Good agricultural and environmental condition of agricultural land:
cross compliance of the new EU policy

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Key words: soil organic matter, soil erosion, crop rotation, farming practices

Abstract: the main goal of the new Common Agricultural Policy (CAP) is enhancing the competitiveness of the Community agriculture and promoting food quality and environment standards. Therefore it is necessary to complete the shift from production support to producer support by introducing a system of decoupled income support for each farm. The farmer, receiving direct payments (“single payment”), has to respect the statutory management requirements, published in 18 Directives and Regulations in the areas: public, animal and plant health, environment and animal welfare (“cross compliance”). In order to avoid the abandonment of agricultural land and ensure that it is maintained in good agricultural and environmental condition, standards for soil erosion, soil organic matter, soil structure and minimum level of maintenance should be established. It is therefore appropriate to establish a Community framework within which the Member States discuss a common policy, adopting standards taking account of the specific characteristics of the areas concerned, including soil and climatic conditions and existing farming systems (land use, crop rotation, farming practices) and farm structures.

INTRODUCTION

As a result of the Mid Term Review, the European Commission adapted its Common Agricultural Policy of Agenda 2000 by the Council Regulation (EC) No 1782/2003 (1).

The most important modification since Agenda 2000 is that the full payment of direct aid to the farmer is linked now to compliance rules relating the agricultural land, agricultural production and activity. Those rules serve to incorporate, in the common market organisations, basic standards for the environment, food safety, animal health and welfare and good agricultural and environmental condition.

The main goal of this new CAP is to enhance the competitiveness of the Community agriculture and promoting food quality and environment standards. Therefore it is necessary to shift from production support to producer support by a system of decoupled income support for each farm. This “\textit{single farm payment}” is made conditional upon “\textit{cross-compliance}” with environmental, food safety, animal health and welfare, as well as the
maintenance of the farm in good agricultural and environmental condition. For the energetic cultures (bio diesel, bio ethanol, etc…) there are subsidies which can justify the use of abandoned land with good economic results; starting with this year this system operates in Romania and in Bulgaria too.

That means that the farmer, receiving direct payments, has to respect the statutory management requirements, published in 18 Directives and Regulations in the following areas:
- public, animal and plant health
- environment
- animal welfare

Besides, in its new policy, the Council highlights two aspects concerning the use of land:
1) In order to avoid the abandonment of agricultural land and ensure that it is maintained in good agricultural and environmental condition, standards for soil erosion, soil organic matter, soil structure and minimum level of maintenance should be established. It is therefore appropriate to establish a Community framework within which the Member States may adopt standards taking account of the specific characteristics of the areas concerned, including soil and climatic conditions and existing farming systems (land use, crop rotation, farming practices) and farm structures.
2) Since permanent pasture has a positive environmental effect, it is appropriate to adopt measures to encourage the maintenance of existing permanent pasture to avoid a massive conversion into arable land.

STATUTORY MANAGEMENT REQUIREMENTS : DIRECTIVES AND REGULATIONS

Some of the 18 Directives and Regulations mentioned the Council Regulation (EC) No 1782/2003, deal with the protection of groundwater and/or soils:
- Council Directive 86/278/EEC on the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture
- Council Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources

All these Directives are applicable from the 1st of January 2005 on, while others, e.g. the Council Directive 91/414/EEC concerning the placing of plant protection products on the market are applicable from the 1st of January 2006 and others like the Council Directive 91/629/EEC laying down minimum standards for the protection of calves is only applicable from the 1st of January 2007.

The national and/or regional governments, responsible for the agricultural policy in the Member States have already implemented these Regulations, in due time, into their specific national legislation. It is clear that the application of the above mentioned Council Directives by the farmers on their own farm situation may have an important impact on the existing farming systems, crop rotations, farming practices and farm structures.
Regarding to our common projects, supported by the Flemish Government, ROE/001/04 and BUL/001/04 “Possibilities and chances for the organic farming in Romania/Bulgaria”, the Council Directive 91/676/EEC concerning “the protection of waters against pollution caused by nitrates from agricultural sources” and Council Directive 80/68/EEC on “the protection of groundwater against pollution caused by certain dangerous substances” are of great importance for the implementation of this new CAP. The “single farm payment” by the EU is made conditional upon the application of both “Nitrate” and the “Dangerous substances”. It seems that only Western countries with an intensive farming management over the last decades, using a lot of external input of pesticides and mineral fertilisers, have problems with these Directives. In the 50’s and 60’s we used e.g. a lot of the insecticide *DDT* to kill Colorado beetles in potatoes and in the 70’s and 80’s *simazin (atrazin)* for the weed control in maize.

Table 1. Total use of agricultural pesticides in tonnes of active ingredients (OECD report 126)

<table>
<thead>
<tr>
<th>country/year</th>
<th>1985</th>
<th>1990</th>
<th>1997</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium</td>
<td>8 748</td>
<td>9 973</td>
<td>8 619</td>
</tr>
<tr>
<td>Italy</td>
<td>166 839</td>
<td>192 509</td>
<td>167 089</td>
</tr>
<tr>
<td>Netherlands</td>
<td>21 002</td>
<td>18 835</td>
<td>10 397</td>
</tr>
<tr>
<td>Poland</td>
<td>12 398</td>
<td>7 458</td>
<td>9 501</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>40 826</td>
<td>35 858</td>
<td>35 432</td>
</tr>
<tr>
<td>United States</td>
<td>390 894</td>
<td>378 636</td>
<td>364 387</td>
</tr>
<tr>
<td>EU-15</td>
<td>353 199</td>
<td>410 460</td>
<td>386 768</td>
</tr>
</tbody>
</table>

And the last 30 years we exaggerated in using mineral nitrogen fertilisers to grow our crops up with to 500 kg N.ha\(^{-1}\).y\(^{-1}\). The result is that in our groundwater still DDT (dichlorodiphenyltrichloroethane), triazine (simazin, atrazine,…) and glyphosate residues are too high concentrations of nitrate are found (fig. 1). Romania and Bulgaria have nowadays no problems with nitrate in ground water. Rarely on etiquettes of water bottles there is any indication for it.
Figure 1. NO$_3^-$ concentrations (mg.L$^{-1}$) in Flemish ground water.

- $<$ 50 mg
- $>$ 50 mg

Regions with high animal concentrations (pigs and cattle) show the highest concentrations.

In order to have an idea how much minerals, especially N, P and K, the farmer uses on the farm, mineral balances are a good instrument. These balances confront the import and export of minerals on the farm and the difference gives an indication about the surplus (per ha, liter of milk, kg of produced meat,...) and about the efficiency of the introduced N, P and K. In this respect the farmer may change his management in order to have a better N, P and K-use efficiency. In some countries (Netherlands) mineral balances are a common practise to inform not only the farmers but also the authorities about the efficiency of farm used minerals and to reward the good farmers.

During 10 years (1986-1996) 50 Flemish dairy farms are investigated in order to examine possibilities to increase the N-use efficiency and to reduce the surplus on the N balance and the N losses on the farm level. On average the N surplus is 305 kg/ha (variation between 520 and 87) and the efficiency 23.8 % (variation between 15.7 and 28.4) (Verbruggen and Carlier, 1996). A better N-use efficiency results from less import of nitrogen fertiliser, good practise and management and use of own farm produced organic manure. A well balanced feed ratio between protein and energy (carbohydrates) in relation to the milk production and a diversified forage crop production (not only based on grass and maize but also on fodder beets and leguminous forage crops) are also important in this respect.

Because the agricultural policy in Belgium is transferred to the regions, the Flemish Government is responsible for the implementation of the above mentioned Directives in the Flemish Region. Therefore it ordered in a Decree its “slurry action plan” in 1991. Farmers know this plan as MAP I, later updated and fine tuned in MAP II. It seems that the limits for fertilisation (organic and inorganic) were not strict enough, because last autumn the parameters, nitrate content in soil and in ground water, exceeded the allowed limit
(maximum 90 kg NO$_3$-nitrogen per ha soil in the zone 0-90 cm depth, determined after harvest: between 15 October and 15 November and 50 mg NO$_3$ per litter water) in many cases. Some countries like The Netherlands, Germany, Denmark, … determined the whole territory as “vulnerable zone for nitrate leaching”. The consequence for this is that according to Directive 676/91 the “code for good agricultural practices” limits the nitrogen from animal origin at 170 kg ha$^{-1}$ y$^{-1}$. For grassland it means about 2 cow equivalents per ha, being the return of nitrogen by their faeces during the grazing season and by their stored slurry during wintertime (Carlier et al., 2006). The latest Flemish action plan for the protection of water against the pollution of nitrates from agricultural sources is published as a decree in the Official Newspaper in December 2006 (Moniteur Belge, 2006). It fixes the maximum quantities of phosphorus and nitrogen (from animal and mineral origin) allowed on grassland, forage and arable crops.

On the 22$^{nd}$ September 2005 the Flemish Government was condemned by the European Court of Justice because too much groundwater samples showed concentrations over 50 mg NO$_3$ per litre. The Flemish Government nowadays tries to convince the European Commission to get derogations for some regions and soil types.

It is our opinion that researchers must have a clear impact and play a role in the defining the above mentioned standards. It seems that administrations sometimes have more interest in the single payment for the farmers (which of course is very important for their income) but sometimes conflict with a real good agricultural and environmental condition. The European Commission gives for “permanent pasture” the following definition: “Land used to grow grasses or other herbaceous forage naturally (self-seeded) or through cultivation (sown) and that is not included in the crop rotation of the holding for five years or longer (Commission Regulation EU No 796/2004).

Only the number of hectares of grassland on the farm must remain the same, but the grassland can be used in a crop rotation system. It means that grassland can be ploughed up and be sown somewhere else on the farm. I wonder if this is a real good practise. What will happen if grassland is ploughed up to 30 cm depth with the nitrate stored in the green mass, in the organic pool and in the roots? How much of this nitrate will be leached and “pollute” the water table? May be this Flemish policy for “permanent pastures” results in an unexpected and unwanted enrichment of soil and water with nitrate and will finally the farmer be unable to prove that he implemented the “nitrate directive” in the good way on his farm. What will finally be the result on the “single payment” system of the EU and on his financial support, having in mind the “cross compliance” condition?

GOOD AGRICULTURAL AND ENVIRONMENTAL CONDITION: GAEC

In its new policy the Council highlights that Member States shall ensure that all agricultural land, especially land which is no longer used for production purposes (e.g. set aside land), is maintained in good agricultural and environmental condition. Member States shall define, at national or regional level, minimum requirements for good agricultural and environmental condition. They have to taken into account the specific characteristics of the area concerned, including soil and climatic condition, existing farming systems, land use, crop rotation,
farming practices, and farm structures. Two aspects concerning the use of land have the main interest of the Council:

1) the avoidance of the abandonment of agricultural land.
2) the maintenance of existing permanent grassland. Since permanent grassland has a positive environmental effect, it is appropriate to adopt measures to encourage the maintenance of existing permanent pasture to avoid a massive conversion into arable land.

Therefore standards for good agricultural and environmental condition are determined in the Council Directive 1782/2003 (table 1).

The Council mentions that it is appropriate to establish a Community framework within which the Member States discuss a common policy and strategy, adopting standards taking account of the specific characteristics of the areas concerned, including soil and climatic conditions and existing farming systems (land use, crop rotation, farming practices) and farm structures.

Although, by analysing the table, it is clear that the mentioned standards may be defined and interpreted differently in the Member States. This may result in different standards for the same issue, even different standards for different regions in one country. It is therefore possible that the implementation of this typical part of the Regulation 1782/2003 may lead to an unbalanced concurrence between the farmers in the different Member States.

<table>
<thead>
<tr>
<th>issue</th>
<th>standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil erosion:</td>
<td>- minimum soil cover&lt;br&gt;- minimum land management reflecting site-specific conditions&lt;br&gt;- retain terraces</td>
</tr>
<tr>
<td>Protect soil through appropriate measures</td>
<td></td>
</tr>
<tr>
<td>Soil organic matter:</td>
<td>- standards for crop rotations where applicable&lt;br&gt;- arable stubble management</td>
</tr>
<tr>
<td>Maintain soil organic matter levels through appropriate practices</td>
<td></td>
</tr>
<tr>
<td>Soil structure:</td>
<td>- appropriate machinery use</td>
</tr>
<tr>
<td>Maintain soil structure through appropriate measures</td>
<td></td>
</tr>
<tr>
<td>Maintain level of maintenance:</td>
<td>- minimum livestock stocking rates or/and appropriate regimes&lt;br&gt;- protection of permanent pasture&lt;br&gt;- retention of landscape features&lt;br&gt;- avoiding the encroachment of unwanted vegetation on agricultural land</td>
</tr>
</tbody>
</table>

All issues mentioned in table 2 are of great importance for the whole EU and especially for Romania and Bulgaria, because of a great part of the territory of abandoned land and the high rainfall in short periods of time. The term “appropriate” gives each EU Member State the possibility to “protect” in its own countryside.

**Soil erosion** can be considered, with different level of severity, an EU-wide problem (Van Lyden, 1995).

Erosion is a natural geological phenomenon resulting from the removal of soil particles by water or wind, transporting them elsewhere. However some human activities can dramatically increase erosion rates. Erosion is triggered by a combination of factors such as steep slopes, climate (e.g. long dry periods followed by heavy rainfall), inappropriate land use, land cover patterns (e.g. sparse vegetation) and ecological disasters (e.g. forest fires). Moreover some intrinsic features of soil can make it more prone to erosion (e.g. thin layer of topsoil, silty texture or low organic matter content).

In more than one third of the total Mediterranean basin, average yearly soil losses exceed 15 tons.ha^{-1}.y^{-1}. And although the Mediterranean region is historically the most severely affected by erosion, there is growing evidence of significant erosion occurring in other parts
of Europe, like in Austria, Czech Republic, the loess belt of France and Belgium. Last years also Romania and Bulgaria came in the picture because of the heavy rains and floods. According to expert estimates, 26 million hectares in the EU suffer from water erosion and 1 million hectares from wind erosion. The costs of attempts to fight erosion and to restore the soil are estimated at about 3.000 million euro over a period of 15 to 20 years (Pimentel et al. 1995).

In our common project “Reduction of soil erosion and soil carbon and nutrient losses by “reduced” tillage cultivation in Bulgarian arable land” (BUL/001/03), supported by the Flemish Government, we investigated the potential and actual risk for soil erosion in Bulgaria. The potential risk of soil erosion exceeds 100 tons.ha\(^{-1}\).y\(^{-1}\) for 10.4% of the country’s territory; 19.5% are with a risk from 40 to 100 tons.ha\(^{-1}\).y\(^{-1}\), 31.7% – from 10 to 40 tons.ha\(^{-1}\).y\(^{-1}\) and only 25.9% have a risk lower than 20 tons.ha\(^{-1}\).y\(^{-1}\).

In Romania 6,3 Mio ha (about 50 of the UAA) are affected by water erosion, whereof 2,3 Mio ha moderate to strong with losses of 50 to 100 tons of soil/ha/y. About 500.000 ha of land are abandoned, creating serious problems. Investigations show that about 150 million tonnes of topsoil, which includes 1.5 million tons of humus, 0.4 to 0.5 million tons of nitrogen, phosphorus and potassium and large amounts of nutrient elements (calcium, manganese, zinc, molybdenum), are lost through erosion.

It has to be mentioned that at least 2 traditional practices in Romanian and Bulgarian agriculture do contribute to the erosion phenomenon in the country:
- overgrazing
- burning crop residues

**Soil organic matter** plays an important role in maintaining key soil functions. It assures the binding and buffering capacity of the soil, thus contributing to limit diffusion of pollution from soil to water and is therefore an essential determinant of erosion resistance and soil fertility.

Soil organic matter decline is a serious problem in Europe. Nearly 75% of the total area analysed in Southern Europe has a low (3.4%) or very low (1.7%) soil organic matter content. Agronomists consider soils with less than 1.7% organic matter to be in pre-desertification stage. But the problem of low or very low organic matter content is not restricted to Southern Europe. Also in more northern regions, the soil organic matter content is decreasing (e.g. Flanders, England and Wales) and is in many cases less than 2%.

Farming and forestry practices have an important impact on soil organic matter. Despite the importance of maintaining the organic matter content of the soil, there is evidence that decomposing organic matter in the soil is frequently not sufficiently replaced under arable cropping systems which are tending towards greater specialization and monoculture (e.g. maize). Specialization in farming has led to the separation of livestock from arable production so that rotational practices restoring soil organic matter content are often no longer a feature of farming.
Soil compaction, widespread in Bulgaria and in Romania (CEC, 2002), occurs when soil is subject to mechanical pressure through the use of heavy machinery or overgrazing, especially in wet soil conditions. In Romania, soil compacting is recorded on 6.5 million hectares. It has been estimated that nearly 4% of soil throughout Europe suffers from compaction (CEC 2002). Compaction reduces the pore space between soil particles and the soil partially or fully loses its absorptive capacity. The overall deterioration in soil structure caused by compaction restricts root growth and water storage capacity, fertility, biological activity and stability. Moreover, when heavy rainfall occurs, the water can no longer easily infiltrate the soil. Resultant large volumes of run-off water increase erosion risks and are considered, by some experts, to have contributed to some recent flooding events in Europe. It has been estimated that nearly 4% of soil throughout Europe suffers from compaction.

The build-up of organic matter in soils is a slow process and takes about 40-50 years to come to a stabilized situation. This process is enhanced by positive farm management techniques such as conservation tillage, including no-tillage cropping techniques, organic farming, permanent grassland, cover crops, mulching, manuring with green legumes, farmyard manure and compost, strip cropping and contour farming. Most of these techniques have also proven effective in preventing erosion. The notion of “Good Farming Practice” GFP is introduced and defined as “the standard of farming which a reasonable farmer would follow in the region concerned” (Carlier and Vlahova, 2005). It entails in any case compliance with general mandatory requirements including environmental legislation but Member States may establish additional requirements associated with good practice.

The agricultural land in Bulgaria is close to half of the territory of the country. About 60% of agricultural land is arable land. The traditional Bulgarian agriculture is based on rotation of winter cereals with spring row crops. This alternation is well-founded from the advantages of this type of crop rotation under Bulgarian conditions as well as from an economical point of view, because the winter cereal crops together with sunflower and maize are the main field crops.

The winter cereal crops (analysis based on the date of annual report of Ministry of Agriculture and Forestry for 2004) - wheat and barley occupy 36.6% of cultivated land in Bulgaria, and here could be added the other cereal crops like rye, triticale and oats, occupying 2.1% of the area. The main spring row crops – sunflower and maize occupy an area of 35.2%. Here should be added other row crops, like tobacco (1.5%), potato (1.5%) and some other industrial crops having insignificant area. It means that, the traditional crop rotation scheme, ensuring the necessary economic profit of Bulgarian regions, frequently is as follows: wheat-maize or wheat-sunflower. Often, in some regions, winter cereals are cultivated for two consecutive years. The main observed principle is to define the best predecessor to the wheat (the main crop for the country). As leguminous crops predecessors, like beans, peas, broad beans, lentils, chick-peas and other leguminous occupy an insignificant area (1.5%), it’s clear the possible predecessors are quite limited.

For wheat the crop rotation system is acceptable. Wheat was grown in 2001 on 28% of the agricultural area as a single crop.
For sunflower a 5-year crop rotation is optimal. If not adhered to, yields are reduced and the phytosanitary status of the soils is reduced. In 2000 and 2001, about 10% of the sunflower was grown on the same areas without rotation.

In some areas, like in and around Samokov, potatoes are grown year after year, giving reduced yields and problems with the phytosanitary status of the soil (problems with Phytophtora infestans).

In Romania 25% of the arable land is covered during the winter, due to the common use of winter crops (barley, rye, and wheat). In large scale farms crop rotation is a common practise. Especially small farms have a very low level of crop rotation and mono-culture is common practise for potatoes, sugar beet and corn.

Agri-environmental measures aimed at soil protection range from overall farm management systems such as organic farming (including maximum stocking rates to overcome e.g. overgrazing) and integrated crop management to specific measures such as no-tillage or conservation practices, grassland strips, winter covers, use of compost and the maintenance of terraces. Measures aimed at promoting balanced rotations can also contribute to the condition of agricultural soils.

CONCLUSION

The new reform of the agricultural policy of the European Council will have a drastic influence on the income structure of the farmer. Instead of being paid per kg produced product like before, the farmer will receive one single payment made conditional upon “cross-compliance” with public, animal and plant health, environment, food safety, animal health and welfare, as well as with the maintenance of the farm in good agricultural and environmental condition. It is not clear how the standards for the good agricultural and environmental condition will be defined in the different Member States. The establishment of a Community framework for the adoption of these standards is necessary. Especially the issues erosion and soil organic matter are of great importance for the Romanian and Bulgarian territory as a whole and for their agriculture in particular.

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