A Review of Policies and the Regulatory Environment Concerning Soil Conservation in the EU

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Introduction

The degradation of soils is a widespread problem all over Europe (EC, 2006). Under agriculture, soils can be considered to be a conditionally renewable resource, given that they do not change irreversibly during biomass production (Várallyay, 2009). But the conservation of soil fertility requires ongoing sustainable land use practices or even amelioration. As cropland covers more than one third of Europe's land area, its protection as a soil resource is an important issue of EU environmental policies.

Up to now, conservation policies in Europe have treated soil and water separately. Water quality is addressed in the Water Framework Directive, whereas no targeted policy framework for soils exists in Europe. However, a range of existing EU, national and regional policies addresses soil conservation implicitly or indirectly, in particular those that are related to the EU's Common Agricultural Policy (CAP).

The objective of this study was to provide a comprehensive overview on the implementation of national and CAP policy

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measures that are relevant to soil quality in the 27 Member States.

Materials and Methods

A semi-structured online questionnaire was developed to collect data on existing policies in the EU-27. Data were mainly gathered from agricultural ministries and administrations. Interviewees were identified through an internet search and with the help of cooperating soil scientists. They were contacted via phone calls following explanatory emails in which the study objective was explained. The survey was available online from April to May 2008.

Following common classifications of environmental policies regarding their influence on farmers' behaviour (Baumol and Oates, 1979; Weersink, 2002), three policy categories were defined that aim to motivate land users to take, or refrain from certain agricultural action. Across the EU-27, policy packages which cluster individual policy measures (
Table 1) reflect these general policy categories.

Table 1: **Classification of policy measures and policy packages within the CAP**

Category	Policy package	Policy measure cluster
Mandatory measures (MM)	Mandatory measures implemented as part of cross compliance	Statutory management requirements (SMRs)
		The requirement to keep land in good agricultural and environmental condition (GAEC)
	Mandatory measures not part of cross compliance	
Voluntary incentive-based measures (VIBM)	Rural development measures (RDM) - Axis 2	Natural handicap payments to farmers in mountain and non-mountain areas (less favoured area (LFA) payments)
		Natura 2000 payments and payments linked to the Water Framework Directive (N2000 and WFD payments)
		Agri-environment payments (AE payments)
		Afforestation, and establishment of agroforestry systems
Awareness-increasing measures and private initiatives (AIM+PI)		

Mandatory measures (MM) involve the government regulator who mandates socially desirable behaviour into law and then uses reinforcement mechanisms such as courts, police or fines to ensure people obey the law. *Voluntary incentive-based measures* (VIBM) influence farmers' actions by providing financial incentives for pollution reduction or environment-friendly practices, or raise the price of polluting inputs. They are commonly called 'economic instruments' and deliver environmental quality beyond a reference level established by MM. *Awareness-increasing measures and private initiatives* (AIM+PI) aim at promoting environmental quality objectives and a sustainable agricultural system. Their compliance is voluntary and the programmes attempt to raise the awareness of land users on how their current practices contribute to environmental problems or how best management practices reduce these problems.

To compare and analyse policy data, a set of standardised policy attributes was defined and adjusted to the policy categories. Some attributes suited all three policy categories, such as e.g. name, description, regional validity, year of implementation, institutions and initiatives involved in the development of the policy or measure, reason for implementation, main target of the policy, soil protection problems addressed, agricultural practices affected, the main implementation problems and a reference to the policy or measure. Some attributes did only fit one or two of the proposed categories. For VIBM, these were e.g. the total budgetary amount of the measure and the amount of compensation payments per hectare, while for MM, monitoring and sanctioning mechanisms were discussed.

Results and Discussion
More than 50 institutions from 24 member states provided a total of 410 data entries, each describing one or more policy measures relevant to soil quality. With the exception of the Czech Republic, Lithuania and Spain, all member states contributed to the survey. In member states with federal structures, such as Austria, Belgium, Germany, Italy and the United Kingdom, data were obtained at a regional level. The number of policies varied considerably between regions. Close to 55% of the measures were entered in the category of mandatory measures (MM) followed by almost 40% voluntary incentive-based measures (VIBM), and close to 10% awareness-increasing measures and private initiatives (AIM+PI).

In this survey, most MM or VIBM were related to European policies while AIM+PI were not. MM, such as cross compliance requirements, and AIM+PI often primarily targeted soil conservation. Under VIBM, soil quality was more often addressed as a secondary objective. Throughout the three policy categories most measures focused on erosion by water, followed by decline in organic matter. Compaction and biodiversity decline were also frequently addressed, while more regional problems, such as floods and landslides, salinisation/sodification or acidification, appeared to receive less importance in the member states' policies or policy implementation.

Within the category VIBM, close to 60% of the rural development measures were AE payments. This is in line with the fact that, on average within the EU-27, AE payments are the most important measure under rural development funding for the 2007-13 programming period (EC, 2009). Spending on AE payments (see Table 1) however differs between member states. Baylis et al. (2006) showed that members' investment in AE payments goes hand in hand with their 'green credentials'. Thus, members with the worst pollution problems or the most intensive agricultural systems do not spend the most on addressing these problems. Most AE payments were designed by a consortium of institutions (e.g., ministry of agriculture, agricultural paying agency, farmer unions). In this sense, Eggers et al. (2007) concluded that decision-making and implementation procedures affect the objectives of AE payments. They showed that there was a trend towards more income objectives, if

the agricultural administrations and farmer unions exerted a strong influence. A stronger influence of lower administrative levels and environmental associations was perceived to be connected with higher environmental effectiveness.

75% of the MM and 85% of the VIBM were identified as action-oriented. This means that most policy measures described required certain farming practices (e.g., the inclusion of cover crops within the crop rotation to reduce erosion) to achieve formulated soil quality objectives, rather than leaving the choice of appropriate practices to the farmer in meeting soil conservation objectives. However, soil quality objectives are often only vaguely defined. This hinders the assessment of effectiveness of policy measures.

Respondents were also invited to describe the level of compliance with mandatory measures, and the monitoring system and sanctions applied. Roughly more than half of the MM were classified regarding their compliance level. Experts estimated in more than 90% of the cases that compliance was in the bracket of 75% to 100%. Accordingly, they expressed a very high level of acceptance of cross compliance measures. These findings coincide with Alliance Environnement (2007), who documented that (1) most member states organise training courses, workshops, seminars and information meetings to inform farmers about cross compliance and (2) many of the national experts interviewed expressed an increased awareness of cross compliance requirements among farmers. Monitoring of MM is mostly carried out by the agricultural paying agencies and the national and federal ministries of agriculture. Only in a few cases it is under the responsibility of the ministry of environment or other environmental authorities. The most common monitoring mechanisms are random field survey and self reporting by farmers. Complete surveys on the contrary are limited to a few policy measures, such as land consolidation policies. Slightly over 90% of the MM had effective sanctions linked to them. However, based on the

data received, single cross compliance measures could not be evaluated on their economic and ecological effectiveness.

Experts identified some implementation problems on the acceptance of a policy or its monitoring. Restrictions on stubble and residue burning, a GAEC standard, were not respected in several member states. In Italy, it was difficult to convince farmers of the damaging effects of this traditional practice. Bulgaria, only member since 2007, reported that farmers are still very used to this traditional practice and have in addition limited experience with the concept of agri-environmental practices, the policy under which they introduced this requirement. Estonia reported that it encountered difficulties in finding out whether the farmer or third parties started the fire. Alliance Environnement (2007) similarly stated that in some member states, experts indicated a need to improve the current knowledge of farmers about their obligations and that elderly farmer often showed greater difficulties with compliance and reporting. Likewise, Davies and Hodge (2006) reflected that the more farmers were stressed by managerial issues, the more they tended to resist to accepting a cross compliance policy.

Fragmented agricultural structures proved to hinder the adoption of certain measures that were compensated with per hectare payments. Romania for example reported this difficulty when setting up green cover crops on arable land during winter time under agri-environmental payments. Furthermore, small agricultural enterprises were more reluctant to invest in machinery for improved soil management (e.g., conservation tillage). Fragmented agricultural structures also constitute a major challenge for the administration. Figures from Poland, with approximately 1.8 million holdings of which about 1.5 apply for direct payments, suggest that a 1% sampling regime would increase the inspection costs dramatically (Bezlepkina et al., 2008). Luxembourg reported weed and disease control (*Fusarium*) problems and occasionally lower yields when farms changed their tillage system from

conventional to no- or reduced tillage. In some cases, financial incentives were considered too low and/or contract periods (often five years) too short.

Conclusion

European policies targeting agricultural soil conservation are of high environmental relevance for Europe. Thousands of single environmental policies or measures are implemented on a local, regional or national scale in the EU-27. Their efficiency and justification is difficult to measure as most policies or measures refrain or stimulate certain actions, such as putting a ban on stubble burning or supporting the use of undersown crops or reduced tillage. However, they do not lead to the achievement of specific environmental goals that allow the evaluation of the policy with e.g. a cost-benefit analysis. This problem may be integrated in the discussion on cross compliance and measures of the rural development plans. Although our survey did vary in data quality and is by far not complete, it may provide a sound basis for further analysis.

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