



Review of economic, social and environmental impacts of and implementation barriers for soil protection and sustainable management measures for arable land across the EU

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Executive summary

Despite many efforts to promote more sustainable agricultural land use, e.g. through Rural Development Programmes including Agri-Environment-Climate Measures (AECM), Greening or GAEC standards, soil degradation of agricultural land in the EU is ongoing (Baude et al., 2019; Stolte et al., 2016). Agricultural management practices often are still unsustainable and are having a negative impact on soil functions and soil-based ecosystem services.

This report raises the following questions: What are the reasons that measures to protect land and especially soils are not fully taken up by decision makers or by land managers? What are the barriers hindering the implementation of sustainable soil management measures and the reasons behind them?

As a first step, the measures that are covered by the term “sustainable soil management” (SSM) as listed in the FAO “Voluntary Guidelines for Sustainable Soil Management” are defined. These include measures for preventing:

- soil erosion
- loss of soil organic matter (SOM) in mineral soils
- loss of SOM in organic soils
- soil compaction
- soil contamination
- decline in soil biodiversity
- soil acidification.

The empirical basis of the report is a literature analysis and a questionnaire sent to international projects focusing on soil and land management. We asked for specific examples of implementation implications and barriers.

Many SSM measures have already been addressed in different policies, even though to a very different extent. The report shows that the application of SSM measures differs between different farming systems, such as conventional and organic farming. Even though SSM is not effectively



implemented everywhere, the report outlines some examples of potential positive impacts. The list of economic, social and environmental impacts is long and has many facets, as is shown in Table 1.

Table 1: Environmental, economic and social impact of SSM

Environmental	Economic (to be considered at short, medium and long term)	Social
Soil conservation (reduction of soil erosion, contamination, sealing, etc.)	Farm income and revenue (<i>changes in yield, land value, subsidies, etc.</i>)	Well-being of farmers (<i>rising awareness, increasing leisure and family dedication, etc.</i>)
Water conservation (increasing soil water content, reducing water pollution, etc.)	Changes in production costs (<i>on-site costs</i>) (<i>farm inputs, machinery, etc.</i>)	Employment (<i>changes in workforce, etc.</i>)
Biodiversity enhancement (promoting soil fauna, increasing, auxiliary fauna and beneficial insects, etc.)	Changes in off-site costs (<i>reducing infrastructure investments, changes in food prices, new markets, etc.</i>)	Human health (<i>increasing food safety, etc.</i>)
Climate change mitigation (increasing soil carbon sequestration, reducing GHG emissions, etc.)		Changes in farm structure (<i>risk of land abandonment, etc.</i>)
		Educational value (<i>demonstration sites, school farms, applied learning, etc.</i>)

The economic impacts are often linked to costs, whereas the social impacts are more diverse and range from employment via health and food safety to agricultural structures. The list of environmental impacts is strongly linked to soil and water quality. Even though SSM measures have many positive impacts on farmers and society, the list of financial, social, technical, and cultural barriers for their uptake is very long. In order to identify measures to overcome these barriers, they need to be understood.

Within the literature many examples of barriers are presented (see Table 2) and the report is illustrated with specific examples from across Europe.

Table 2: Financial, technical and administrative and cultural / social barriers to SSMs implementation

Financial	Technical	Administrative	Cultural / social
Periods without revenues (e.g. when changing farming systems)	Lack of knowledge (e.g. how to use the equipment and implement measures)	Lack of support (e.g. in form of advice from administration)	Mental models of society and other farmers (→ prohibiting changes in farming practices)
Lack of equipment and investment capital	Small field size (→ does not allow the implementation of certain measures)	High transaction costs (e.g. for the implementation of measures in terms of field monitoring)	Demographic factors (e.g. different interests between old and new generations)
Additional costs (e.g. for labour or new machinery)		Measure design conflicting SSM	
		Other policies conflicting SSM (→ influencing land tenure and risk tolerance)	



Farmers – like other decision makers – are often attracted by short-term solutions and immediate benefits, while the benefits of conservation agriculture appear in the medium- or long-run (Stagnari et al., 2010). Therefore, financial barriers are often quoted as critical factors for the implementation of sustainable practices (see, for example, Warren et al., 2016). They include a lack of investment capital, or periods without revenues and, at the same time increasing costs, for example, for labour.

Farmers' decisions about the choice of agricultural practices depend not only on profit but are also influenced by cultural beliefs, social norms, family, personal values towards nature or community in their decisions (Warren et al., 2016). In addition, technical and administrative barriers, such as poor access to knowledge and support, can have a similar impact and hinder farmers integrating SSMs in their farming practise.

The report concludes with recommendations on how to overcome the barriers to implement SSM. These solutions are not a one-size-fits-all approach and need to be selected on a case-specific basis. Recommendations include actions at different levels, for example:

- Policy reforms towards supporting the implementation of SSMs → including regulatory but also economic instruments in a policy mix.
- Reduction of perverse incentives through counteracting policies, such as energy and environmental policies.
- Stronger stakeholder participation in policy-making processes, including not only well-known lobby groups but a balanced representation of all relevant groups.
- Financial incentives at regional and national levels, such as tax reduction tailored to the SSMs, mobilisation of additional funds (e. g. private) and collaboration activities between farmers.
- Provisioning of governance structures that increase farmers' access to information and advice.
- Awareness-raising campaigns and outreach activities to increase acceptance of sustainable farming actions.

References:

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