



Sowap - Soil and Surface water protection using conservation tillage in northern and central europe

LIFE03 ENV/UK/000617



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#### Project description:

##### Background

Agricultural production can have negative impacts on the environment, and there is considerable concern as to the sustainability of conventional land-use practices on arable land in Northern and Central Europe. Previous and current applied research studies have demonstrated the environmental damage that may result from unsustainable use of land resources, particularly in over-cultivation of arable soils.

Conventional land preparation and crop agronomy requires many field operations, especially for winter cereals in the UK and sugar beet in Belgium. Such conventional tillage is associated with aggregate breakdown, which significantly increases soil erosion susceptibility, and surface sealing and capping that encourages production of surface runoff. These two facts combine to give high soil losses, high sediment concentrations and high runoff volumes.

The eroded sediment may carry chemical contaminants, which are then transported to water bodies in which quality is compromised by the turbidity caused by particulate matter. Chemicals in the run-off also pollute these water bodies. Many studies have shown the sensitivity of aquatic ecosystems (flora and fauna) to even low levels of water pollution by sediment and its associated contaminants. Much is known about the principles behind soil conservation practices; however, there is a considerable gap between what is known in principle and what is applied in practice.

## Objectives

The project aimed to bridge the gap between Conservation Agriculture research and implementation on the farm by implementing soil and surface water protection using conservation tillage in Northern and Central Europe (SOWAP). It hoped to prove that the benefits seen in research projects could be replicated on the farm by demonstrating practical and realistic land-use to adopt and implement soil and water conservation strategies.

Specifically, the project aimed to demonstrate the environmental impacts associated with “conventional” arable land use practices, where intensive soil management can lead to degradation of soil resources, water pollution, reduced biodiversity and less carbon sequestration viability. It then sought to demonstrate the environmental, ecological, economic and social benefits of 'conservation-oriented' arable land management systems and their effectiveness in protecting soil resources and improving catchment.

SOWAP thus hoped to show how an environmentally sound land-use policy can be implemented, as recommended by the EU 6th Environment Action Programme and the EC Communication on Soil Protection. It finally sought to show how a unique database can be disseminated successfully at the local, regional, national and EU level via workshops, multi-media, field visits, publications and the internet.

## Results

Using demonstration plots in three sites across Europe, the project was able to collect important information and data to establish the pros and cons of conservation agriculture to inform land-use management decisions by farmers and politicians.

Conservation agriculture still uses fertilisers and pesticides, but aims to understand the processes much better to improve their effectiveness and reduce their environmental impact. A key technique used was replacing ploughs with zero-till or non-inversion tillage to reduce losses of soil to erosion, allow cover crops during winter, improve soil structure and enhance soil biodiversity. It also promoted in-depth analysis of on-farm requirements for chemical applications, to ensure use of the optimum amounts. This reduces losses through run-off, ensures maximum economic benefit to the farmer, and fosters better appreciation of the processes of uptake and timings of applications for different crops.

The project compared crop yields under different land management regimes and collected data on the impact of different techniques on soil erosion, fertiliser and pesticide run-off, soil function, avian ecology and water ecology. The only major negative of Conservation Agriculture compared to 'conventional' agriculture was the drop in crop yield. However, the project was able to demonstrate to a large number of farmers that losses in yield were typically no more than 10 percent and that this was balanced by savings in fertiliser and pesticide applications, or through savings in time.

Despite the variables and the difficulty of pulling out trends and conclusions, the project established the positive effect that conservation agriculture can have, including reducing run-off by as much as 90 percent, particularly during heavy rainfall and soil erosion by 95 percent on light sandy soils. It was seen that soil function improved under conservation agriculture with higher soil carbon, nitrogen and soil moisture together with much higher invertebrate biodiversity (including earthworms).

The project allowed for exchange of good practice between farmers and provided a good body of information for future work. The project has fed into the WOCAT network - a global network of soil water conservation – and has therefore contributed towards the implementation of the Water Framework and Soils Framework Directives.

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Environmental issues addressed:

Themes

Land-use & Planning - Soil and landscape protection  
Industry-Production - Agriculture - Forestry

Keywords

soil erosion, water quality, environmental impact of agriculture, land use planning

Natura 2000 sites

Not applicable

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Beneficiaries:

Coordinator	SYNGENTA UK
Type of organisation	International enterprise
Description	Syngenta is currently the largest crop protection company in the world, and Jealott's Hill International Research Centre, its European headquarters for environmental research, is recognised globally as a centre for excellence.

## Partners

GRI HAS International Soil Reference and Information Centre, The Netherlands  
Katholieke Universiteit Leuven, Belgium  
Vaderstad, Sweden

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## Administrative data:

Project reference	LIFE03 ENV/UK/000617
Duration	01-JUN-2003 to 01-SEP -2006
Total budget	3,565,066.00 €
EU contribution	1,782,533.00 €
Project location	Vlaams Gewest(België - Belgique) Associated Hungary (H)(Hungary Magyarország) East Midlands(United Kingdom) South West (UK)(United Kingdom)

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## Read more:

Project web site	<a href="#">Website of the project</a>
Publication: After-LIFE Communication Plan	Title: After-LIFE Communication Plan Year: 2006 No of pages: 2
Publication: Guidelines-Manual	Title: "Conservation Agriculture in Europe - An approach to sustainable crop production by protecting soil and water?" (4.7 MB) Year: 2006 No of pages: 56

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