as Geo-textile Lined Grassed Waterways.

"To date, Cobrey Farms has successfully installed over 3.8 km of GWWs, effectively controlling runoff and diffuse pollution under extreme rainfall from over 85ha of asparagus in Herefordshire, Gloucestershire and Suffolk."

The results are so impressive that the farm hosted two open days for Natural England and the Environment Agency to show other farmers and land agents what could be achieved, says Mr Chinn.

"The grassed waterways have eliminated water run-off from some fields and hugely reduced the problem from others.

He believes continued research by Cranfield into mulch application and shallow soil cultivations to improve infiltration into compacted furrows, should secure the sustainability of his asparagus production.

Typical costs are £1,450/ha, comprising £350 for professional fees, £500 for materials and £600 for labour and machinery to shape the GWWs, seed with grass and lay the geo-textile. That is cost effective when set against the ability to continue growing high value crops.

"We do seem to be getting more extreme weather, but we're now getting the tools to deal with it."

Even after such crops come to the end of their life, GWWs will probably remain in place for any combinables sown in the same direction as the current rows. "I don't expect we'll rip them out," Mr Chinn concludes.



Cranfield-designed grassed waterways are doing a fine anti-erosion job, says John Chinn.