PINPOINT
Rivers Trusts and Farmers tackling water pollution

Best Practice Information Sheet

A clear solution for farmers
CATCHMENT SENSITIVE FARMING

A joint project between the Environment Agency and Natural England, funded by Defra and the Rural Development Programme for England, working in priority catchments within England.

Cultivation techniques to protect soils **Sheet 22.0a**

Introduction

Why change?

Optimising crop establishment by using timely operations and techniques such as reduced cultivation, contour ploughing and rough ploughing can protect your soils and save money. Review your cultivation systems and benefit from:

- lower crop establishment costs
- less crop damage
- improved soil structure
- reduced risk of soil erosion, runoff and watercourse pollution
- enhanced diversity of wildlife.

Wheeling damage

Steps to success

1. **Identify potential opportunities** for optimising crop establishment to protect the soils on your farm. Consider whether you could reduce, combine or improve the timeliness of your operations. Use the **Cross Compliance Soil Protection Review (SPR)** as guidance for soil management.

2. **Calculate the cost-benefit of these opportunities** by comparing the cost of factors such as time, machinery, energy and agrochemical losses for different crop establishment systems. Remember that optimising crop establishment also offers savings associated with improved soil workability and structure, as well as reduced soil erosion, runoff and pollution risk.

3. **Develop an action plan** to optimise crop establishment to protect the soils on your farm:
   - aim to match cultivation techniques to crops
   - timeliness is the key to good soil management and successful crop establishment. Take account of weather and soil conditions. Avoid working wet land to minimise the potential for capping, compaction, smearing, runoff and erosion of soils. Check soil wetness by digging a small hole before operations
   - consider ploughing less deeply and less often to reduce energy input
   - use low-pressure tyres or tracked vehicles to reduce wheeling damage
   - plan your weed control. Use herbicide sparingly and at the right time. Rotate crops to improve soil structure, fertility and control weeds
   - consider the use of machinery rings or contractors to increase work rates, and ensure timeliness of operations
   - consider adopting the following systems where possible:

Minimum tillage

Direct drilling

Rough Ploughing

Contour ploughing

4. **Check** your fields regularly for opportunities to optimise crop establishment, minimise pests, protect your soils and save money.

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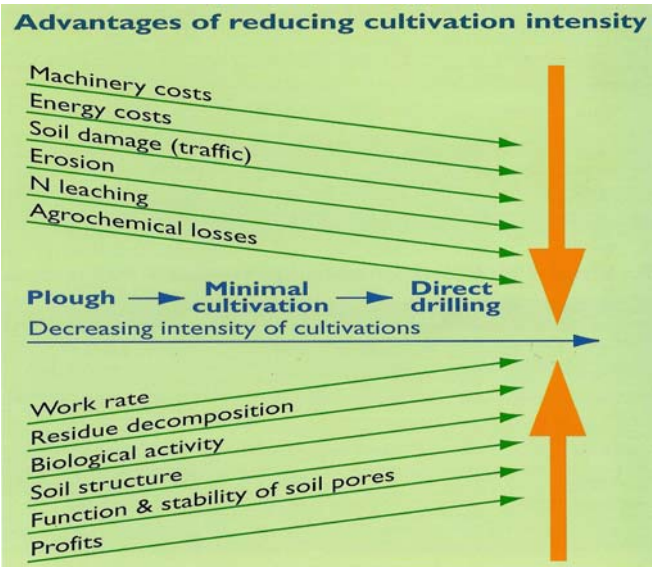
Practical examples



Source: Arable cropping and the environment - a guide (Defra, 2002)

Undersowing crops - example

To avoid bare ground after maize harvest from October until the following May, on soils which often cannot be Autumn ploughed, a 5 ha maize crop was undersown with herbicide tolerant Italian ryegrass for worm-free ewe/lamb winter and spring grazing.

Broadcasting and seed costs were approximately £86/ha = £430. The undersown crop produced six tonnes DM/ha with a Relative Feed Value (RFV) of approximately £38/tonne, which was worth £1140.

The total saving was £1140, which represents a net saving of £710 and payback in less than a year.

This excludes the uncosted benefits of reduced soil damage and productivity loss associated with untimely operations, runoff and soil erosion.

Comparison of crop establishment systems

Source Defra (2009)

System	Depth cm	Cost £/ha	Time min./ha	Cereal yield %
Plough	15-35	100-135	150-220	100
Reduced cultivation	5-10	70-90	60-100	100.8*
Direct drilling	0	30-60	25-40	99.2*

* Average yield relative to ploughing for a medium loam soil

Undersowing reduces potential erosion costs

Remember

- Crop establishment using reduced cultivation or direct drilling techniques can reduce costs and protect soils
- Contour ploughing and rough ploughing techniques can help reduce soil erosion and runoff
- Cultivations should be timely - only carried out when soil and weather conditions are right

For further information: Defra (www.defra.gov.uk), CSF (www.gov.uk/catchment-sensitive-farming), Natural England (www.naturalengland.org.uk/csf), Environment Agency (www.environment-agency.gov.uk), Cross Compliance Helpline 0845 345 1302 (www.crosscompliance.org.uk) and The Rivers Trust (www.theriverstrust.org)

THE RIVERS TRUST

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This information sheet is part of a series providing farmers with advice on land management practices to protect water bodies, produced by The Rivers Trust with support from Catchment Sensitive Farming. The advice will also enable farmers to use farm resources more efficiently and help meet Nitrate Vulnerable Zone and Soil Protection Review requirements under Cross Compliance and environmental regulation.

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