

Linking soil degradation processes, soil-friendly farming practices and soil-relevant policy measures



(Source: Geertrui Louwagie)

Agriculture occupies a substantial proportion of Europe's land area. It therefore plays an important role in maintaining natural resources and cultural landscapes and is a precondition for other human activities in rural areas. Farming has contributed over the centuries to creating and maintaining a rich variety of landscapes and habitats. However, agricultural practices can also have adverse environmental effects. Degradation of soil, pollution of soil, water and air, the fragmentation of habitats and loss of wildlife can be the result of inappropriate agricultural practices.

Recognising the environmental challenges of agricultural land use, the European Parliament has requested the European Commission to carry out a pilot project on 'Sustainable agriculture and soil conservation through simplified cultivation techniques' (SoCo). The project is a joint collaboration between the Directorate-General for Agriculture and Rural Development (DG AGRI) and the Joint Research Centre (JRC).

This is the first of a series of ten fact sheets that summarise the core findings of the SoCo project. Three fact sheets will focus on soil degradation processes, three more on soil-friendly farming practices and a further three on soil-relevant policy measures. This fact sheet connects the topics presented in the individual fact sheets (fact sheet no. 1).

Soil is composed of mineral particles, water, air and organic matter, including living organisms. It is a complex, dynamic, living resource, which



(Source: Geertrui Louwagie)



performs many vital functions: food and other biomass production, storage, filtration and transformation of substances including water, carbon and nitrogen. Soil also serves as a habitat and a gene pool, and provides a foundation for human activities, landscape and heritage, and the supply of raw materials.

Soil is subject to a series of degradation processes. Some of these processes are closely linked to agriculture: erosion due to water, wind and tillage; compaction; declining soil organic carbon and soil biodiversity; salinisation and sodification; and soil contamination (by heavy metals and pesticides, or excess nitrates and phosphates). In the accompanying fact sheets,

we pay closer attention to water erosion and compaction (fact sheet no. 2), soil organic matter decline (fact sheet no. 3), and salinisation and sodification (fact sheet no. 4). Links with related degradation processes and environmental issues (such as water quality, biodiversity or landscape) are also presented.

Soil degradation processes imply a need for protection, maintenance and improvement of soil quality. Soil properties as well as soil-forming factors such as climate, land use or soil management determine the extent of the soil degradation. Certain farming systems and practices address one or more soil degradation processes and can help to achieve better

Effects (positive/negative) of farming practices on soil degradation processes, related environmental issues and economics and their encouragement through the GAEC requirement and agri-environment payments or both



(Source: Stephan Hubertus Gay)

Legend: *: conservation agriculture encompasses this set of complementary agricultural practices; +: positive observed effect; -: negative observed effect; [x]: expected effect; (x): limited (e.g. short-term) or indirect effect; empty field: no particulars known; : encouraged through the GAEC requirement; : encouraged through agri-environment payments; : encouraged through the GAEC requirement and agri-environment payments

	Water erosion
Conservation agriculture	
No- or reduced tillage*	-/+
Cover crops*	+
Crop rotation*	+
Soil-friendly tillage practices	
Intercropping	+
Subsoiling	
Contour farming	+
Soil-friendly farm infrastructure elements	
Buffers	+
Terraces	+



protection and maintenance of soil resources. The fact sheets on conservation agriculture (fact sheet no. 5), soil-friendly tillage practices (fact sheet no. 6) and farm infrastructure elements (fact sheet no. 7) describe such relevant practices.

Policy makers may decide to support particular farming practices (or systems) through relevant policies, or may even make them mandatory. The Common Agricultural Policy (CAP) plays an important role in preventing and mitigating soil degradation processes. The fact sheets on the requirement to keep agricultural land in good agricultural and environmental condition (GAEC) (fact sheet no. 8), agri-environment measures

(fact sheet no. 9) and advisory services (fact sheet no. 10) elaborate on this topic.

Soil degradation processes, soil-friendly farming practices (or systems) and soil-relevant policies are interrelated. The table below gives an overview of the links that are presented in the accompanying fact sheets. Environmental as well as economic effects of soil-friendly farming practices are highlighted. Further details can be found in fact sheets nos. 2-9.

Further reading

<http://soco.jrc.ec.europa.eu>

Soil degradation processes			Related environmental issues			Economics
Compaction	Organic matter decline	Salinisation/Sodification	Water quality	Greenhouse gas emissions	Biodiversity	
+	+		-/+	-/+	[+]	-/+
[+]	+		+	+	[+]	+
+	+		+	(+)	+	+
+	+		+		+	-/+
(+)		(+)				-/+
[+]	[+]		+		+	-/+
	[+]					-



This fact sheet is based on the findings of the 'Sustainable agriculture and soil conservation' (SoCo) project. It is part of a package of ten sheets organised around the three main topics of the project. The sheets cover the following topics:

- Introduction:
 - Fact sheet no. 1: Linking soil degradation processes, soil-friendly farming practices and soil-relevant policy measures;
- Soil degradation processes:
 - Fact sheet no. 2: Water erosion and compaction;
 - Fact sheet no. 3: Organic matter decline;
 - Fact sheet no. 4: Salinisation and sodification;
- Soil-friendly farming systems and practices:
 - Fact sheet no. 5: Conservation agriculture;
 - Fact sheet no. 6: Soil-friendly tillage practices;
 - Fact sheet no. 7: Soil-friendly farm infrastructure elements;
- Soil-relevant policies:
 - Fact sheet no. 8: Requirement to keep land in good agricultural and environmental condition (GAEC);
 - Fact sheet no. 9: Agri-environment measures;
 - Fact sheet no. 10: Advisory services.

All SoCo fact sheets and project reports can be downloaded at: <http://soco.jrc.ec.europa.eu>.

