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**IMPACT ASSESSMENT**

**Common Agricultural Policy towards 2020**

**ANNEX 2A**

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## **ANNEX 2A: FACT SHEET BIODIVERSITY AND AGRICULTURE**

### **1. INTRODUCTION**

The Communication of the European Commission "Options for an EU vision and target for biodiversity beyond 2010" of January 2010 (COM(2010)4) recognises the positive role of agriculture for preserving and enhancing biodiversity. The recent Communication on "Our life insurance, our natural capital: an EU biodiversity strategy to 2020" (COM(2011)244) sets out a target and actions for the Commission and Member States that are needed in agricultural and forest areas in order to achieve the EU 2020 and the global 2020 biodiversity targets, and by which a significant contribution is made towards the objectives of the Europe 2020 Strategy.

By managing a large part of the European Union's territory, agriculture and forestry have a significant impact on, and a huge role in preserving farm and forest-genetic resources, biodiversity, and a wide range of valuable habitats. Many valuable habitats and the presence of species have a direct interdependence with agriculture (e.g. many bird species nest and feed on farmland). The maintenance of a number of species and ecosystems that have emerged over centuries of agricultural cultivation depends on the continuation of appropriate land management practices. Agriculture is also the first to benefit from biological diversity and related ecosystem services (like pollination).

Specialisation and intensification of certain production methods (such as the use of more chemicals and heavy machinery) as well as marginalisation or abandonment of traditional land management may become a threat to biodiversity on farmland.

The first ever systematic assessment of the conservation status of Europe's most vulnerable habitat types and species protected under the Habitats Directive was released in 2009<sup>1</sup> as part of the regular 6-yearly progress reporting across all Member States and all the 11 bio-geographical regions. The results demonstrate that, in general, all habitat types associated with agriculture are doing significantly worse in terms of conservation status than other types of habitats. This might be due to shifts towards inappropriate agricultural practices in some part of the EU, while in other areas the abandonment of the agricultural land and the absence of management is the underlying reason for decline.

Therefore, preventing these processes and preserving certain habitats and biodiversity are key to halting the loss of biodiversity and maintaining key ecosystem services that are underpinning our economy and society's well-being.

The ambitious EU 2020 headline target and long-term vision for 2050 endorsed by EU leaders in March 2010 send a clear signal that all policies including agriculture and

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<sup>1</sup> Report from the Commission to the Council and the European parliament - Composite Report on the Conservation Status of Habitat Types and Species as required under Article 17 of the Habitats Directive (COM(2009) 358 final)

forestry, have to step up efforts to deliver on biodiversity objectives, and that this needs to be reflected in the coming financial framework (2014-2020).

## 2. CURRENT STATUS AND TRENDS REGARDING BIODIVERSITY IN THE EU

Biodiversity loss in the EU is the result of a combination of direct pressures and underlying socio-economic drivers. Most of the pressures on biodiversity stem from human-induced disturbance to ecosystems with underlying causes of economic and market failures. The 2010 EU biodiversity baseline documents the impact of these key pressures on biodiversity in the EU<sup>2</sup>. In particular, Europe's biodiversity remains under severe threat from:

- Habitat loss due to land use change and fragmentation, including through conversion of grassland into arable land, land abandonment, urban sprawl, and rapidly expanding transport infrastructure and energy networks;
- Pollution. 26% of species are threatened by pesticides and fertilisers such as nitrates and phosphates (IUCN);
- Overexploitation of forests<sup>3</sup>, oceans, rivers and soils;
- Invasive alien species;
- Climate change. Shifts in habitats and species distribution due to climate change are being observed. Climate change interacts and often exacerbates other threats.

A recent assessment (2009) published by the European Environmental Agency<sup>4</sup> states that European biodiversity continues to be under serious pressure and that the policy response, although successful in some areas, is not yet adequate to halt the general decline. Many ecosystems have been degraded thereby reducing their capacity to respond to future shocks such as the effects of climate change.

Progress towards the European target of halting biodiversity loss by 2010 has been assessed<sup>5</sup>. Analysis of the indicators suggests that with respect to the *status and trends in biodiversity* some progress has been made towards halting biodiversity loss in Europe. Overall, however, the status of most species and habitats still gives rise to concern. The overall risk of extinction of wildlife has probably increased and livestock genetic diversity also remains at risk.

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<sup>2</sup> European Environment Agency, 2010. EU 2010 Biodiversity baseline. EEA Technical report No 12/2010. <http://www.eea.europa.eu/publications/eu-2010-biodiversity-baseline/>

<sup>3</sup> Whilst wood harvesting in the EU is largely sustainable, dead wood (which is a key indicator for forest biodiversity and the conservation value of a forest) remains well below optimal levels from a biodiversity perspective in most European countries (EEA, 2009).

<sup>4</sup> Progress towards the European 2010 biodiversity target. EEA Reoprt No. 4/2009

<sup>5</sup> Report from the Commission to the Council and the European Parliament. The 2010 Assessment of Implementing the EU Biodiversity Action Plan, COM(2010)548 final.

Nevertheless, progress has been made in protecting habitats with up to 18 % of EU land area now included in the Natura 2000 network. At the same time, 40–85 % of habitats and 40–70 % of species of European interest have an unfavourable conservation status. Linked to this is the progressive decline in grasslands and wetlands across Europe and rises in urban, woodland and open water habitats.

In assessing the *threats to biodiversity* it can be stated that some have decreased. Acidification and eutrophication from excessive nitrogen accumulation are declining and nitrogen surpluses on farmlands are decreasing. While invasive alien species are recognised as a major driver of biodiversity loss, in the future the issue needs to be considered more broadly in the context of climate change, particularly adaptation.

### **3. THE EU BIODIVERSITY AGENDA**

The EU Biodiversity Agenda is based on the United Nations Convention on Biological Diversity signed by the European Community in December 1993. Subsequently, in 1998, the Community adopted a European Community Biodiversity Strategy. The Strategy mentions as one of the key objectives the need to “reverse present trends in biodiversity reduction or losses and to place species and ecosystems, including agro-ecosystems, at a satisfactory conservation status”.

In 2001, the European Council of Göteborg "agreed on a strategy for sustainable development". To contribute to this strategy, the European Council "agreed that biodiversity decline should be halted with the aim of reaching this objective by 2010".

To follow this up, a Biodiversity Action Plan (BAP) was adopted in 2006<sup>6</sup> with a detailed set of actions to accelerate progress towards this target, including some on agriculture and rural development. The 2008 implementation report<sup>7</sup> confirmed that there was an urgent need for further integration of biodiversity considerations into sectoral policies, which remained a key challenge. In spite of significant action carried out within the framework of the BAP, the 2010 BAP report<sup>8</sup> concluded that the EU had missed its 2010 target of halting biodiversity decline.

At the heart of the EU's regulatory response to halting biodiversity loss by 2010 are the Birds Directive (1979) and the Habitats Directive (1992). Central to these Directives is the creation of a Europe-wide ecological network of protected sites – the Natura 2000 network.

In January 2010, the European Commission published the Communication "Options for an EU vision and target for biodiversity beyond 2010". It sets out first steps towards establishing specific targets for 2020 and a long-term vision to be achieved by 2050. It acknowledges that the target of halting the loss of biodiversity in the EU by 2010 will not

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<sup>6</sup> COM(2006) 216 final "Halting Biodiversity loss by 2010 – and beyond: sustaining ecosystems services for human well being"

<sup>7</sup> COM(2008) 864 final on a "Mid-term assessment of implementing the EC Biodiversity Action Plan"

<sup>8</sup> COM(2010)548 final [http://ec.europa.eu/environment/nature/biodiversity/comm2006/bap\\_2010.htm](http://ec.europa.eu/environment/nature/biodiversity/comm2006/bap_2010.htm)

be achieved. Particular risks are stated for grasslands, wetlands, estuary and coastal habitats.

In March 2010, the Environment Council adopted a new headline target for biodiversity: "To halt the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, restore them in so far as feasible, while stepping up the EU contribution to averting global biodiversity loss", which was endorsed by European Heads of States and Governments.

Subsequently, the Commission adopted an EU biodiversity strategy to 2020<sup>9</sup>. Within the six targets that need to be achieved in order to deliver on the 2020 headline target, agriculture and forestry is specifically addressed. The Strategy sets out a limited number of focused actions both for the Commission and Member States that are essential to the success, among which those related to the below target on agriculture (actions 8-10), outline some directions to be considered within the CAP reform and design of the future programming (2014-2020).

Target 3A) Agriculture: By 2020, maximise areas under agriculture across grasslands, arable land and permanent crops that are covered by biodiversity-related measures under the CAP so as to ensure the conservation of biodiversity and to bring about a measurable improvement(\*) in the conservation status of species and habitats that depend on or are affected by agriculture and in the provision of ecosystem services as compared to the EU2010 Baseline, thus contributing to enhance sustainable management.

Target 3B) Forests: By 2020, Forest Management Plans or equivalent instruments, in line with Sustainable Forest Management (SFM)<sup>10</sup>, are in place for all forests that are publicly owned and for forest holdings above a certain size\*\* (to be defined by the Member States or regions and communicated in their Rural Development Programmes) that receive funding under the EU Rural Development Policy so as to bring about a measurable improvement (\*) in the conservation status of species and habitats that depend on or are affected by forestry and in the provision of related ecosystem services as compared to the EU 2010 Baseline.

(\*) Improvement is to be measured against the quantified enhancement targets for the conservation status of species and habitats of EU interest in Target 1 and the restoration of degraded ecosystems under Target 2 of the strategy.

(\*\*) For smaller forest holdings, Member States may provide additional incentives to encourage the adoption of Management Plans or equivalent instruments that are in line with SFM.

#### **4. OVERVIEW OF CAP INSTRUMENTS ADDRESSING BIODIVERSITY ISSUES**

The requirement of integrating environmental concerns into sectoral policies, as spelled out in the Treaty, has been an important element in the reforms of the Common Agricultural Policy. The CAP has a wide range of instruments essentially based on two complementary approaches. They provide incentives for farmers to deliver

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<sup>9</sup> COM(2011)244 final

<sup>10</sup> As defined in SEC(2006) 748.

environmental public goods, including the preservation of habitats, biodiversity and environmentally valuable landscapes. This concerns both the first pillar (combination of direct payments and cross-compliance) and the second pillar (agri-environment measures, non-remunerative investments, support for Natura 2000).

#### **4.1. First pillar (market and income policy)**

Measures under Pillar I are focused on a single income payment per farm, which is decoupled from production. Decoupling is expected to reduce the incentives for intensive production and for using inputs beyond the carrying capacity of the environment.

With the introduction of mandatory cross-compliance, the full granting of direct payments is linked to the respect of a number of "Statutory Management Requirements" (SMRs) on the whole farm, including those stemming from the implementation of the Birds and Habitats Directives. The beneficiaries of direct payments must also maintain all farmland in "Good Agricultural and Environmental Condition" (GAEC). The scope of GAEC includes requirements beneficial for biodiversity such as the retention of landscape features, the establishment buffer strips along water courses and the creation and/or retention of habitats (optional standard). Finally, beneficiaries of direct payments are obliged to maintain land under permanent pasture.

Measures targeted towards the preservation of habitats and biodiversity are supported via article 68 of Regulation 73/2009. It concerns specific types of farming which are important for the protection or enhancement of the environment and for specific agricultural activities entailing additional agri-environment benefits (e.g, support in Portugal for maintaining natural pastures of high natural value or the protection of the national olive-growing heritage; support for the conversion to organic farming in France).

In addition, the reforms of certain Common Market Organisations have introduced or strengthened measures aiming at the protection of the environment. In particular, the fruit and vegetables and wine CMOs have been included in the single payment scheme which means that cross-compliance will be mandatory for those producers receiving direct payments. For the fruit and vegetables CMO, producer organisations must devote at least 10 percent of expenditure in each Operational Programme to environmental measures. There will be a 60 percent Community co-financing rate for organic production in each Operational Programme.

#### **4.2. Second pillar (rural development policy)**

As regards the second pillar of the CAP, the Community strategic guidelines identify three priority areas for measures aimed at improving the environment and the countryside, including biodiversity, the preservation and development of high nature value farming and forestry systems and traditional agricultural landscapes. These are translated into national strategy plans, which in turn form the basis for the national and regional rural development programmes. The measures under axis 2 ("Improving the environment and the countryside") are expected to significantly contribute to the EU commitment to halt the loss of biodiversity by 2020.

The rural development policy provides Member States with several possibilities including:

- Agri-environment payments for commitments going beyond mandatory standards: Most important in this respect are the agri-environment measures that are targeted towards achieving environmental objectives while reflecting region-specific needs and specificities. Agri-environment payments encourage farmers to adopt agricultural activities (e.g. organic farming as an environmentally friendly farming system) or levels of production intensity that deliver positive environmental outcomes, while not being necessarily the first choice from the point of view of profitability. Agri-environment payments cover income forgone and costs incurred due to following environmental commitments.
- Natura 2000 payments in agricultural and forest areas: These measures include allowances compensating for region-specific disadvantages that result from the application of mandatory requirements as prescribed by the site's management plan of the area concerned. Those payments will ease the application of the respective legal environmental policy framework.
- Compensation allowances in Less Favoured Areas: LFA payments contribute as additional income support to ensure continued land use in area suffering from naturally adverse conditions. By fine-tuning eligibility criteria, LFA payments can be steered towards sustainable types of farming systems.
- Conservation of genetic resources in agriculture and the preservation of local animal breeds and plant varieties: Rural Development measures as well as the implementation of actions established on the basis of Council Regulation (EC) 870/2004 contribute to the conservation, characterisation, collection, and utilisation of genetic resources in agriculture (plant, tree, and animal species).
- Investment into human and physical capital: Training measures, farm advisory services, non-productive investments, as well as the conservation and upgrading of the rural heritage contribute in manifold manners to enhancing biodiversity and habitats.
- Forest-environment payments for commitments going beyond mandatory standards:
- Restoring forestry potential and introducing preventing actions

Looking at the Rural Development budget, 44% of the EAFRD funding for the 2007-2013 period (some 43 billion €) has been allocated by Member States to Axis 2 measures (“improving the environment and the countryside”). The CAP Health Check assigned some additional funding to 5 "new challenges", including biodiversity. For the current programming period, 22 billion € representing half of the budget devoted to the environmental axis of Rural Development policy, will be spent on agri-environment; 472 million € will be spent on Natura 2000 measures on farm land; and 111 million € on Natura 2000 measures on forestry land.

Some examples of Rural Development measures enhancing biodiversity and habitat values, as implemented in Member States' programmes:

#### Agri-environment:

- Support for organic farming (all Member States)

- Protection of the habitats of the bear and the jackal (Greece)
- Conservation of genetic resources (Saxony-Anhalt)
- Conservation of endangered animal breeds (Italy-Liguria)
- Extensive management of grassland and maintenance of heaths (Hamburg)
- Perennial fields and riparian boundary strips and biobeds (Romania)
- Protection of birds (crex crex) and other wildlife and improvement of biotope network, reducing entry of harmful substances in bordering habitats (3 metres strips), conservation of protected fauna and flora (Romania)
- Eléments du réseau écologique et du paysage, conservation des éléments clé du maillage écologique qui constituent des réservoirs de biodiversité en même temps que des couloirs de dispersion (Belgique)
- Support for limestone and woodland pastures as well as semi-natural grazing lands and mown meadows with special natural and cultural values. (Sweden)
- Pasture land for wintering geese. Extra grass and rest for migratory geese populations (The Netherlands).

#### Vocational training:

- skills updating and enhancement, in particular covering environmentally compatible production methods (Hamburg)

#### Use of advisory services:

- Scope of the measure extended to provide information on the use of quality and environmental management systems in agricultural and forestry businesses (Saxony-Anhalt)

#### Non-productive investments:

- Non-remunerative investments for creation of buffer areas/hedgerows and creation/maintenance of small lakes or ponds (Italy-Liguria)

#### Forest-environment payments:

- Support for project-related individual measures on forestry land in Natura 2000 areas (Saxony-Anhalt)

#### Conservation and upgrading of the rural heritage:

- Restoration of grasslands and moorlands (Belgium-Wallonia)
- Implementing Natura 2000 in coherence with other European conservation systems, to contribute to environmental education and public awareness (Saxony-Anhalt),

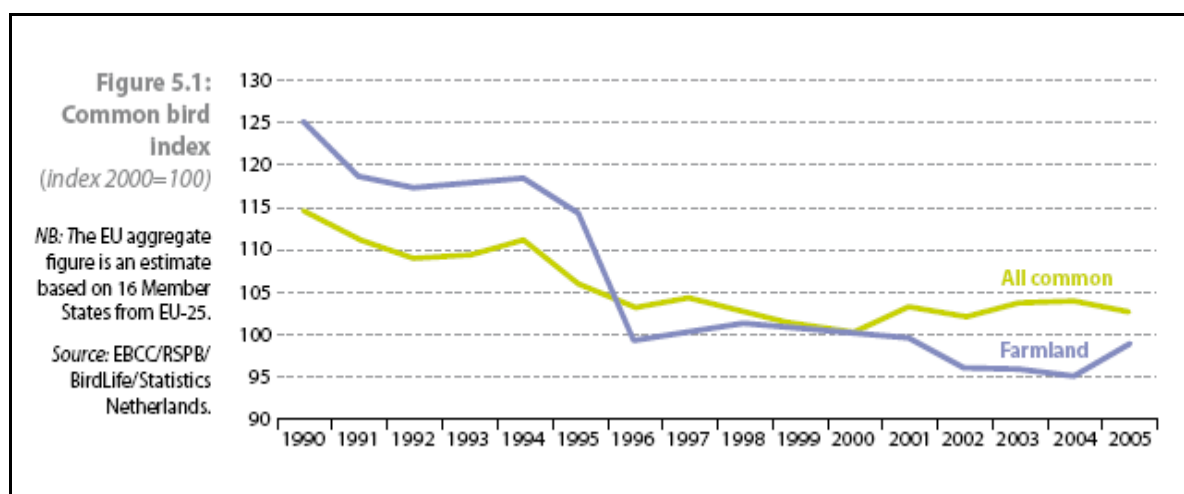


- Drawing up of protection and management plans for Natura 2000 areas (Italy-Liguria, Hamburg, Schleswig-Holstein).

## 5. MONITORING AND REPORTING ON BIODIVERSITY WITHIN AGRICULTURAL AREAS AND FORESTRY:

Within the set of biodiversity indicators, the one mostly used for agricultural areas and forestry is the Common Bird Index, including the farmland bird and the forest bird indexes. The farmland bird index is also one of the impact indicators forming part of the Common Monitoring and Evaluation Framework for Rural Development Policies.

Some controversies developed around the bird indicators as there were some changes in the methodology during the nineties which limit the validity of long-term trends. However, since 1990 when the methods have become more fine-tuned, data show that the European Union's common farmland birds have declined by 20–25 % and, during the same period, common bird populations have decreased by around 10 %<sup>11</sup>.



As regards the forest bird index, there are even more concerns about the stability of the methods and, therefore, the robustness of this indicator.

Under Rural Development Policy, biodiversity targets are matched by result and impact indicators introduced into the Common Monitoring and Evaluation Framework for Rural Development (CMEF):

- "Area under successful land management contributing to biodiversity and high nature value farming/forestry" (result indicator – measure-based)
- "Reversing biodiversity decline, measured by farmland bird species population" (impact indicators - target-based)
- "Maintenance of high nature value farmland and forestry" (impact indicators - target-based)

<sup>11</sup> SEBI2010 indicator No 1 — Common birds in Europe — uses a population index of 100 for the year 1980, but its geographical coverage is wider than the European Union.

Member states are obliged to make those indicators operational and provide the necessary quantitative or qualitative information.

## **6. IMPORTANT FORTHCOMING DEVELOPMENTS**

EURECA, the European Ecosystem Assessment, has been launched by the EEA and shall deliver the first assessments in 2011, with more following in subsequent years. EURECA assesses the state of ecosystems in Europe and their possible developments. Regarding the CAP, reconciling demands for ecosystem services such as food, (bio) energy, nature, and landscape values will be taken into account.

In the Commission's White Paper on climate change adaptation, the role of biodiversity and healthy ecosystems is acknowledged as a cross-cutting issue. The white paper recognises the importance of ensuring healthy, resilient and properly functioning ecosystems in the defence against the impacts of climate change and promotes the application of Green Infrastructure type of (ecosystem-based) approaches. The EU strategy on Green Infrastructures is foreseen to be adopted in 2012.

In December 2008, the Commission presented a Communication "Towards an EU Strategy on Invasive Species". The Commission aims to tackle the challenge posed by IAS through the review of existing legislation (i.e. Plant and Animal Health Regimes) and through a dedicated EU strategy on invasive species, to be adopted in 2012. Several measures will be proposed which should substantially reduce the impact of invasive alien species in Europe. The Commission will also examine the possibility of setting up an Early Warning and Information System based on a regularly updated inventory.

As the establishment of Natura 2000 is at an advanced stage, the next period will be critical to making the network fully operational through the effective management and restoration of the sites. This will not happen without adequate financial investments in Natura 2000. A new Communication on financing Natura 2000, is planned by the European Commission, foreseen for 2011. A first estimation of Natura 2000 cost for agriculture gives the figure of 2 billion € representing 35 % of the total Natura 2000 cost set at 5,8 billion €per year.



## EUROPEAN COMMISSION

DIRECTORATE-GENERAL FOR AGRICULTURE AND RURAL DEVELOPMENT

Directorate H - Sustainability and Quality of Agriculture and Rural Development  
**H.1. Environment , Genetic Resources and European Innovation Partnership**

### **FACT SHEET**

### **INTEGRATING ENVIRONMENTAL REQUIREMENTS INTO THE CAP**

#### **1. INTRODUCTION**

Around half the land in the European Union (EU) is farmed. Farming has contributed over the centuries to creating and maintaining a unique countryside. Agricultural land management has been a positive force for the development of the rich variety of landscapes and habitats, including a mosaic of woodlands, wetlands, and extensive tracts of an open countryside.

The links between the richness of the natural environment and farming practices are complex. While many valuable habitats in Europe are maintained by extensive farming, and a wide range of wild species rely on this for their survival, agricultural practices can also have an adverse impact on natural resources. Pollution of soil, water and air, fragmentation of habitats and loss of wildlife can be the result of inappropriate agricultural practices and land use.

Maintaining agricultural land management, in line with site-specific requirements and needs, is essential for preserving the environmental and scenic values of the EU's rural areas. Therefore, the Common Agricultural Policy (CAP) has an important role in contributing to EU environmental objectives.

Treaty requirements to integrate environmental concerns into other policies are reflected in the Treaty on the Functioning of the European Union, (Part 1, Title II, Article 11) as follows 'Environmental protection requirements must be integrated into the definition and implementation of the Union's policies and activities, in particular with a view to promoting sustainable development'. Since the 1990s, the CAP has increasingly aimed at heading off the risks of environmental degradation, while encouraging farmers to continue to play a positive role in the maintenance of the countryside and the environment; and to serve sustainability purposes better.

Because the integration approach promoted by the Treaty has been well developed in the agricultural sector, environmental policy has also become heavily dependent on CAP Rural Development funding, which has increasingly been used to deliver environmental public goods. It needs to be recognised that there is a logic to funding this type of environmental measures through a CAP instrument, as many of the environmental services farmers can provide are jointly provided with production.

## **2. THE INTEGRATION APPROACH : TOWARDS A SUSTAINABLE AGRICULTURE**

The key concept shaping the way how environmental requirements are integrated in the CAP is that of “sustainable agriculture”. The concept of "sustainability" refers, beyond the preservation of the environment, to the need to ensure economic viability and social acceptability. Pursuing sustainable agriculture means addressing economic, environmental, and social targets in a coherent and mutually reinforcing manner. Evidently, sustainable agriculture cannot exist, unless it provides farmers with a sufficient income.

In this context we must recall that agriculture has been increasingly exposed to high market volatility, which represents a major challenge to economic viability. Furthermore, production in less productive areas is under constant competitive pressures that call into question continued land management. Thus, any strategy pursuing the environmental dimension of farming would need to incorporate also instruments addressing the economic and social dimension of farming. Furthermore, it also needs to reflect the fact that farming is dependent on many aspects of environmental protection (fertile soil, sufficient water supply, pollinating insects etc); and that some environmental services depend on farming remaining in place.

## **3. ENVIRONMENTAL LEGISLATION RELEVANT FOR AGRICULTURE**

The legal framework of environmental policy provides the context beyond which the integration of environmental requirements into the CAP has to operate. EU agriculture is subject to a comprehensive regulatory framework related to environmental issues.

The most important legal acts are

- Natura 2000, an EU-wide network of nature protection areas which has been established aiming to ensure the long-term survival of Europe's most valuable habitats and endangered species,
- the Water Framework Directive (WFD) which makes provisions for a long-term-oriented approach towards sustainable water management,
- the Nitrates Directive which was established in 1991 and provides for a series of measures designed to reduce and prevent water pollution caused or induced by nitrates from agricultural sources,
- and the EU legislation on pesticides which provides for measures minimising the risk of negative health and environmental impacts of pesticide use.

This general environmental policy needs to be complemented by an integration approach. To this end the CAP has set up many tools to integrate environmental requirements into the CAP.

## **4. MEASURES INTEGRATING ENVIRONMENTAL CONCERNS INTO THE CAP**

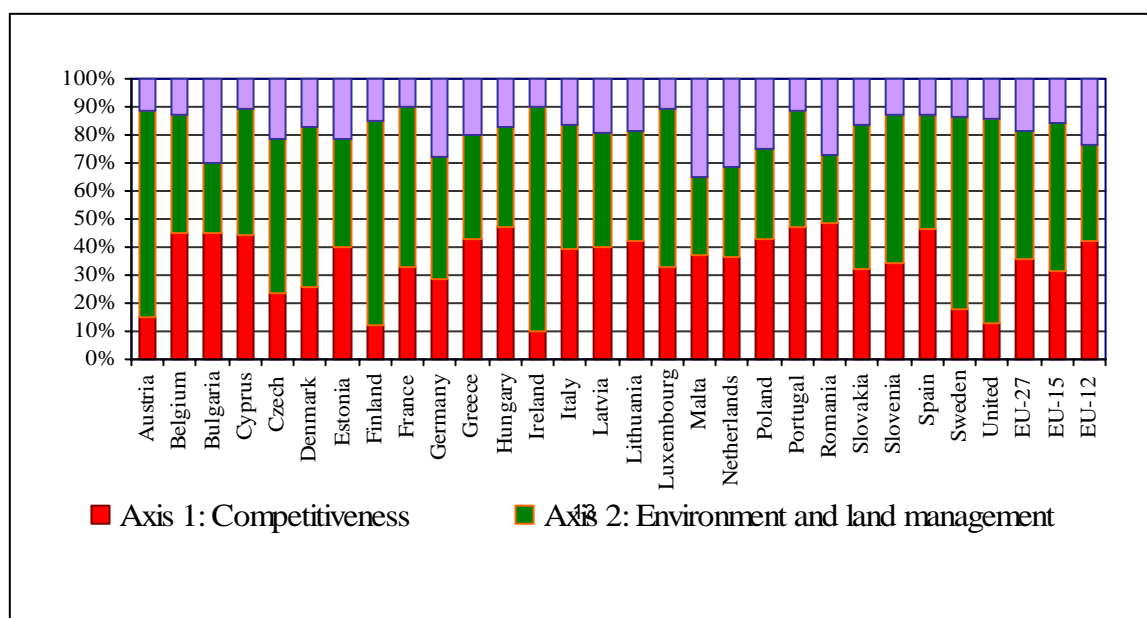
Today, the CAP includes a series of measures that contribute to preserving and enhancing the environment, in line with the principles prescribed in the Council's Environmental Integration Strategy of 1999. CAP measures promote in manifold ways the development of agricultural practices that contribute to preserving the environment and safeguarding the countryside.

Integrating the environment into the CAP is effectively achieved in both pillars of the CAP: Environmentally harmful effects of farming are limited through "cross-compliance" as cross-compliance establishes a link between income payments and the respect of mandatory standards. The encouragement of beneficial environmental outcomes of farming is subject to incentive measures, established on a voluntary basis (the two approaches are complementary and non-overlapping):

- Direct payments provide a general layer of support to all farmers, which constitutes the basis for keeping farming in place throughout the European countryside. In combination with cross-compliance direct payments contribute to the protection of natural resources and the respect of basic requirements for agricultural activities. Thus, direct payments provide the basis for the delivery of public goods through agriculture.
- Rural Development Policy consists of measures targeted towards delivering public goods, including the enhancement of the environment, creating an enabling context for improving competitiveness of the agriculture and forestry sector, and promoting the diversification of economic activity and quality of life in rural areas. The flexible and strategic approach of programming under Pillar II ensures a high degree of targeting. Agri-environment payments encourage farmers to adopt or maintain agricultural activities favourable to preserving the environment. Training and advisory services ensure a better performance of EU agriculture, also with respect to environmental outcomes. Other environment-related measures are non-productive investments and training. Compensation payments applied in areas subject to requirements of Natura 2000 or the Water Framework Directive help to support the implementation of these mandatory standards. Some investment measures can help ensure environmental protection (e.g. manure storage facilities, water saving measures...).

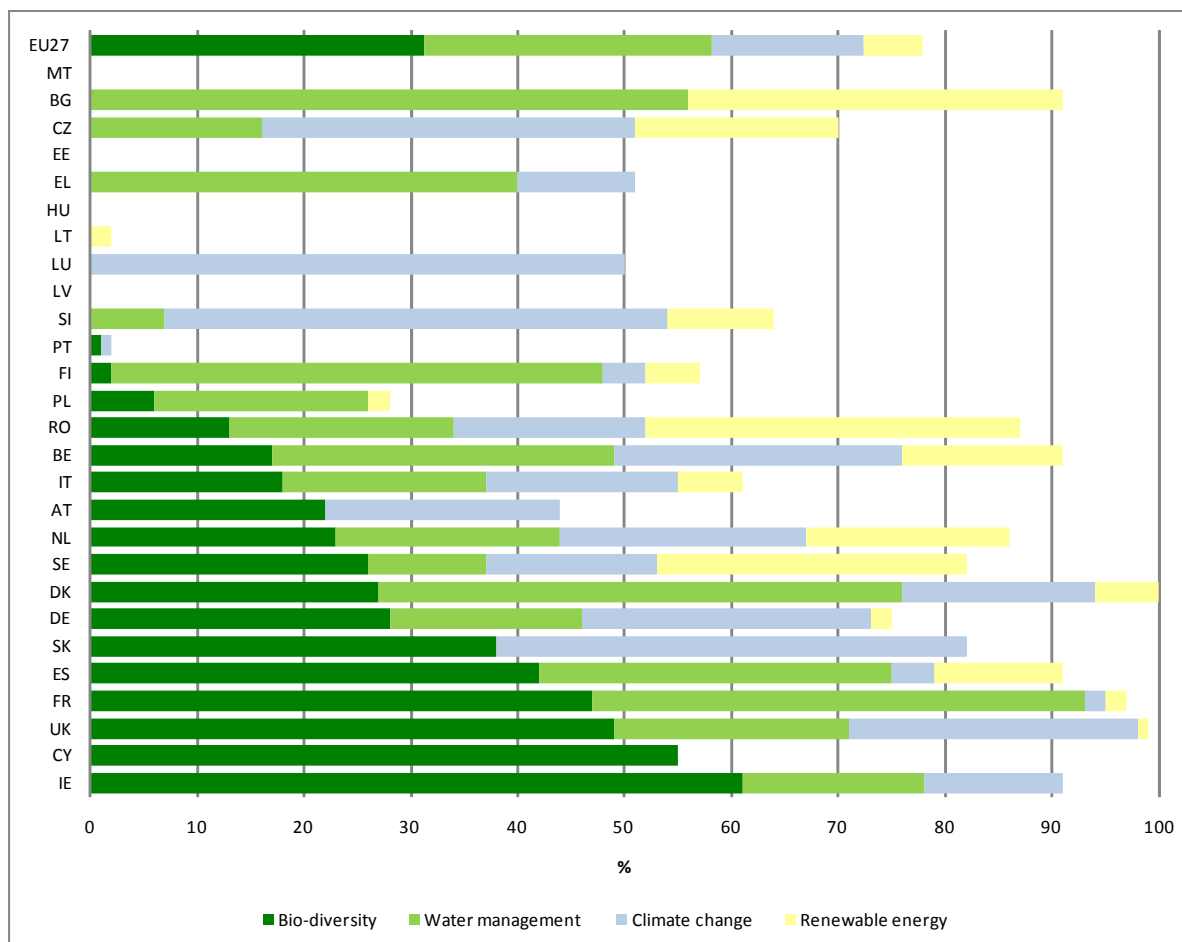
Looking at the Rural Development budget, we observe a strong environmental focus (cf table below): 45% of the EAFRD funding for the 2007-2013 period (some 43 billion €) has been allocated by Member States to Axis 2 measures ("improving the environment and the countryside"). For the current programming period, 22 billion € representing half of the budget devoted to the environmental axis of Rural Development policy, will be spent on agri-environment; 472 million € will be spent on Natura 2000 measures on farm land; and 111 million € on Natura 2000 measures on forestry land.

### The three 2007-2013 RD thematic axes in the MS



EU Average: Axis 1: 35.8% Axis 2: 45.4% Axis 3: 18.8%

### Overall distribution of CAP Health Check and EERP funds (€4.95 billion) according to “new priorities”



Note: These figures do not include national co-financing

## 5. ASSESSING THE INTEGRATION PROCESS

In order to be accountable, policy outcomes need to be assessed against declared objectives. Also the process of integrating environmental concerns into the Common Agricultural Policy needs regular assessments. In the EU, an elaborated approach towards regular policy evaluation has been established at European, national, and regional level.

The Common Monitoring and Evaluation Framework (CMEF) provides a single framework for monitoring and evaluation of all rural development interventions for the programming period 2007-2013, it establishes means for improving programme performance, ensuring the accountability of programmes and allowing an assessment on the achievement of established objectives. The CMEF is laid down in a set of documents drawn up by the Commission and agreed with Member States. These documents were put together in 2006 in a handbook which includes a series of evaluation guidelines and guidance fiches on the common indicators for monitoring and evaluation.

In addition, there is ongoing work on “agri-environmental indicators” for monitoring the integration of environmental concerns into the Common Agricultural Policy. This work

involves different partners, namely DG AGRI, ENV, Eurostat, JRC, SANCO and the EEA. A related work plan was established in line with requests of the Council to report on progress on the integration of environmental concerns into EU policies.

Among its primary objectives, this system aims at providing information on the state of the environment in agriculture, monitoring the linkages between agricultural practices and their effects on environment, and assessing the extent to which agricultural and rural development policies promote environment friendly farming activities and sustainable agriculture.

In September 2006, the Commission issued a Communication entitled "Development of agri-environmental concerns into the CAP" (COM (2006)508) which presents a list of 28 indicators to be implemented. Some agri-environment indicators form also part of the Common Monitoring and Evaluation Framework for Rural Development.



## EUROPEAN COMMISSION

DIRECTORATE-GENERAL FOR AGRICULTURE AND RURAL DEVELOPMENT

Directorate H - Sustainability and Quality of Agriculture and Rural Development  
**H.1. Environment , Genetic Resources and European Innovation Partnership**

### FACT SHEET

#### ORGANIC AND MINERAL FERTILISERS

##### 1. INTRODUCTION

Farmers spend much effort, time and investment to improve and maintain soil fertility through appropriate land use, crop rotation, liming, manuring and fertilizing. Nutrients are essential for crop yield and quality.

Organic manures and composts contribute valuably to a base dressing of plant nutrients, but generally an additional precise application of mineral fertilizers is required, specifically calculated for each nutrient: nitrogen, phosphorus, potassium, magnesium, calcium, sulphur, etc. The total and available nutrient contents of manures and compost can be measured or estimated so that the balancing mineral fertilizer requirements can be calculated. In some regions with intensive livestock production, manures (sometimes processed to reduce bulk) are exported to other, mainly arable, areas. This helps ensure the best utilisation of nutrients by avoiding any excessive applications.

Because crops use nitrogen from manures only at certain times of the year, effective storage of livestock manures is necessary to preserve nutrient value and to prevent that manure is applied when there is no or little crop uptake. In some areas, especially in Nitrate Vulnerable Zones, there are legal requirements for minimum storage capacity. In temperate areas of northern Europe the required storage capacity can be up to nine months of production and the period of spreading limited to a few months.

However, while mineral and organic fertilisers are necessary for agricultural production, excessive nutrient surpluses can pose a threat to the environment and human health, leading to i.a. pollution of drinking waters, eutrophication of water bodies, negative impacts on species and ecosystems in water bodies, proliferation of algal blooms in coastal waters, global warming and stratospheric ozone depletion, and contribution towards acid rain. Soils are also at risk as excessive organic nutrient supply can deplete oxygen in the soil. The result is that the natural micro-organisms cannot function properly and soil fertility is affected. In addition, highly nitrate-contaminated ground and surface water is considered a health risk and cannot be used as drinking water. This results in extra costs for the water industry to remove nitrates from ground and surface water sources of drinking water. Furthermore, excessive and technically inappropriate fertilization practices (mineral and organic) contribute to enhanced greenhouse gas (GHG) release.

While mineral fertilizers affect indirectly the soil organic matter (SOM) content by increasing biomass production, including the root system, organic fertilizers contribute



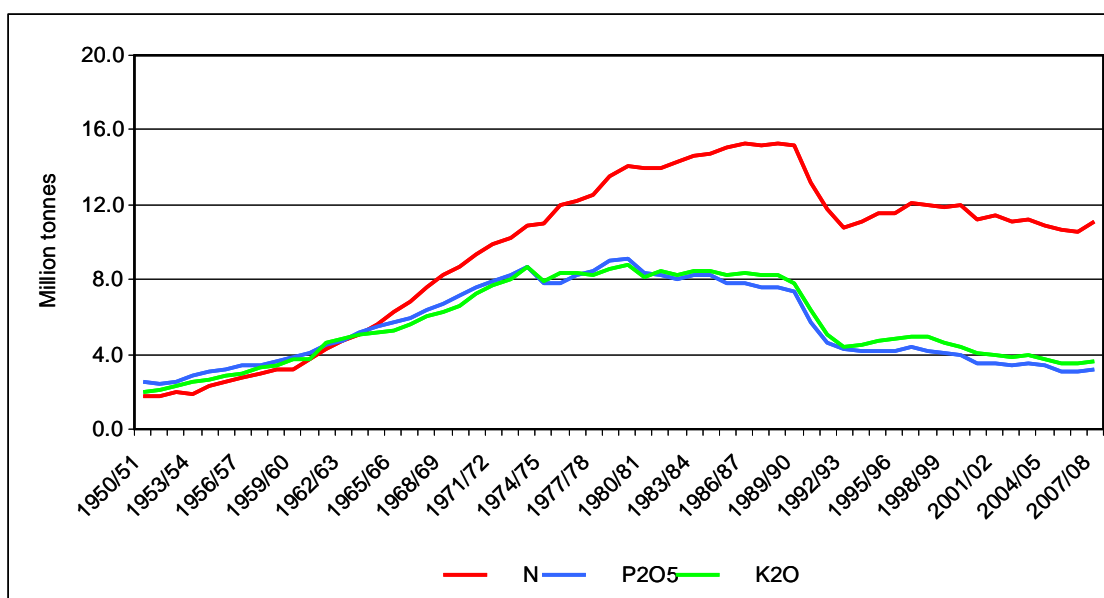
directly and indirectly to the SOM content as they contain a certain percent of organic matter. Thus, they not only contribute to a recycling of nutrients but significantly improve aggregate stability, soil structure, water infiltration and water retention. The stabilization of soil structure counteracts soil compaction and reduces erosion losses. Complexes of organic matter and mineral soil parts, mainly clay, enhance the pore stability, improving aeration and water infiltration ("soil as a sponge"). Mainly farmyard manure (not animal slurry or sewage sludge) and compost provide agricultural soils with humified substances, helping to avoid organic matter depletion – thus maintaining and improving soil fertility in general and beyond their nutritional value.

## 2. CURRENT STATUS AND TRENDS REGARDING THE USE OF FERTILISERS

### 2.1. Mineral fertilisers

Mineral fertiliser consumption has been declining in EU-27 since the late 1980s, as shown in the figure below.

Fertilizer consumption in the EU 27 (Source: Fertilizers Europe, 2009)



Forecast by Fertilizers Europe indicate that, between 2009 and 2019, the use of nitrogen, phosphorus and potassium in the EU-27 is expected to increase respectively by 4.1%, 3.9% and 7.7% (base year: 2009). When using 2007 as base year (which eliminates two exceptional years), the expected changes become +3% for N, -9.7% for P<sub>2</sub>O<sub>5</sub> and -4.4% for K<sub>2</sub>O.

However, this is still a substantial decline from the consumption peak of the seventies and eighties; by 2017, nitrogen will have decreased by 28% in the EU-27, compared to 1988 when the nitrogen consumption peaked. It is also estimated that there will be a decrease of 67% phosphorus and 61% potassium, compared to 1979, when the consumption of phosphorus and potassium peaked. Due to fertilization rates partly far beyond the need of crops and despite lowered rates, many soils still show an oversupply with some nutrients, e.g. phosphorous.

In the long-term forecast (until 2019), Fertilizers Europe foresees a general decrease of all nutrients in the EU-15, with the exception of Austria and Sweden (strong

development of energy crops), and Spain (development of irrigation). In the EU-12, on the other hand, with the exception of Slovenia and Latvia, consumption of all nutrients will increase. As a consequence, the significant development of nitrogen consumption in the new Member States will counteract the decrease in EU-15 consumption, resulting in an overall increase of nutrient consumption for the whole EU-27. Likewise, the development of energy crops will continue to partially compensate the negative impact of the reform of the CAP (decoupling) on phosphorus and potassium consumption, and will contribute to the increase in nitrogen (4.1%) consumption.

### **3. ORGANIC FERTILISERS**

Animal numbers and industrialization of animal farming increased during the past fifty years, contributing to a greater overall nitrogen burden through organic fertilisers. Due to the agricultural systems of intensive production facilities the share of slurry increased compared to farmyard manure, supplying soil with more instantly available nutrients and less humus. The trend towards regional intensification has caused a surplus of organic fertilizers, mainly slurry, in certain regions while arable dominated regions often suffer from a lack of available organic fertilizers with valuable humus fractions. Changes in agricultural policy notably in 1984, 1992, 1999 and 2003 have since contributed to stabilising or reducing livestock numbers.

Comparison between 2003 and 2007 shows that, for EU 15, pig and laying hen numbers slightly increased, while goat, sheep, cattle and poultry, other than laying hen, numbers decreased. For EU 27 similar but less pronounced trends are noticed. Globally the nitrogen "pressure" on EU 15 agricultural soils from animal husbandry (mainly cows, pigs, poultry and sheep) is estimated at approximately 7,6 million tons annually spread on agricultural soils. Therefore, the total diffuse nitrogen "pressure", when the additional 8,9 million tons nitrogen from mineral fertilisers is added, was approximately 16,5 million tons in 2003, compared to almost 18 million tons in 1999 and 17,4 million tons in 1995.

Whereas mineral phosphorous is a non-renewable resource, it is not the only possible source of this indispensable nutrient for plant growth. Manure and to a lesser extent sewage sludge and biowaste are potential sources of phosphorous. For 15 Member States out of 22 (no data available for Cyprus, Luxembourg, Bulgaria, Romania and Malta), the main source of phosphorous in agricultural land is manure. In Denmark, Netherlands and Estonia the amount of phosphorous coming from manure is more than three times that coming from mineral fertilisers – but those Member States have a surplus of manure due to the high density of animal farms – whereas in Finland, France, Greece, Hungary, Italy, Latvia, Slovenia and Spain, mineral phosphate fertilisers are the main source of phosphorous.

Furthermore, among the 22 Member States, only the UK and the 3 Baltic States have a negative balance in phosphorous. The others have a phosphorous surplus which means that the input of phosphorous to the soil is higher than the output leading to soil accumulation and subsequent leaching into surface water and groundwater causing eutrophication problems such as in the Danube River and the Baltic Sea.

This phosphorous surplus is not always appropriately managed in the Member States. Reducing phosphorous inputs in those regions where soils are saturated would not only decrease problems of eutrophication, it would also reduce cadmium inputs from mineral phosphate fertilisers.

## 4. OVERVIEW OF EU POLICY INSTRUMENTS ADDRESSING FERTILISER ISSUES

### 4.1. Industrial policy

**Regulation 2003/2003** relating to fertilisers aims to ensure the free movement of mineral fertilisers within the European Community. All types of fertiliser which comply with this regulation are designated "EC fertilisers" and are subject to its provisions. A type of fertiliser is designated as "EC fertiliser" only if:

- it does not adversely affect human, animal, or plant health, and the environment
- it is effective
- appropriate sampling, analysis, and if required, test methods are available.

The Regulation does not apply to cadmium and does not therefore address the issue of the unintentional presence of this substance in fertilisers. The need for a limit on the cadmium content of phosphate fertilisers has been discussed for a number of years within the Commission. This may end in a Commission proposal at the beginning of 2012.

The marketing of organic fertilisers and soil improvers is not regulated at EU level. Preliminary discussions on a possible legislation for these products started in the fourth quarter of 2009.

### 4.2. Environmental policy

The **Water Framework Directive** (Dir. 2000/60/EC) requires Member States to establish, at the latest by end 2009, river basin management plans (RBMP), each one including a programme of measures aiming to prevent deterioration, enhance and restore bodies of surface water and groundwater to good status and to preserve protected areas dependent on aquatic ecosystems as a rule by 2015. As of January 2011, 17 Member States had adopted their RBMPs. Annex VIII to the Directive provides an indicative list of the main pollutants, such as substances which contribute to eutrophication, in particular nitrates and phosphates.

EU rules regarding the protection of waters against nitrate pollution from agriculture are covered by the **Nitrates Directive** (Dir. 91/676/EEC). Obligations under this directive mainly relate to organic and mineral fertilizer management (e.g. buffer strips along watercourses, fertilisation plans, manure storage) and limitation of land application (e.g. amount of nitrogen from livestock manure limited to 170 kg/ha/year in nitrates vulnerable zones).

The **Directive on industrial emissions** (Directive 2010/75/EU) provides for a permitting system for certain categories of industrial installations (including intensive pig and poultry rearing installations). Operators should take all appropriate preventative measures against pollution, in particular through the application of best available techniques (BAT) enabling them to improve their environmental performance.

### 4.3. Common Agricultural Policy

The CAP includes a series of instruments that contribute to the protection of the environment.

Within the first pillar, direct payments to farmers are linked to various obligations – some of them related directly or indirectly to water quality – through the mechanism of cross-compliance. The Nitrates and Groundwater Directives are included in the Statutory Management Requirements to be respected under cross-compliance. The new standard of good agricultural and environmental condition requiring the establishment of buffer strips along watercourses by 2012 is also particularly relevant with regard to fertiliser use.

Member States may also support farmers undertaking agri-environmental actions via the fruit and vegetables Operational Programmes. Examples of such actions include the preparation and implementation of balanced fertilisation plans (CY, HU, IT, SE), introduction of methods/systems (equipment) for optimising use of fertiliser to avoid overfertilisation (FR), precision farming (IT).

The second pillar offers a broad menu of flexible policy measures which can be used to support sustainable water management practices. The possible types of support relate primarily to:

- training and information;
- farm modernisation;
- compensations for farmers facing area-specific disadvantages due to requirements introduced by the Water Framework Directive;
- environmentally beneficial land management practices which go beyond legal requirements (e.g. wetland restoration, development of semi-natural water bodies, reduced application of fertilisers).

In addition, some of the obligations of the Nitrates Directive have been funded on a temporary basis by other measures of rural development, i.e. the 'meeting standards' measure and the support to investments, e.g. for building manure storage.

Some concrete examples of measures taken from the RDPs 2007-2013 concerning the environmental measures related to water quality.

- Under the measures on vocational training and use of advisory services

Netherlands: formulation of "business water plans" (describing how to improve the impact on quantity and quality of water at farm level)

- Under the measure on farm modernisation

Belgium – Flanders and Wallonia: aid for investments on water purification, storage and use of rainwater

- Under the agri-environmental measures

Luxembourg: management of nitrogen and phosphorous fertilisers to improve water quality.

Finland: Establishment and management of riparian zones to reduce nutrients runoff into watercourses and to reduce risks of flooding.

- Under the measure on non-productive investments

Netherlands: Support for several types of investments aimed at improvement of the water quality, in and nearby pre-defined priority areas (Natura 2000 and other important nature areas).

## **5. IMPORTANT FORTHCOMING DEVELOPMENTS**

Discussions on a possible EU legislation concerning the marketing of organic fertilisers and soil improvers: since end 2009.



## EUROPEAN COMMISSION

DIRECTORATE-GENERAL FOR AGRICULTURE AND RURAL DEVELOPMENT

Directorate H - Sustainability and Quality of Agriculture and Rural Development  
**H.1. Environment , Genetic resources and European Innovation Partnership**

### **FACT SHEET INTEGRATED FARMING**

#### **1. INTRODUCTION**

Integrated farming or integrated production is an approach to crop and livestock production based on the adoption of a holistic approach to farm management aiming to make production processes economically viable, socially acceptable and ecologically responsible. There is wide variation of integrated farming approaches which cover production systems which can be positioned between conventional production and organic production.

This approach pays particular attention to:

- the whole “farm system” and its relationships with the wider socio-economic and ecological environment;
- the different components of the farm system (crop and/or animal productions undertaken, cropping pattern, land use, farming practices, farm management).

No Community-wide regulation exists on integrated farming. This has led to national and regional authorities developing their own production and marketing standards, which they enforce with the aid of duly accredited certifying bodies. Despite the absence of specific rules, Community regulations include the possibility of awarding financial support to farmers using this agricultural system via *i.a.* operational programmes for fruit and vegetables, agri-environment, support for investment, training, support for food quality schemes.

#### **2. CURRENT STATUS OF INTEGRATED FARMING**

Integrated farming has an important potential for realising economic and environmental benefits. The adoption of integrated production by farmers can bring advantages such as savings on external inputs (pesticides, synthetic fertilisers) without necessarily eliminating their use altogether. However, it involves additional investment in time, training and advice resulting from the need to control and manage the information produced by the holdings themselves. Except for a few specific regions and labels, the market for integrated production is not well developed. However, the development of integrated production is being strongly influenced by a number of large retail chains, which are increasingly demanding products that meet requirements very similar to those typically met by this system. The pesticide and fertiliser industries also promote integrated farming.

Hardly any recent quantitative data is available on the application of this farming system in the EU. Integrated crop management (i.e. integrated farming limited to plant production) is estimated to cover only about 3 % of the utilised agricultural area in the EU (EEA, 2003). Based on a survey commissioned by the European Crop Protection Association in 1999, the area under integrated crop management in the European Union in 1999 was 3,641,420 ha. The Member State with the largest area under ICM was United Kingdom, followed at a considerable distance by Denmark and Austria. Available data on integrated livestock production is even scantier.

'Integrated farming' is not synonymous with 'integrated pest management'. IPM constitutes an important pillar of integrated farming and includes the set of practices and/or agricultural techniques used in integrated farming systems for the control of pests, diseases and weeds. IPM emphasizes working with and enhancing naturally occurring pest management mechanisms, using farming, biological, and physical techniques to keep pests below thresholds of economic damage. Where these methods do not provide adequate control, conventional pesticides are used as a last resort, with preference for the least toxic options. Developed by academics in the 1950s, IPM has gained acceptance by numerous farmers, particularly in the fruit and vegetable sector. By 2014, minimum requirements for IPM will become mandatory for all farmers in the EU in accordance with the Framework Directive on the sustainable use of pesticides.

### **3. OVERVIEW ON POLICY INSTRUMENTS**

#### **3.1. Environmental policy**

The Framework Directive on the sustainable use of pesticides (Directive 2009/128) will regulate the plant protection element of integrated farming, i.e. integrated pest management. It stipulates that minimum requirements for integrated pest management will become mandatory for all farmers at the latest by 2014. In addition, Member States will be required to encourage professional users to implement crop or sector specific guidelines for IPM on a voluntary basis.

#### **3.2. Common Agricultural Policy**

The CAP offers various possibilities to support integrated farming-related measures. The most prominent ones are the fruit and vegetables operational programmes in the first pillar, and participation in food quality schemes and agri-environmental measures in the second pillar.

For instance, with regard to the fruit and vegetables CMO, many Member States included in their national frameworks for environmental actions support for integrated farming (BE, CY, DK, GR, ES, FR, IT, NL, UK). In addition, support was also granted for specific practices which are part of integrated farming, e.g. use of alternative methods or materials to chemical plant protection of chemical disinfection (16 MS), planting of hedges with indigenous plant species to provide a habitat to birds and insects (CY), installation of habitats and/or landscape elements favourable to biodiversity (FR, SK), training, advice and or technical assistance in support to environmental actions (14 MS).

Similar measures have also been included into the rural development programmes for the period 2007-2013. A few examples are provided hereunder:

- Vocational training and information actions

- BE-Fl: awareness raising on innovative and sustainable practices including integrated production
- Setting up of advisory services
  - ES-Andalusia: Setting up of i.a. specific advisory actions, including on integrated pest management and integrated production
- Adding value to agricultural and forestry products
  - ES-Andalusia, Latvia: Support for improving quality of production, with particular reference to organic and integrated production.
- Participation of farmers in food quality schemes
  - BE-Wa, EL, ES-Andalusia, France, Poland, Portugal mainland: support to certification for food products recognised under a Community or national quality scheme
- Information and promotion activities
  - Poland, Slovenia: Quality schemes which may be supported include organic and integrated production
- Agri-environment
  - AT, BE-Fl, CY, CZ, EL, ES-Andalusia, Cataluña, HU, Italy- Emilia Romagna, LV, PT, SI, SK: support for integrated production in various crops





## EUROPEAN COMMISSION

DIRECTORATE-GENERAL FOR AGRICULTURE AND RURAL DEVELOPMENT

Directorate H - Sustainability and Quality of Agriculture and Rural Development  
**H.1. Environment , Genetic Resources and European Innovation Partnership**

### FACT SHEET

## ENVIRONMENTAL RISKS DUE TO FARMLAND ABANDONMENT

### 1. INTRODUCTION

By managing a large part of the European Union's territory, agriculture has a significant impact on and has as well a huge role in preserving farm-genetic resources, biodiversity, and a wide range of valuable habitats. Many valuable habitats and the presence of species have a direct interdependence with agriculture (e.g. many bird species nest and feed on farmland). The preservation of a number of species and ecosystems that have emerged over centuries of agricultural cultivation depends on the continuation of appropriate land management practices. Agriculture is also the first to benefit from biological diversity and ecosystem services (like water retention, pollination).

In many parts of Europe the continuation of land management is threatened by abandonment of farming activities. Land abandonment is one of various pressures which can lead to biodiversity loss in the EU. Preventing this process is therefore an important element in the political debate with implications for the policy design of the CAP.

A recent JRC report proposes to define farmland abandonment as the loss of utilised agriculture area that has not been converted into artificial zone or afforested (tree plantation). This non-utilised agricultural land is no longer farmed for economic, social or other reasons (no alternative use), and is not included anymore in the crop rotation system. Depending on the climate and ecological context, this abandoned farmland will gradually be covered by other species and habitats as the succession proceeds (eg scrubs and trees).

### 2. THE SCALE OF FARMLAND ABANDONMENT

Farmland abandonment is commonly understood as the cessation of agricultural activity on a given surface of land. This process has been observed in many regions of Europe at different periods. Farmland abandonment bears significant environmental consequences and is often associated with social and economic problems in rural areas.

The differences in methodology used in available studies make it impossible to validate and to compare the results for getting a clear insight on the real extent of farmland abandonment. However, looking at the literature available, it can be concluded that overall farmland abandonment tends to be of a lower importance in Western Europe while in Southern or Eastern Europe it is of more importance due to natural conditions as well as problems attributable to economic and political transition in eastern Member States.

Some studies speak about an average of 0.2 % of land abandonment in Europe, others refer to a level of 2%. Often figures on land abandonment are given only at national level: As an example, a recent study from the JRC<sup>12</sup> states that in the 1990s 2% of the French UAA, 4% of Poland's and 8% of Spain's UAA were abandoned.

### **3. RISK OF FARMLAND ABANDONMENT AND DRIVING FORCES**

From a policy point of view it is important to analyse the leading causes of farmland abandonment rather than getting a picture of the farmland already abandoned. Manifold causes exist for farmland abandonment in Europe, depending on the area and the period under consideration. The agricultural situation differs from region to region, as a consequence of natural conditions, historic developments and the economic and demographic context. In most cases, a combination of different factors leads to farmland abandonment.

There is a general agreement in the scientific literature about the main drivers for farmland abandonment:

- Environmental/biophysical conditions: Farmland abandonment is more likely to occur in areas characterized by adverse conditions concerning climate, soil or water availability.
- Economic conditions: Farmland abandonment may increase where the agriculture income is substantially below that of the rest of the economy (regional income).
- Structural conditions and remoteness: Farmland abandonment is more likely to occur where the economical viability of farming is low due to unfavourable farm structure and remoteness to markets.
- Social conditions: Farm land abandonment may happen due to unfavourable social factors such as high age of active farmers as well as a low level of training.

The literature stresses a strong relationship between farmland abandonment and a low competitiveness of farming systems. The risk of arable land being abandoned is much lower than is the case for extensive and traditional grazing systems with high proportions of permanent grasslands.

Currently there is no clear-cut assessment of the relative weight of the different factors which are determining farmland abandonment. In the context of the ongoing work on agri-environmental indicators, the JRC established an expert panel group that will identify the weight and the thresholds to be given to each of these factors.

It needs also to be borne in mind that, in mountain areas, the same drivers can lead to a decision to afforest agricultural land. In that case, the same environmental consequence as for land abandonment can occur. It needs to be recognised that, although this particular situation is probably not accounted for as land abandonment, it can have similar consequences for biodiversity.

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<sup>12</sup> JRC (2008) Analysis of Farmland Abandonment and the Extent and Location of Agricultural Areas that are Actually Abandoned or are in Risk to be abandoned.

#### **4. ENVIRONMENTAL IMPACT OF FARMLAND ABANDONMENT**

Farmland abandonment is occurring mostly on semi-natural grassland. Semi-natural grasslands in Europe developed over centuries as a result of continuous management by farmers. Grazing and haymaking were the most common activities but also other management systems were used like sod cutting and burning grass and heather. As a result of continuous management, species diversity increased and specific grassland vegetation types can now be identified.

The abandonment of semi-natural grasslands, for example species rich swards, generally has a negative impact on biodiversity and ecosystems because vegetation succession leads to species-poor and more homogeneous vegetation types. In most places in Europe the final succession stage will be forest, except in the forest-steppe zone of south-eastern Europe and above the treeline in mountainous areas. Vegetation succession also results in a structural change from an open to a closed landscape, which in turn has an impact on the fauna and on the status of habitats suitable for meadow birds and butterflies.

Other environmental effects of abandonment may include the loss of small scale mosaics of landscape and land use and their characteristic species, and also those of forest edge habitats; a reduction in genetic diversity in both wild species and in local breeds of livestock or varieties of crops (which are often well adapted to semi-natural habitats); and an increased fire risk in forests where grazing areas act as firebreaks.

#### **5. POLICY MEASURES AIMING TO AVOID LAND ABANDONMENT**

For avoiding land abandonment, the CAP offers two main measures with the objective of keeping farming in place and thereby contributing to maintaining the production capacity of European agriculture: decoupled direct payments with their link to cross-compliance requirements and the Less Favoured Area payments.

Decoupled direct payments contribute to stabilizing and enhancing farm income.

Besides their role of supporting farm incomes, direct payments, in combination with cross-compliance, underpin the respect of basic requirements for agricultural activities. Cross compliance consists of mandatory requirements related to the environment, food safety, animal health and welfare (SMRs). Furthermore, it includes the requirement to keep land in Good Agricultural and Environmental Conditions (GAEC). In case a farmer does not respect these basic requirements on all his land, his direct payments are reduced or entirely cancelled. Linking direct payments to basic agricultural land management requirements helps to protect natural resources and maintain the capacity to produce, also on marginal land which might be at risk of abandonment.

It is important to ensure that the GAECs on minimum level of maintenance are adapted to local conditions. If the fight against encroachment of vegetation is too intensive or not limited to unwanted vegetation, this can be environmentally counterproductive.

Compensatory payments in Less Favoured Areas help maintain farming activity in areas which, due to adverse natural conditions, are less profitable. This concerns in particular marginal areas or mountainous areas where the LFA payments contribute to avoiding land abandonment and, thereby, negative effects for the environment and/or the attractiveness of the rural areas in question. However, for receiving LFA payments, eligibility rules are established which mean that not every farmer in these areas are de facto able to receive

LFA payments. Moreover, the level of LFA payment in some Member States is very modest, and so can only play a minor role in helping to avoid land abandonment.

There are also agri-environmental measures which can contribute to avoiding land abandonment; but agri-environment is not really designed to address the issue of land abandonment on its own: it is best used to fine tune land management to specific environmental needs, while the other instruments address the income aspect.

## **6. OUTLOOK**

In view of maintaining the production capacity of European agriculture, to enhance biodiversity and ecosystem services provided by natural or semi-natural ecosystems, to keep rural areas alive and to improve social conditions, it is necessary to avoid farmland abandonment. As the global demand for food increases, there is a justified interest in keeping agricultural land fit for agricultural production. In addition, there is a strong societal interest in maintaining valued landscapes or precious habitats as well as avoiding environmental damage that can result from land abandonment.

Thus, land abandonment is an issue which needs policy attention. Due to a lack of reliable data concerning the scale of the problem, there is a strong need for further research. It will only be possible to achieve a full picture of the problem by region-specific studies which can then be compared and summed-up. However, this is not a valid reason for delaying action, as farmland abandonment already takes place and it risks increasing in coming years.



## EUROPEAN COMMISSION

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Directorate H - Sustainability and Quality of Agriculture and Rural Development  
**H.1. Environment , Genetic resources and European Innovation Partnership**

### **FACT SHEET** **AGRICULTURAL LANDSCAPES AND ECOSYSTEMS**

#### **1. THE AGRICULTURAL LANDSCAPE PERSPECTIVE**

Human interventions such as agricultural land use and forestry have shaped landscapes over centuries. Whereas natural landscapes in the final stage of natural succession are dominated by forests in certain areas, land use led to a rich variety of cultivated landscapes and semi-natural habitats. Farmed landscapes are generally appreciated for their aesthetics; in addition they can represent cultural identity and the natural heritage. The scenic value of landscapes makes rural areas attractive for the establishment of enterprises, for tourism and recreation businesses, and as places to live in.

A landscape perspective facilitates the understanding of the interaction between productive land use and nature as a system that integrates all natural resources, such as soil, air, water and biodiversity. It addresses simultaneously the goals of ecosystem maintenance, agricultural and forestry production, and improved quality of life. Accordingly, measures directed towards sustainable land use systems would always also address goals related to preserving biodiversity, soil, and water.

Man-made modifications of the landscape often enhanced biodiversity, depending on region-specific conditions and land use pattern. Following centuries of cultivation, many species turned into farmland specialists. Unlike natural landscapes, cultural landscapes are not stable, but depend on continued human intervention.

Environmentally valuable agricultural landscapes are characterised by their specific pattern of perennial natural and planted vegetation, the maintenance of soil cover, and special grazing management, all contributing to the connectivity between semi-natural habitats, biodiversity and cultivation. Hedgerows, stonewalls, meadows, and intermediate elements such as small woods and watercourses are important features of the ecological and scenic values of cultivated landscapes.

When the farming structure and land management methods that helped creating valuable habitats and biodiversity lose their economic viability, changing land use practice, intensification and restructuring become drivers of ecosystem changes. Standardisation and specialisation of production, mechanisation, land improvement, such as drainage and irrigation, longer crop rotations, and increased parcel sizes can lead to major environmental pressures. Eutrophication, pollution, fragmentation and spatial isolation result in the destruction of habitats and biodiversity decline.

## 2. THE CONCEPT OF "ECOSYSTEM" SERVICES

The interaction between productive land use and the preservation of valuable habitats and landscapes is more and more discussed with reference to "ecosystem services". Reference to "ecosystems" can be found in the European Union 2020 Biodiversity Strategy. It mentions as one of the key objectives of the strategy the need to "place species and ecosystems, including agro-ecosystems, at a satisfactory conservation status".

Practical definition of concepts of "ecosystem" and "ecosystem services" emerged in a recent discussion of environmental and agricultural organisations:

- **Ecosystem.** An ecosystem is a dynamic complex of plant, animal, and micro-organism communities and the nonliving environment interacting as a functional unit. Humans are an integral part of ecosystems. Ecosystems vary enormously in size; a temporary pond in a tree hollow and an ocean basin can both be ecosystems.
- **Ecosystem services.** Ecosystem services are the benefits people obtain from ecosystems. These include provisioning services such as food and water; regulation services such as regulation of floods, drought, land degradation, and disease; supporting services such as soil formation, nutrient cycling, and the preservation of habitats and biodiversity; and cultural services such as recreational, spiritual, and other nonmaterial benefits such as landscape amenities.

These definitions underline that the different natural resources, such as biodiversity, air, soil and water, cannot be meaningfully addressed as an isolated concept, but only by considering the overall economic, social, and environmental context.

The communication "Options for an EU vision and target for biodiversity beyond 2010" (COM(2010) 4) links agricultural land use explicitly to the concept of ecosystems when stating that the *"decline in the viability of farming practices favourable to biodiversity led to the loss of some critical ecosystem services in rural areas"*. Furthermore, it advocates *"the enhanced application of payments for ecosystem services to reward those whose land provides these services"*.

## 3. CAP MEASURES ADDRESSING LANDSCAPE PRESERVATION

Valued agricultural landscapes have the characteristics of public goods: Landscapes provide benefits to many users, while there are limited or no possibilities to ensure that every user provides his or her share to covering the costs. Thus, markets cannot ensure a sufficient supply of valued landscapes and policy intervention is needed to ensure delivery.

The CAP offers a wide range of measures contributing to the maintenance and preservation of agricultural landscapes.

- CAP measures such as income support and market stabilisation help keeping sustainable farming in place throughout the European countryside. In combination with cross-compliance, direct payments contribute to the protection of and landscape elements and the respect of basic requirements for agricultural activities, thus providing the basis for the delivery of public goods through agriculture.

- Rural Development Policy consists of measures targeted towards delivering environmental public goods. Agri-environment payments encourage farmers to adopt agricultural activities favourable to preserving the environment and the countryside. Other measures relevant in this context are non-remunerative investments and training.

CAP measures concerning income support and market stabilisation help keeping sustainable farming in place throughout the European countryside. Cross compliance provides a mechanism that links direct payments to compliance by farmers with basic standards, including the protection of landscape elements and habitats: Non-compliance is sanctioned by payment reductions. In addition, cross-compliance standards serve as a baseline for agri-environment payments which are granted for voluntary commitments beyond those basic requirements.

Rural Development Policy consists of a range of measures targeted towards delivering environmental public goods. Agri-environment payments encourage farmers to adopt agricultural activities favourable to preserving the environment and the countryside. Examples include targeted actions such as protecting and promoting local crop and livestock diversity, preserving hedgerows and extensive pastures, maintaining continuous year-round soil cover or special grazing management with the aim of keeping the landscape open. In parallel, forestry measures such as Natura 2000 payments or forest environment payments support forest owners to improve forest land and its ecosystem services (water protection, soil formation and protection, biodiversity conservation or carbon stocks) Other Rural Development measures relevant in this context are non-remunerative investments and training.

In addition, and similar to income support under the first pillar of the CAP, to the above-mentioned measures, compensatory payments in the Less Favoured Areas help maintaining farming in less competitive areas, which is the very precondition for ensuring land management in view of preserving the countryside.

#### **4. IMPORTANT FORTHCOMING DEVELOPMENTS**

The established sectoral sub-targets for biodiversity under the 2020 Biodiversity Strategy<sup>13</sup> include conserving and restoring nature, maintaining and enhancing ecosystems and their services and ensuring the sustainability of agriculture, forestry and fisheries. These sub-target definitions will have implications also for the CAP being a land management policy relevant for preserving valuable landscapes and ecosystems.

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<sup>13</sup> COM (2011) 244



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### **FACT SHEET PESTICIDES**

#### **1. INTRODUCTION**

Pesticides are used to kill or control harmful organisms such as weeds, micro-organisms or insects. In Community legislation, pesticides have usually been divided into two major groups (plant protection products and biocides). This fact-sheet will address the main group used in agriculture, i.e. plant protection products (PPPs).

PPPs are used by farmers to fight crop pests and reduce competition from weeds, thus improving yields, protecting the quality of the produce (blemish-free produce), and ensuring food safety (Food contaminants such as mycotoxins can be reduced and prevented by using pesticides). This, in turn, ensures reliable supplies of agricultural products every year and contributes to the availability of low-priced fruits and vegetables, affordable for all consumers.

However, human and animal health can be negatively affected through direct exposure (industrial workers producing PPPs and operators applying them) and indirect exposure (residues of PPPs in agricultural produce and drinking water, exposure of bystanders or animals via spray drift).

Spray drift, leaching or run-off are diffuse sources of uncontrolled dissemination of PPPs into the environment leading to pollution of soil and water compartments (surface water and groundwater). Environmental contamination can also occur during and after application, cleaning of equipment or uncontrolled, illegal disposal of PPPs or their containers (point sources).

PPP use may also cause direct and indirect effects on the ecosystem, e.g. loss of biodiversity. Non-target organisms can be directly impacted by PPP during spraying. Indirectly, over-efficient weed control means that insect-feeding birds may suffer from shortage of food. Conversely, if weed control is less systematic, the resulting increase in insect populations is beneficial for the populations of these birds. However, biodiversity is also influenced by a number of other factors, such as agricultural practices, plot sizes, type of crops, etc.

#### **2. CURRENT STATUS AND TRENDS REGARDING PLANT PROTECTION PRODUCT USE IN THE EU**

Official EU statistics on the use of PPPs are currently not available. Estimations are nevertheless provided to Eurostat by the European Crop Protection Association. The



latest report from ESTAT on the use of PPPs in the EU was published in 2007 using data from the period 1992-2003. This report shows that agriculture is by far the biggest PPP-using sector. The use (both nature and total volumes applied) of pesticides varies depending on the type of agricultural produce - the largest quantities of PPPs are used on vines, cereals, fruit, vegetables and potatoes - and on a range of factors, such as outbreaks of plant diseases or plagues of insects. Moreover, a number of other features affect figures from one year to the next, such as weather, seasonal factors, prices of pesticides and land set-aside obligations. The major types of product in 2003 were fungicides (ca. 49% of the market), followed by herbicides (38%), insecticides (10%) and other pesticides (3%).

The ESTAT report also reveals that, in 2003, five countries together accounted for nearly 75% of the total of the 220,000 tonnes of PPP used in EU-25: France (28%), Spain and Italy (14%), Germany (11%) and UK (7%). The use of PPPs per hectare of agricultural land is much higher in the western than in the eastern Member States. The total amount of PPP used in the EU-25 increased steadily in the 1990s, stabilising in the late '90s, and then declined continuously from 1999 until 2003. This decline is attributed to the EU-15 Member States. The consumption of PPP in the new Member States slightly increased during that period. The replacement of products used at high dosage rates by substances active at very low dosages is probably the main reason for the overall decrease. This illustrates that volume as such is not the only indicator of pesticide effect: the modern low dosage products are more efficacious and they tend to have significant fewer unwanted side-effects. However, new approaches to agricultural management also play a role: the increase in organic farming in north-western Europe (from 3% in 2000 to 4.7% in 2007) and the use of integrated crop management techniques in many pesticide-intensive farming systems (less than 3% of UAA in the late 1990s). Irrigated farming generally relies on high to very high doses of pesticides per hectare, whereas they are generally not used, for example, in extensive grazing systems.

The 2009 Commission report on the monitoring of pesticides residues in products of plant origin in the EU and EEA countries indicates that, in 2007, 96.01% of the samples analysed were compliant with the legal Maximum Residue Levels (MRLs). In 3.99% of all samples, residues above the MRL were found. The number of exceedances of MRLs was higher in produce imported from Third Countries (6.84 exceedances/100 samples) than in produce from the EU (2.31 exceedances/100 samples). Compared to previous years, the frequency of samples exceeding MRLs has slightly been decreasing since 2003 where it peaked at 5.5%. Organic cereals, fruit and vegetables have, overall, a lower rate of MRL exceedances (1.24%) in comparison with conventionally grown products (3.99%).

### **3. OVERVIEW OF POLICY INSTRUMENTS ADDRESSING THE MARKETING AND USE OF PLANT PROTECTION PRODUCTS**

#### **3.1. Health policy**

The evaluation, marketing and use of PPPs (herbicides, insecticides, fungicides etc.) in the Community are regulated under **Council Directive 91/414/EEC**. This Directive lays out a comprehensive risk assessment and authorisation procedure for active substances and products containing these substances. An EU list of approved active substances (Annex I to Directive 91/414/EEC) is established, and Member States may authorise only plant protection products containing active substances included in this list.

As from June 2011, Council Directive 91/414 has been replaced by **Regulation (EC) No 1107/2009** concerning the placing of plant protection products on the market. This Regulation specifies strict criteria for approval of substances. In particular it provides that carcinogens, mutagens, endocrine disruptors, substances toxic for reproduction or which are very persistent will not be approved, unless exposure to humans is negligible.

In the EU, as from 1 September 2008, a new legislative framework on pesticide residues (**Regulation (EC) No 396/2005**) is applicable. This Regulation completes the harmonisation and simplification of pesticide MRLs. With the new rules, MRLs undergo a common EU assessment to make sure that all classes of consumers, including the vulnerable ones, like babies and children, are sufficiently protected. The Regulation covers pesticides currently or formerly used in agriculture in or outside the EU (around 1100). Where a pesticide use is not specifically mentioned, a general default MRL of 0.01 mg/kg applies.

### **3.2. Environmental policy**

Together with the Regulation 1107/2009 on the placing of PPPs on the market, the Council and European Parliament adopted the **framework Directive 2009/128/EC on the sustainable use of pesticides**, which aims at filling the current legislative gap regarding the use-phase of pesticides at EU level. This directive sets minimum rules for using pesticides in the Community, improving the quality and efficacy of pesticide application equipment, ensuring better training and education of users and developing integrated pest management schemes. In particular, minimum requirements for integrated pest management will become mandatory for all farmers by 2014 at the latest.

The **Water Framework Directive (WFD) 2000/60/EC** aims to ensure *i.a.* the good chemical status of both surface water and groundwater bodies across Europe. For surface waters this goal is defined by limits on the concentration of specified pollutants of EU relevance, known as priority substances, including a number of pesticides (e.g. atrazine). To date, 33 priority substances have been identified. A daughter Directive 2008/105/EC, published in December 2008, established limits, known as Environmental Quality Standards, for these 33 substances and for an additional 8 substances regulated under previous legislation. The list of priority substances is currently under review, and more substances, including some additional PPPs, may be included in the Commission proposal due this year. In the context of assessing the ecological status of surface waters under the WFD, Member States must identify additional substances of national concern, including other PPPs, which are being discharged in significant quantities into the body of water as "river-basin specific pollutants". These have to be monitored and must meet national quality standards in order for the relevant river basins to meet the "good ecological status" criterion. The Water Framework Directive's requirement for good chemical status of groundwater is reinforced by the 2006 Groundwater Directive 2006/118/EC, which specifies measures to assess, monitor and control groundwater pollution, as well as generic quality standards for active substances in pesticides, singly and in total. Member States are required to establish more stringent quality standards if it is needed for achieving WFD objectives.

### **3.3. Common Agricultural Policy**

The CAP contains several tools where support is either linked to the respect of environmental requirements (e.g. cross-compliance linked to Single Farm Payment) or granted to farmers for the provision of specific environmental services (Rural

Development). These could contribute to reducing the risks linked to the use of PPPs in the agricultural sector.

In the first pillar, with the introduction of mandatory cross-compliance, the full granting of direct payments is linked to the respect of a number of statutory management requirements applicable on the whole farm, including those stemming from the implementation of Directive 91/414. The Health Check of the 2003 CAP reform introduced a new standard of good agricultural and environmental condition related to water, i.e. establishment of buffer strips along water courses. Member States will be able to define restrictions applying to these buffer strips, including restrictions on the use of PPPs.

The farm advisory system can help farmers respect their cross-compliance obligations and improve the environmental performance of their farms.

In the framework of the Common Market Organisation for fruit and vegetables, support is granted to producer organisations for the implementation of operational programmes that must comprise two or more environmental actions or devote at least 10% of the expenditure on environmental actions. Examples of such actions include the installation of biobeds for filling, storing and washing sprayers (FR); the use of alternative methods and materials to chemical plant protection (natural enemies, traps, solarisation, etc) (BE, CY, ES, FR, HU, IE, IT, NL, SE, UK); organic (ES, IT, NL, SE, UK) and integrated production (CY, EL, ES, FR, IT, NL); integrated pest management (BE, CY).

The second pillar offers a broad menu of flexible policy measures which can be used to support input reduction measures. The possible types of support relate primarily to:

- training and information,
- use of advisory services
- support for farm modernisation (e.g. improvement of spraying equipment)
- pesticide-related obligations for farmers introduced by the Water Framework Directive, imposing major restrictions in farming practice which result in a significant loss of income (article 38);
- environmentally beneficial land management practices which go beyond legal requirements (e.g. support for pesticide use reductions, organic farming, integrated farming).

Some concrete examples of measures taken from the RDPs 2007-2013 contributing to a more sustainable use of pesticides are given hereunder.

- Under the measures on vocational training and use of advisory services

Malta: Advisory services shall cover inter alia supporting documentation required in terms of Rural development measures, including plant protection plans.

- Under the measure on farm modernisation:

Bulgaria: Investments connected to the conversion and development of organic farming and agri-environment

Netherlands: Support contributing to a further reduction of emission of nutrients, ammonia, greenhouse gases and pesticides.

- Under the agri-environmental measures

All Member States (except NL): conversion and/or maintenance of organic farming

AT, BE-FI, CY, CZ, EL, ES, HU, IT, LV, PT, SI, SK: Support to integrated production

Belgium-Flanders: mechanical weeding.

Finland: use of pest monitoring

France: implementation of biological control

Luxembourg: pesticide use reduction in arable crops; biological control against grape berry moths using pheromones for mating disruption

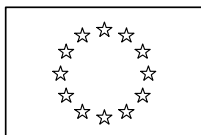
Poland: Establishment of buffer zones where the use of fertilisers and pesticides is prohibited

Sweden: environment protection plan, including measures to reduce risks linked to pesticide use

#### **4. IMPORTANT FORTHCOMING DEVELOPMENTS**

General principles of integrated pest management will become mandatory for all farmers from 2014. This will raise the baseline for agri-environment measures encouraging voluntary actions with regard to pest management.

Member States must communicate National Action Plans under the Pesticide Framework Directive to the Commission by 14 December 2012, this will encourage Member States to take a structured approach to their measures in favour of sustainable use of pesticides, and this should then flow through into the measures they support under rural development.



## EUROPEAN COMMISSION

DIRECTORATE-GENERAL FOR AGRICULTURE AND RURAL DEVELOPMENT

Directorate H - Sustainability and Quality of Agriculture and Rural Development  
**H.1. Environment , Genetic resources and European Innovation Partnership**

### FACT SHEET SOIL

#### 1. INTRODUCTION

Soil is a complex, living resource which performs vital functions as a basis for production (food, livestock feed, fibre, and fuel). Soil is essential for the preservation of water and ecosystem stability. As a global carbon sink, soil has an important role in the mitigation of climate change. Soil is a reservoir for genes and it is an important element constituting landscape amenities and habitat values.

However in spite of the importance of the afore-mentioned functions, soil problems have not received as much attention as the threats such as related to water or air. The lack of attention to soil degradation is illustrated not only in the limited soil protection targets across the EU, but also in the scarcity of data.

Soil is a non-renewable resource and needs to be managed sustainably. Seven of the *soil degradation processes* commonly identified as matters of primary concern (water, wind and tillage erosion; decline of soil organic matter; compaction; salinisation ; acidification; diffuse contamination; and declining soil biodiversity) *are closely linked to agriculture*.

*Erosion* is known to be a serious problem throughout Europe, especially in the Mediterranean zone (water erosion) and in northern Europe (wind erosion). It is a natural process, which can however be significantly accelerated by inappropriate farming practices, namely: ploughing up-and-down slopes, removal of vegetative soil cover and/or hedgerows, abandonment of terraces, overstocking and inadequate use of heavy agricultural machinery. An estimated 115 million hectares or 12% of Europe's total land area are subject to water erosion, and 42 million hectares are affected by wind erosion. With the very slow rate of soil formation, any soil loss of more than 1 t/ha/yr can be considered as irreversible within a time span of 50–100 years.

*Soil organic matter* is a major contributor to soil fertility, as it binds nutrients to the soil, thus ensuring their availability to plants. It is the home for soil organisms, from bacteria to worms and insects, and allows them to transform plant residues, and hold on to nutrients available to plants and crops. It also maintains soil structure, thereby improving water infiltration, decreasing evaporation, increasing water holding capacity and avoiding soil compaction. Moreover, soil organic matter accelerates the break down of pollutants and can bind them to its particles, so reducing the risk of run-off.

In addition, because soil organic matter contains around 60% carbon, it is the defining factor in soil's influence on the global carbon cycle. There is more carbon stored in soil than in the atmosphere and in vegetation combined. In the EU alone, there are more than 70 billion tonnes of organic carbon in our soils. However, as with other carbon cycles, there are constant transfers of CO<sub>2</sub> (carbon dioxide) between the soil and the atmosphere and vice versa, through plants. In addition to CO<sub>2</sub>, soils also play a significant role in the balance of other greenhouse gases: nitrous oxide (N<sub>2</sub>O) emissions are associated with the decomposition of organic matter and the use of nitrogen fertilisers, and methane (CH<sub>4</sub>) is produced in soils under anaerobic conditions<sup>14</sup>.

Decline of soil organic matter has severe consequences for soil biodiversity as well as for suitability and possibility to produce certain crops. An estimated 45% of European soils have low organic matter content, in particular in southern Europe but also in areas of France, Germany and the United Kingdom. Some agricultural practices can have adverse effects on the soil organic matter content: conversion of grassland to arable land, drainage of wetlands, poor crop rotation and plant residue management such as burning crop residues, accelerated mineralization due to management practices such as continued tillage and deforestation. Recent trends in land use and climate change resulted in soil organic matter losses at a rate equivalent to 10 % of the total fossil fuel emissions at pan-European scale. A survey of Belgian croplands (210 000 soil samples taken between 1989 and 1999) indicated a mean annual loss of 76 g C/m<sup>2</sup>. A large-scale inventory in Austria revealed that croplands were losing 24 g C/m<sup>2</sup> annually. Carbon losses from soils across England and Wales in 1978-2003 were about 13 million tonnes of carbon annually. Contrary to cropland, grassland is seen as a net carbon sink in most European countries, with an overall mean of 60 g C/m<sup>2</sup> annually. However, the undisputed hot spot of CO<sub>2</sub> emissions from soils comes from the drainage of peatlands. Although peatlands represent only around 2% of the crop area in Europe, they are responsible for more than 50% of CO<sub>2</sub> emissions from croplands.

*Soil compaction*, i.e. an increase in bulk density and a decrease of soil porosity, can be induced by inappropriate use of heavy machinery and high livestock densities, in particular in wet conditions or on wet soils. Negative effects of compaction includes a loss of soil fertility due to changes in soil structure because of reduced oxygen and water supply to plant roots, reduced water infiltration and retention resulting in increased water run-off, and in increased emission of greenhouse gases from the soil due to changes in the nutrient cycle.

*Salinisation*, i.e. the accumulation in soils of soluble salts (mainly sodium, magnesium, and calcium), can occur naturally in low, poorly drained areas in hot and dry climates, where surface water collects and evaporates, but can be exacerbated by agricultural activities, in particular due to poor irrigation technology, inappropriate drainage and the use of saline waters for irrigation and the overexploitation of groundwater. The countries most affected are Spain, Hungary and Romania.

Acidification, i.e. a significant decrease of the pH value of the soil, describes the loss of base cations through leaching and replacement by acidic elements. It depletes the buffering capacity of the soils and thus changes its ability to neutralise acidity, seriously damaging certain soil biota which are unable to adapt to changes in soil chemistry.

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<sup>14</sup> Both N<sub>2</sub>O and CH<sub>4</sub> are greenhouse gases, almost 300 and 20 times more potent than CO<sub>2</sub> respectively.

*Diffuse contamination* by nutrients, fertiliser impurities (e.g. cadmium) and biocides is more concentrated in areas with intensive agricultural production and can have significant impacts on soil biology communities (and thus soil functions), groundwater sources, and crop uptake. According to the Soil Chapter in the SOER 2010 (p. 21), approximately 15 % of the land surface of EU-25 experienced soil nitrogen surpluses in excess of 40 kg N/ha. Proxy measurements such as the concentration of nitrates and phosphates in water bodies, including groundwater supplies, can be used as an indication of excessive nutrient application to soils.

*Soil biodiversity* is affected by all the threats listed above, and therefore all driving forces mentioned apply to the loss of soil biodiversity, changes in land use (agricultural and forestry practices) and soil contamination being the most prominent.

It is difficult to extrapolate current *trends* into the future based on the limited existing data. However, the human-induced driving forces causing the threats are showing an upward trend. Climate change, in the form of rising temperatures and extreme weather events, is exacerbating both greenhouse gas emissions from soil and threats such as organic matter decline, erosion, salinisation and landslides. All this suggests that soil degradation in Europe will continue, possibly at a faster pace.

## **2. EU INITIATIVE FOR SOIL PROTECTION**

Soil protection is not a specific objective of any EU legislation but it features in some legislation as a secondary objective. To close this gap, the Commission proposed a Soil Framework Directive in September 2006<sup>15</sup>.

In essence, the Directive would require Member States to preserve soil functions, to identify where degradation is already occurring and, setting their own level of ambition and their own timetable, to combat such degradation. This means that where soil friendly sustainable agricultural practices are carried out, they should continue. Where the Member States' own diagnosis establishes that soil degradation is occurring at an unacceptable level, then Member States will need to develop appropriate responses to ensure sustainable use. The European Parliament endorsed the proposal in November 2007, while the Environment Council has been so far unable to reach a qualified majority in its favour.

Currently the most relevant EU environmental directives with respect to soil quality are the Nitrates Directive and the Water Framework Directive. The Nitrates Directive, where properly implemented, is having positive effects on local and diffuse soil pollution by nitrates (and phosphates). The Water Framework Directive is primarily focused on water quality and mitigating the effects of floods and droughts. Because of the link between water and soil quality, measures taken under these directives may contribute to reducing diffuse soil contamination, with expected positive side effects on soil biodiversity.

Other EU environmental directives, such as the Birds and Habitats Directives, the Sewage Sludge Directive and the Plant Protection Products Directive, are expected to have beneficial effects on soil quality, but to a lesser extent. Finally, the Resource Efficiency Road Map, scheduled for 2011, will look at soil in its context as a key resource for the rural economy.

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<sup>15</sup> COM(2006) 232, [http://ec.europa.eu/environment/soil/index\\_en.htm](http://ec.europa.eu/environment/soil/index_en.htm).

### 3. SOIL CONSERVATION FARMING PRACTICES

Data collected under the project "Sustainable Agriculture and Soil conservation" (SoCo, 2009) on the type and distribution of various soil-relevant agricultural practices have allowed the assessment of *two farming systems* (conservation agriculture and organic farming ) and *eleven conservation practices* (no-tillage, reduced tillage, cover crops, ridge tillage, agro-forestry, buffers, contour farming, intercropping, sub-soiling, terracing, water management). The analysis was performed from environmental and economic perspectives, and with respect to their effectiveness in addressing soil degradation processes. These practices appear to have varying capacity for achieving environmental objectives. Knowledge regarding their economic implications is limited.

*Conservation agriculture* comprises a combination of practices, which minimise alteration of the composition and structure of the soil, safeguarding it against erosion and degradation, and preserving soil biodiversity. No-tillage and reduced tillage, in combination with permanent soil cover (cover crops, crop residues) and crop rotation, are essential practices in conservation agriculture. These practices are also referred to as "simplified cultivation techniques". Under conventional tillage, soil organic carbon distribution is uniform over the first 30 centimetres, as a result of soil turnover by ploughing. When conservation agriculture is applied, soil organic matter originated by crop residues is not buried but accumulates in the topsoil: 75 % of the organic carbon from the crop can be found in the uppermost 5 cm.

Uptake of *no-tillage* varies from 4.5 to 10 % (of total arable land) in Finland and Greece and from 2.5 to 4.5 % in the Czech Republic, Slovakia, Spain and the United Kingdom. *Reduced tillage* is practised on 40 to 55 % of the arable land in Finland and the United Kingdom, and on 20 to 25 % in France, Germany and Portugal. All mentioned practices minimise the risk of soil degradation. On the economic side, significant cost savings with respect to labour and fuel consumption are reported, depending on the geographical location (northern or southern Europe). Similarly, consumption of fuel can realistically drop for reduced tillage and no-tillage respectively. Nevertheless, switching to conservation agriculture might require significant capital investment (for example, in sowing equipment) and greater attention in the use of chemicals (that is for weeding). Furthermore, conservation agriculture is a complex, site-specific farming system, requiring training of farmers.

Systematic use of *cover crops* leads to an annual increase in organic carbon of up to 160 kg C/ha/yr. Due to the positive correlation between organic carbon content on the one hand and aggregate stability, moisture content and biodiversity abundance on the other hand, the effect of cover crops on the latter characteristics is also expected to be positive. Cover crops are also considered the best measure against wind erosion.

So-called *catch crops*, in particular, reduce nutrient leaching and thus have a positive impact on soil contamination. Soil cover in general shows significant effects in reducing nitrate losses, whatever the tillage system used, and thus improves water quality. Reduced emissions of N<sub>2</sub>O were observed when no- and reduced tillage was combined with cover crops, especially leguminous ones.

As regards *organic farming*, the area cultivated over the period 1998-2005 under this farming system (including conversion areas) increased by 130 % in the EU-15, and by 2005 it amounted to 4 % of the total utilised agricultural area in the EU-25. However, there is considerable variation between Member States. Organic farming, although



different from conservation agriculture, has similar positive effects on soil organic matter, soil structure, and soil biodiversity. Energy consumption is reduced and beneficial effects are reported on water quality, in particular with respect to pesticides (which are strictly limited in organic farming), on biodiversity (in particular species abundance and/or richness), and landscape.

#### **4. OVERVIEW OF CAP INSTRUMENTS ADDRESSING SOIL ISSUES**

The CAP contains several tools essentially based on two complementary approaches where support is either linked to the respect of mandatory management requirements (e.g. direct payments in combination with cross-compliance) or granted to farmers for committing themselves to provide environmental services beyond mandatory requirements (Rural Development Policy). Both tools could contribute to agricultural soil conservation purposes.

##### **4.1. First Pillar (market and income policy)**

Compulsory cross compliance, a horizontal tool for both pillars, plays an important role in soil protection, conservation and/or improvement. Under cross compliance rules, the receipt of the Single Farm Payment (but also for payments for eight rural development measures under Axis 2) is linked to compliance with a set of standards. Statutory management requirements (SMRs) create synergies between the Direct Payments Scheme and a number of relevant EU environmental directives, including the Nitrates Directive. The requirement to keep agricultural land (whether in productive use or not) in Good Agricultural and Environmental Conditions (GAEC) aims at preventing land abandonment and ensuring a minimum maintenance of agricultural land.

The "health check" of the Common Agricultural Policy in 2009 has kept compulsory some soil-related GAEC standards (minimum soil cover, minimum land management reflecting site-specific conditions, and arable stubble management), while others became optional (retain terraces, standards for crop rotations, appropriate machinery use). Member States have certain margin of discretion in determining national GAEC obligations for farmers. The fact that GAEC requirements are defined at national level enables Member States to address soil degradation processes flexibly according to local conditions. Some Member States used GAEC to compensate for gaps in their existing national legislation on soil protection, while other Member States already had a legislative basis in place and merely adapted it for cross compliance.

##### **4.2. Second pillar (rural development policy)**

Within Pillar 2, a wide range of measures is available which are potentially relevant to soil protection/conservation. These measures offer Member States the possibility of supporting actions to reduce soil degradation on agricultural land when such a need has been identified in their territories:

- Vocational training and information actions: These measures promote important diffusion of knowledge among farmers which is essential for changing practices toward those which are more environment-friendly and sustainable, or help farmers meet costs arising from the use of advisory services or to cover costs arising from the setting up of farm management, farm relief and farm advisory services.

- Modernisation of agricultural holdings or Investment support: These measures can be used to encourage transfer of technologies protecting and enhancing the environment in order to improve the overall performance of the agricultural holding, while respecting the Community standards applicable to the investment concerned.
- Restoring agricultural production potential: This measure is used to mitigate damage caused by natural disasters as well as for preventive action.
- Natural handicap payments in mountain areas and payments in other areas with handicaps: LFA payments aim to ensure continued agricultural land management in areas facing adverse natural conditions. LFA measures are generally relevant to soil protection through avoiding land abandonment. Farmland abandonment has generally negative impacts on soil, such as increased erosion and reduction of soil organic matter quality. Targeting LFA aid to areas suffering from natural handicaps like poor soil texture or steep slopes, and to extensive farming systems important for land management, reduces the above risks. Maintaining agricultural land use in these areas thus delivers environmental and landscape benefits that would otherwise not be provided by the market alone.
- Natura 2000 payments and payments linked to Directive 2000/60/EC: Such payments help farmers to cope with disadvantages resulting from the implementation of the respective directives (Birds, Habitats and Water Framework Directive) in certain agricultural areas.
- Agri-environment measures: These measures encourage farmers to provide environmental services beyond mandatory requirements by offering payments to cover income foregone or costs incurred due to providing such services. The baseline of mandatory requirements comprises cross compliance rules as well as minimum requirements for fertiliser and plant protection product use and other relevant mandatory requirements established by national legislation and identified in the Rural Development Programme. Some schemes pursuing objectives like water or biodiversity protection, or landscape maintenance, are equally favourable to soil conservation. Reduction of input (e.g. fertilisers, plant protection products), crop rotation, cover crops, buffer strips, conversion of arable land to grassland, extensification of livestock and in specific cases voluntary set-aside, are examples of farming practices to protect, maintain or improve soil quality.
- Support for non-productive investment: The aim of this measure is to underpin the commitments undertaken under agri-environment schemes and Natura 2000 through support of non-remunerative investments.
- First afforestation of agricultural land and first establishment of agroforestry systems on agricultural land: These measures pursue to stimulate the diversification from agriculture toward forestry that has a high ecological potential. They offer a strong potential to prevent serious soil degradation processes, in particular soil erosion. First afforestation of agricultural land has been used in many programmes.

## Annex (Soil Fact-Sheet)

### Examples of RD agri-environment schemes with an influence on soil conservation (from "Sustainable Agriculture and Soil Conservation" study (SoCo project, Case Studies, 2009))

Case study and main soil degradation problem	Name of agri-environment incentive scheme	Objectives and Description	Technical Measures	Soil degradation issue targeted
West-Vlaanderen (BE)  Diffuse contamination, soil erosion, decline in organic matter	<b>Agri-environment scheme (RDP)</b>	General objective of agri-environment scheme to achieve green and blue services of agriculture for environment and nature.	Broad range of environmentally favourable farming practices	Multiple soil related targets
	<b>Agri-environment scheme Water</b>	Only available in zones important for surface water collection. Objective: to tackle soil degradation processes of the region.	Manure standards are more restrictive than in Manure Decree (zero or reduced manuring).	Diffuse pollution
	<b>Agri-environment scheme Erosion</b>	Only on parcels susceptible to erosion. Objective: to tackle soil degradation processes of the region.	Non-inversion tillage, no-tillage, grass buffer strips, grass corridors, talus or erosion pools.	Soil erosion, soil compaction
	<b>Soil Cover</b>		Cover crop during winter months.	Soil erosion
<b>Bjerringbro and Hvorslev (DK)</b>  Soil compaction, decline in organic matter, soil erosion	Conversion to organic farming	Conversion to organic farming for cultivated agricultural areas during a 5-year commitment period.	Organic farming practices.	Multiple soil related targets
	Extensive production on agricultural land	Pesticide-free farming during a 5-year commitment period. Support is paid for cultivated agricultural areas only.	No use of pesticides.	Soil biodiversity

Case study and main soil degradation problem	Name of agri-environment incentive scheme	Objectives and Description	Technical Measures	Soil degradation issue targeted
	Establishment and management of set-aside border strips	Replacement and special conservation of set-aside areas. The set-aside must be placed on border strips adjacent to lakes and watercourses, and will reduce soil erosion to the lake or watercourse.	Set aside of agricultural land.	Multiple soil related targets
	Shelter belts	Establishment of landscape and biotope-improving vegetation, including shelter plants.	Planting shelter belts.	Wind erosion
<b>Axe and Parrett catchments (UK)</b>  Soil compaction, diffuse contamination, erosion	<b>Agri-environment scheme:</b> Environmental Stewardship Scheme England	One of the four primary overall objectives is natural resource protection with focus on water quality and soil erosion.  Environmental Stewardship Scheme comprising three elements.	Broad range of environmentally favourable farming practices	Soil in general as a natural resource, soil erosion, risk of runoff, protecting watercourses from diffuse pollution
	<b>Entry Level Stewardship (ELS)</b>		Choice of any of the following: - management of high erosion risk cultivated land - management of maize crops - buffer strips, field margins - beetle banks across contours.	
	<b>Organic Entry-Level Stewardship (OELS)</b>		As per ELS but for organic farmers.	
	<b>Higher Level Stewardship (HLS)</b>	Targeted to environmental priorities of the respective Joint Character Area.	Choice of: - converting arable to grassland - in-field grass areas - seasonal livestock removal - no use of fertiliser on grassland.	
<b>Rodópi (GR)</b>  soil erosion, decline in organic matter, compaction	Agri-environment scheme Natura 2000 (RDP)	Protect and improve natural areas within the boundaries of Natura 2000 sites.	- harvesting from the centre of the field - uncultivated islands in the parcel - limitations on grazing - protecting water collection elements - particular rules for each site.	Indirectly soil erosion, soil compaction

Case study and main soil degradation problem	Name of agri-environment incentive scheme	Objectives and Description	Technical Measures	Soil degradation issue targeted
	Agri-environment scheme Organic agri-culture (RDP)	Income support for organic farmers to avoid use of chemical fertilisers or pesticides.	Particular requirements for organic agriculture.	Indirectly soil erosion, decline in soil organic matter, compaction, soil contamination
<b>Guadalentín basin (ES)</b>  Soil erosion, salinisation, decline in organic matter	Agri-environment scheme Soil Erosion Control	To make agricultural production compatible with soil conservation. Targeted at soil conservation and the control of water erosion.  Allocation of 8 % of Agri-environment scheme budget (fourth rank).	<ul style="list-style-type: none"> <li>- maintain and build new infrastructure such as ponds, ditches, trenches, stone terraces</li> <li>- tillage following slope line is prohibited</li> <li>- establish permanent vegetation strips on erosion prone land with min 25 % planted with re-vegetation species and max 75 % cereals and protein crops</li> <li>- parcels crossed by water flows maintain a 3-5 m wide strip that is vegetated and not cultivated</li> <li>- mulching with remains of pruning.</li> </ul>	Soil erosion by water
	Agri-environment scheme Organic Agriculture	Preserve ecosystems, maintain/increase soil fertility and organic matter content, obtain crops free of chemical residues and reduce chemical pollution from agricultural sources.  Allocation of 57 % of Agri-environment scheme budget.	<ul style="list-style-type: none"> <li>- comply with production rules of EU Organic Farming Regulation and Confederation of Agricultural Producers of Spain</li> <li>- hydroponic systems are prohibited</li> <li>-(and others not related to soil conservation).</li> </ul>	Decline of soil organic matter,  indirectly compaction and pollution
	Agri-environment scheme Integrated Production	Preserve ecosystems, recover/maintain soil fertility and organic matter content, obtain crops with less chemical residues and reduce chemical pollution from agricultural sources.  Allocation of 17 % of Agri-environment scheme budget.	<ul style="list-style-type: none"> <li>- reduction of chemical plant treatments for pest control</li> <li>- comply with technical rules for Integrated Production by RPOPIRM</li> <li>- hydroponic systems are prohibited</li> <li>- (and others not related to soil conservation).</li> </ul>	Decline of soil organic matter,  indirectly compaction and pollution

Case study and main soil degradation problem	Name of agri-environment incentive scheme	Objectives and Description	Technical Measures	Soil degradation issue targeted
Midi-Pyrénées (FR)  Erosion, decline in organic matter	2 <sup>nd</sup> Programme (Regulation 2078) (1993–1999)	EUR 40 000 /yr	Conversion of arable land into grassland, grass strips along river banks, hedgerow plantations	Some projects only (Rougiers de Camarès (Aveyron); Bes Quercy (Tarn et Garonne))
	3 <sup>rd</sup> Programme (2000-2006)	Local definition of environmental priorities (biodiversity, water quality and quantity, eutrophication, erosion) by local authorities and farmers organisation, first involvement of NGOs	- Grassland payment scheme (prime à l'herbe) : 43% of AEM payments - Farm Territorial contract followed by Sustainable Agricultural Contract - main focus on management of existing grassland	Eutrophication, erosion
	Current Programme (2007-2013)	Two environmental priorities:  • compliance with and implementation of WFD  • biodiversity (Compliance with Birds and Habitats Directives)	Broad range of environmentally favourable farming practices	Multiple soil related targets
	LFA	Aimed at preventing land abandonment, keeping the farming population in these areas, and preserving cultural landscapes.	Support permanent grasslands	Soil degradation (+landscape preservation)
	National policy :  Decree 'areas under environmental constraints'	Preservation of humid areas with a high potential for biodiversity (e.g. peat bogs, marsh swamps), 'drinking water' areas and areas subject to erosion.	Recommendations concerning soil cover (temporary or permanent), soil tillage, management of crop residues, provision of organic matter, input management (fertilisers and pesticides), crop diversification (rotation and cropping plan) and preservation or implementation of structures to limit run-off (hedges, banks, ponds, 'fascine').	Soil erosion, soil compaction, soil organic matter decline, soil contamination (+landscape features)

Case study and main soil degradation problem	Name of agri-environment incentive scheme	Objectives and Description	Technical Measures	Soil degradation issue targeted
<p><b>Marche (IT)</b></p> <p>Erosion, loss of organic carbon, compaction</p>	<p>F- Measures of Axis 2 (RDP 2000-2006)</p>	<p>'Protection and Valorisation of the landscape and of Environmental resources'</p> <p>430 000 ha</p>	<p><i>Submeasure</i></p> <p><i>F1): actions targeting the management of agriculture according to low environmental impact techniques and environmentally protective techniques;</i></p> <p><i>Submeasure F2 and F2 B): actions targeted to organic farming techniques and protection of the environment.</i></p> <p>The measure F1 requires farms receiving RDP funds to adopt on the entire farm area techniques with low impact like:</p> <p><i>a Fertilisation Plan defined on the basis of the physical and chemical characteristics of soils and the crops grown,</i></p> <p><i>b) integrated pest control</i></p> <p><i>c) a crop rotation plan for five years and the respect of surface water management as indicated by GAEC,</i></p> <p><i>d) cover crops maintained during winter.</i></p> <p>Other optional techniques can be adopted like erosion control with barriers, hedges, tree rows. The measure F2 and F2B are mainly focused on the organic farming techniques as set by</p> <p>Reg.CEE 2092/91.</p>	<p>Erosion, Loss of soil organic carbon</p>

<b>Case study and main soil degradation problem</b>	<b>Name of agri-environment incentive scheme</b>	<b>Objectives and Description</b>	<b>Technical Measures</b>	<b>Soil degradation issue targeted</b>
<b>Svratka river basin (CZ)</b>  Soil erosion, compaction, decline in organic matter	Agri-environment scheme conversion	Compensation payments to farmers for conversion of arable land to grassland. Targeted to vulnerable soils.	Conversion of arable land to grassland	Soil erosion
	Agri-environment scheme cover crops	Compensation payments to farmers for growing cover crops	Growing cover crops	Soil erosion and preventing loss of nitrogen
<b>Uckermark (DE)</b>  Erosion, compaction decline in organic matter	Agri-environment scheme Environmental friendly cultivation and maintenance of grassland	Overall objective: contribute to the protection of the rural habitat, landscape, natural resources, soil and genetic diversity.	Grassland extensification: application of manure and fertiliser is forbidden; restrictions on periods of grassland use.	Impact on soils is a by-product, indirect effects on soil erosion, compaction and diffuse pollution.
	Environmental and animal friendly agriculture and horticulture and genetic diversity		Greenbelt setting for fruit and vegetable production.	
	Organic farming		Organic farming practices. Includes restriction on use of fertiliser, soil conserving farming practices such as ban on grassland conversion.	





## **FACT SHEET**

### **WASTE, SEWAGE SLUDGE, BIOWASTE IN AGRICULTURE**

#### **1. INTRODUCTION**

Agriculture is considered to be a major source of waste including, *inter alia*, livestock manure, crop residues, plastics and packaging. However, an important part of agricultural "waste" (e.g., slurry, manure, straw, vegetable and cereal residues), is re-used within the agricultural production cycle or for energy recovery (e.g., biogas) and should therefore not be considered as waste.

Moreover, some residues that can be qualified as "waste" have an important role to play from the viewpoint of soil fertility and the carbon cycle. The soil organic matter or carbon cycle is based on continually supplying carbon in the form of organic matter as a food source for microorganisms, the loss of some carbon as carbon dioxide, and the building up of long term carbon in the soil that contributes to soil aggregation and formation. If the rate of addition is less than the rate of decomposition, soil organic matter will decline and, conversely if the rate of addition is greater than the rate of decomposition, soil organic matter will increase. As soil organic matter is crucial to soil fertility, keeping a steady flow of (at least part of) production residues such as straw, vegetable and cereal residues entering the soil is fundamental for food and biomass production.

The agricultural sector also plays an important role in the recycling of waste generated by other sectors. This is particularly the case for sewage sludge, which results mainly from the treatment of urban wastewater. Over the period 2003-2006 (latest data), about 37% of the total sewage sludge produced in the EU (*ca.* 10 million tons dry matter) was used in agriculture<sup>16</sup>, with some countries/regions (France, Denmark, the Walloon Region, Spain and the United Kingdom) reaching rates of over 50%. This could also be the case in the future for biodegradable waste, e.g. food and catering waste, following processing into compost.

For both sources, the effective use of these waste streams is important for the sustainable use of phosphorus, an essential fertiliser that has been identified in several recent scientific studies<sup>17</sup> as an under pressure resource.

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<sup>16</sup> Source: [http://ec.europa.eu/environment/waste/sludge/pdf/part\\_iii\\_report.pdf](http://ec.europa.eu/environment/waste/sludge/pdf/part_iii_report.pdf).

<sup>17</sup> Sustainable Use of Phosphorus, Schroder, Cordell, Smit and Rosemarin, 2010

## **2. CURRENT TRENDS REGARDING WASTE AND SEWAGE SLUDGE IN THE EU**

The volume of waste generated by economic activities can be allocated to the four main economic sectors: agriculture, industry, construction and services. In 2006 industry and construction generated the highest volume of waste, together accounting for 82.7% of all waste produced by economic activities. Services accounted for 11.6% of the total waste and agriculture for 5.8%. Significant deviations from these averages can however be found when looking at country specific data. Some countries show a surprisingly high percentage of waste in one of the four sectors when compared with the EU27 averages. For instance, Cyprus and Lithuania reported substantial volumes of waste from agriculture (23.5% and 30.5%), whereas Romania and Bulgaria reported most of their waste from the industrial sector (95.6% and 98.7%).

The activities differ considerably in the composition of their waste. Some activities are dominated by one waste category, e.g. agriculture by animal faeces, urine and manure. Other activities have a much more mixed composition of their waste; for instance manufacturing and services.

## **3. OVERVIEW OF POLICY INSTRUMENTS ADDRESSING WASTE ISSUES**

### **3.1. Environmental policy**

Waste policies in the EU have been progressively put in place since the 1970s. The EU's current waste policy is based on the 'waste hierarchy'. This first aims at waste prevention, then at reducing waste disposal through re-use, recycling and other waste recovery operations. This hierarchy has been strengthened by the revised Waste Framework Directive (Directive 2008/98/EC), and by the thematic strategy on the prevention and recycling of waste (COM(2005) 666). With regard to residues from agricultural production, the European Court of Justice has ruled that, where the further use of the material is not a mere possibility but a certainty, without any further processing prior to reuse and as part of a continuing process of production, then the material would not be a waste. All three parts must be met. This is the case e.g. when livestock effluents are used as fertiliser or soil improver. However, that is not the case for composting or biogas production because they correspond to further processing of livestock effluents. Consequently, manure and slurry will fall under the scope of the Waste Framework Directive when they are destined for a waste treatment operation such as incineration, landfilling, anaerobic digestion, or composting.

The Sewage Sludge Directive (86/278/EEC) seeks to encourage the use of sewage sludge in agriculture and to regulate its use in such a way as to prevent harmful effects on soil, vegetation, animals and man. To this end, *inter alia*, it prohibits the use of untreated sludge on agricultural land unless it is injected or incorporated into the soil. Since 2009, DG ENV has been assessing whether this Directive should be revised – and if so, the extent of this revision. Work on an impact assessment is ongoing.

In 2008, the Commission adopted a Green Paper on bio-waste, which was followed-up in 2010 by a Communication explaining the future steps in bio-waste management in the European Union. Defining EU standards of quality for compost is one of the options envisaged in order to increase the use of compost made from i.a. biowaste.

### 3.2. Common Agricultural Policy

The CAP includes a series of instruments that contribute to the protection of the environment, in line with the principles prescribed in the Council integration strategy.

Within the first pillar, direct payments to farmers are linked to various obligations through the mechanism of cross-compliance. The Sewage Sludge Directive is included in the Statutory Management Requirements to be respected under cross-compliance. In the framework of the Common Market Organisation for fruit and vegetables, support is granted to producer organisations for the implementation of operational programmes that must comprise two or more environmental actions or devote at least 10% of the expenditure on environmental actions. Examples of such actions include the support for the production and use of compost (BE-FI, ES, IT); the environmental management of packaging (AT, BE-FI + Wa, DK, ES, FR, HU, IE, IT, NL, PT, SE, SK, UK), the use of recyclable substrates (BE-FI).

The second pillar offers a broad menu of flexible policy measures which can be used to support sustainable waste management practices. The possible types of support relate primarily to:

- training and information;
- farm modernisation;
- adding value to agricultural and forestry products
- environmentally beneficial land management practices beyond legal requirements
- basic services for the economy and the rural population.

Some concrete examples of measures taken from the RDPs 2007-2013 concerning the environmental measures related to waste management.

- Under the measures on vocational training and use of advisory services

Malta: Advisory services shall cover i.a. waste management plans

UK-England: Training on i.a. resource use, including waste reduction, waste management, etc.

- Under the measure on farm modernisation

Malta: support for investments in systems of waste management that go beyond the relevant statutory management requirements

- Under the measure 'adding value to agricultural and forestry products'

Belgium-Flanders: support for waste treatment

Belgium-Wallonia: Valorization of wood waste for renewable energy production

- Under the measure 'basic services for the economy and the rural population'

France: Development of essential services, including waste management

- Under the measure 'conservation and upgrading of the rural heritage'

Ireland: Environmental initiatives aimed at waste reduction; alternative or renewable energy actions

In addition, it should be highlighted that organic farming contributes to better waste management since it shall be based on i.a. the specific principle of recycling wastes and by-products of plant and animal origin as input in plant and livestock production. 26 Member States have used agri-environmental measures to support the conversion to and/or maintenance of organic farming.

#### **4. IMPORTANT FORTHCOMING DEVELOPMENTS**

Preparatory work for a possible revision of the sewage sludge directive (2009-2011)

Preparatory work for a possible legislative proposal on biowaste (2009-2011)

Preparatory work for a possible Green Paper on the sustainable use of phosphorus (2010-2011)

Preparatory work for a setting of end-of-waste criteria for compost and digestate from biodegradable waste (technical report expected end of 2011, possible adoption – 2012).

Preparatory work for a setting of recycling target for bio-waste within the framework of revision of Waste Framework Directive (2010-2014).



## EUROPEAN COMMISSION

DIRECTORATE-GENERAL FOR AGRICULTURE AND RURAL DEVELOPMENT

Directorate H - Sustainability and Quality of Agriculture and Rural Development  
**H.1. Environment , Genetic resources and European Innovation Partnership**

### FACT SHEET WATER AND AGRICULTURE

#### 1. INTRODUCTION

Agriculture can impact in different ways on the good chemical and quantitative status of groundwater and on the good chemical and ecological status of surface waters.

Modern-day agricultural practices often require high levels of fertilisers and manure; leading to high nutrient (e.g. nitrogen and phosphorus) surpluses that are transferred to water bodies through various diffuse processes. Excessive nutrient concentrations in water bodies, however, cause adverse effects by promoting eutrophication, with an associated loss of plant and animal species. In high nutrient waters with sufficient sunlight, algal slimes can cover stream beds, plants can choke channels and blooms of plankton can turn the water murky green. Oxygen depletion, the introduction of toxins or other compounds produced by plants, reduced water clarity and fish kills can also result. Excess levels of nutrient, in particular nitrates, can be detrimental to human health.

Pesticides used in agriculture are transported to both surface and groundwaters, threatening both wildlife and human health. The excessive sediment run-off from agricultural land results in turbid waters and the clogging of spawning areas. This in turn leads to loss of aquatic habitats. Microbial pathogens from animal faeces can pose a significant risk to public and animal health. The adverse impacts of all these agricultural pollutants are exacerbated by the use of water for agriculture (primarily irrigation), the net effect of which is to increase the concentration of pollutants in water bodies.

Irrigation as part of intensive agriculture, including horticulture, can lead, and has in fact led, to unsustainable use of water in specific areas of some Member States. In addition, charges for irrigation water do not always cover all costs. Problems arising from irrigation mainly occur in Southern Member States and are often linked to specific crops, such as maize, potato, and fruit and vegetables.

On the other hand, agriculture can also play a positive role in respect to water resources and related ecosystems. Thus, for instance, traditional irrigation systems create diverse and intricate landscapes, which support a variety of wildlife and have important cultural and historic value. In the same way, the creation and management of rice fields often provides important feeding and over-wintering opportunities for some bird species. Moreover, through a redistribution of water resources, new irrigation projects can contribute to improving aquifer recharge and habitat conservation in the areas receiving the new water. This may be the case, for instance, for irrigation projects that entail the

creation of wetland areas, which may provide new feeding and/or breeding opportunities for wildlife.

The preservation of farming activities in mountain and hill zones can ensure the maintenance of a positive land management in these areas, which eventually contributes to preventing floods and landslides and, by decreasing the rapidity of peak run-off of waters, to better regulating the flow pattern and level of the surface water bodies downstream.

Certain farming systems contribute to the building-up of organic matter in the soil and, thus, to the maintenance or even the enhancement of the binding, storage and buffering capacity of these soils, which help limit the diffusion of pollution from soil to water.

## **2. CURRENT STATUS AND TRENDS REGARDING WATER IN THE EU**

In the WFD implementation process, pressures by agriculture have been identified as very high. A review<sup>18</sup> of the draft River Basin Management Plans (dRBMP), which were ready in September 2009, showed evidence that the agricultural sector generates a significant pressure on both surface waters and ground waters in terms of quality and quantity. Results show that diffuse or point source pollution by nitrogen is reported in 91% of the dRBMPs, phosphorus in 90% of the cases and pesticides in 69% of the dRBMPs. Hydro-morphological pressures are reported in about 50% of the dRBMPs. Furthermore, irrigation presents a pressure to water quantity found in about 37% of the dRBMPs (this survey did not include most of Southern European countries and therefore the real percentage is larger).

The first results from the assessment of final River Basin Management Plans confirm these figures.

Pursuant to Article 5 of the Water Framework Directive (WFD), Member States produced in 2004-2005 an environmental analysis of river basin districts and an economic analysis of water use. The results indicate that Member States consider that only a very small percentage of their waters is not at risk of failing to meet WFD environmental objectives.

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<sup>18</sup> Ecologic, 2010. Assessment of agriculture measures included in the draft River Basin Management Plans

<http://ec.europa.eu/environment/water/quantity/pdf/summary050510.pdf>

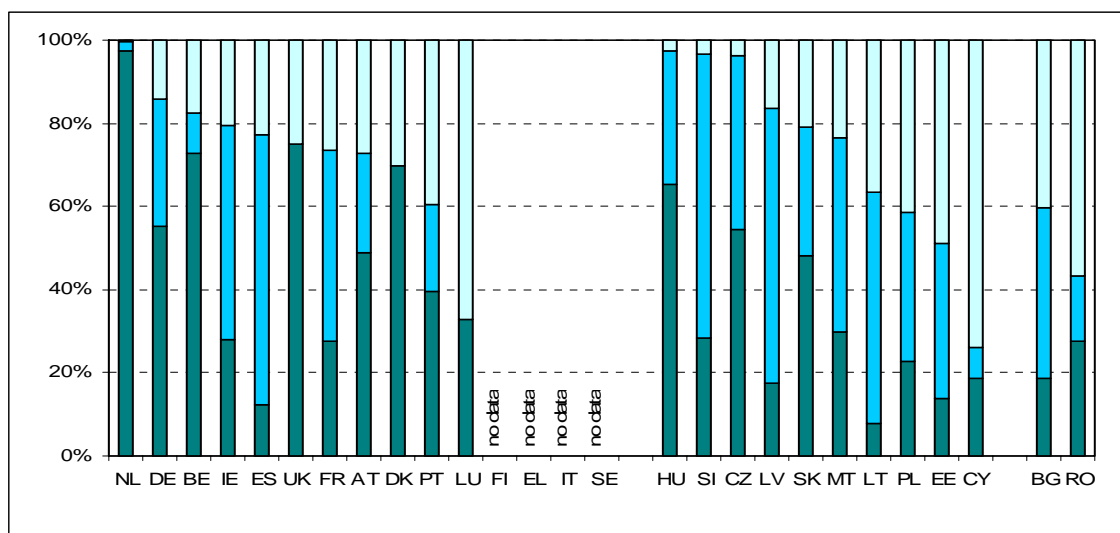


Figure 1: Percentage of surface water bodies at risk of failing WFD objectives per Member State - ■ = 'at risk', ■ = 'insufficient data', ■ = 'not at risk' (based on Member States' reports)

According to the European Environmental Agency, the past decades have seen significant progress in treating the sewage and industrial wastes which are being pumped into Europe's river systems, resulting in lower levels of most pollutants and a measurable improvement in water quality. The agricultural sector, on the other hand, has not made sufficient progress.

Fertiliser input per hectare of agricultural land is declining from a high level in the EU-15. However, it is increasing significantly in the EU-10. Concentrations of phosphorus in European rivers and lakes generally decreased during the 1990s, reflecting the general improvement in wastewater treatment over this period. However, the decrease was not sufficient to halt eutrophication. There was a small decrease in nitrate concentrations in some European rivers during the 1990s. Nitrate concentrations in Europe's groundwaters have remained constant and are high in some regions, threatening drinking water abstractions.

Conclusions in the latest nitrates report<sup>19</sup> state that regarding water quality, for groundwater, 66% of the monitoring stations show stable or decreasing nitrate concentrations. However, in 34% of the stations an increase in nitrate pollution was still observed and 15% of stations showed nitrate concentrations above the quality threshold of 50 mg per litre. Within groundwater bodies, shallow levels showed higher nitrate concentrations than deeper levels. The highest proportion of contaminated water lies between 5 and 15 metres below the surface.

For fresh surface water, 70% of the monitoring stations show stable or decreasing nitrate concentrations. In 3% the concentration is exceeding 50 mg per litre while in 21% the concentration is below 2 mg per litre. In 33% of the stations monitoring trophic status, the water is defined eutrophic or hypertrophic. The pressure from agriculture with respect

<sup>19</sup> Report from the Commission to the Council and the European Parliament on implementation of the Nitrates Directive for the period 2004-2007; SEC(2010)118

to surface water nitrate pollution has decreased in many Member States, although agriculture still contributes largely to nitrogen loads to surface waters.

While pesticide use has remained constant or has declined in general, pesticide concentrations above EU drinking water standards are found in several EU Member States. There has been no significant progress in dealing with the legacy of some localised hot spots of pesticide contamination.

According to the EEA, in Europe as a whole, 44% of water abstraction is used for energy production, 24% for agriculture, 21% for public water supply and 11% for industry. However, these figures mask significant differences in sectoral water use across the continent. In southern Europe, for example, agriculture accounts for 60% of the total water abstracted and reaches as much as 80% in certain areas. The data further show that agricultural water use across Europe has increased over the last two decades, driven in part by the fact that farmers have seldom had to pay the true cost of water. In general, agricultural water use currently appears stable across Europe but at a high level.

### 3. OVERVIEW OF POLICY INSTRUMENTS ADDRESSING WATER ISSUES

#### 3.1. Environmental policy

The main legislation influencing water management is the **Water Framework Directive**<sup>20</sup>, which entered into force in December 2000. This Directive requires Member States to establish, at the latest by end 2009, river basin management plans, each one including a programme of measures aiming to prevent deterioration, enhance and restore bodies of surface water and groundwater and preserve protected areas. MS are also required to ensure, at the latest by end 2010, that water pricing policies provide adequate incentives for users to use water resources efficiently and that the various economic sectors contribute to the recovery of the costs of water services, including those relating to the environment and resources. This directive is complemented by the recent groundwater<sup>21</sup> and priority substances directives<sup>22</sup>.

The WFD implementation follows a pre-established schedule (see table below).

Year	Issue	Reference
2000	Directive entered into force	Art. 25
2003	- Transposition into national legislation - Identification of River Basin Districts and Authorities	Art. 23 Art. 3
2004	Characterisation of river basin: pressures, impacts and economic analysis	Art. 5

<sup>20</sup> Directive 2000/60/EC of the European Parliament and the Council of 23 October 2000, establishing a framework for Community action in the field of water policy.

<sup>21</sup> Directive 2006/118/EC of the European Parliament and of the Council of 12 December 2006 on the protection of groundwater against pollution and deterioration

<sup>22</sup> Directive 2008/105/EC of the European Parliament and of the Council of 16 December 2008 on environmental quality standards in the field of water policy



2006	- Establishment of monitoring network - Start public consultation (at the latest)	Art. 8 Art. 14
2008	Present draft river basin management plan to public	Art. 13 & 14
<b>2009</b>	<b>Finalise river basin management plan including programme of measures</b>	Art. 13 & 11 + Annex VI
2010	Introduce pricing policies	Art. 9
<b>2012</b>	<b>Programmes of measures operational</b>	Art. 11
2015	Meet environmental objectives (Good status of waters)	Art. 4

Through the **Nitrates Directive**<sup>23</sup>, the European Union has introduced a series of measures designed to reduce and prevent water pollution caused or induced by nitrates from agricultural sources. These measures include the obligation to identify polluted waters or waters at risk if no action is taken and to designate the zones that drain in these waters, as well as to establish codes of good practice and action programmes that contain an obligatory set of measures for farmers located in vulnerable zones.

Measures required under *inter alia* the Nitrates Directive must be included in the programmes of measures established under the Water Framework Directive.

Irrigation projects are in the scope of the **Environmental Impact Assessment Directive**<sup>24</sup>, which entered into force in 1997. This Directive requires MS to determine whether public and private irrigation projects should be subject or not to an environmental impact assessment, aiming to identify, describe and assess the direct and indirect effects of the project.

Several other legal acts and initiatives of EU environmental policy are contributing to the protection of waters, e.g. the urban waste water directive, the thematic strategies on soil protection (if adopted) and on the sustainable use of pesticides, the European Climate Change Programme, the 2009 White Paper "Adapting to climate change in Europe – Options for EU action", the 2007 Communication on water scarcity and droughts.

### **3.2. Common Agricultural Policy**

The CAP contains several tools where support is either linked to the respect of environmental requirements (e.g. cross-compliance linked to Single Farm Payment) or granted to farmers for the provision of specific environmental services (Rural Development). These could contribute to implementing the WFD in the agricultural

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<sup>23</sup> Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources

<sup>24</sup> Council Directive 85/337/EEC, on the assessment of the effects of certain public and private projects on the environment, as last amended by Council Directive 97/11/EC.

sector. Most of these instruments have the potential to provide improvements not only in terms of water quality but also in terms of water quantity and hydromorphology.

In the first pillar, decoupling is particularly important for water management issues. It is expected to reduce incentives for intensive production, including the incentive to irrigate. With the introduction of mandatory cross-compliance, the full granting of direct payments is linked to the respect of a number of statutory management requirements on the whole farm, including those stemming from the implementation of the Nitrates directive and the first Groundwater directive, and on keeping all farmland in good agricultural and environmental condition. The CAP reform of 2009 introduced 2 new standards of GAEC related to water: a) establishment of buffer strips along water courses, b) compliance with authorisation procedures for use of water for irrigation.

The farm advisory system can help farmers respect their cross-compliance obligations and improve the environmental performance of their farms.

Member States may also support farmers undertaking agri-environmental actions via the fruit and vegetables Operational Programmes. Examples of such actions include the preparation and implementation of balanced fertilisation plans (CY, HU, IT, SE), the use of water saving irrigation systems (EL, ES, FR IT, NL UK), the use of water saving technologies in the product preparation/processing phase (BE, ES, FR, IT, UK).

The second pillar offers a broad menu of flexible policy measures which can be used to support sustainable water management practices. The possible types of support relate primarily to:

- training and information;
- farm modernisation;
- improving and developing infrastructure related to the development and adaptation of agriculture
- forestry measures aiming at the restoration of the agricultural or forestry production potential damaged by natural disasters and at introducing appropriate prevention actions, where there are risks of floods
- obligations for farmers introduced by the Water Framework Directive, imposing major restrictions in farming practice which result in a significant loss of income (article 38);
- environmentally beneficial land management practices which go beyond legal requirements (e.g. wetland restoration, development of semi-natural water bodies, reduced application of fertilisers).

In addition, some of the obligations of the Nitrates Directive have been funded on a temporary basis by other measures of rural development, i.e. the 'meeting standards' measure and the support to investments, e.g. for building manure storage.

Some concrete examples of measures taken from the RDPs 2007-2013 concerning the environmental measures related to water quality.

- Under the measures on vocational training and use of advisory services

Netherlands: formulation of "business water plans" (describing how to improve the impact on quantity and quality of water at farm level)

- Under the measure on farm modernisation

Belgium – Flanders and Wallonia: aid for investments on water purification, storage and use of rainwater

Hungary: aid for investments for on-farm water saving irrigation systems

- Under the measure on infrastructures related to agriculture

Italy-Marche: improvement and rationalisation of the irrigation network

Spain-National Framework: Horizontal Action of Management of the water resources

France: support for collective water storage infrastructures

- Under the agri-environmental measures

Luxembourg: management of nitrogen and phosphorous fertilisers to improve water quality.

Finland: Establishment and management of riparian zones to reduce nutrients run-off into watercourses and to reduce risks of flooding.

- Under the measure on non-productive investments

Netherlands: Support for several types of investments aimed at improvement of the water quality, in and nearby pre-defined priority areas (Natura 2000 and other important nature areas).

### **3.3. Important forthcoming developments**

According to article 13.6 of the WFD, river basin management plans and the programmes of measures had to be published before 2009.

To date (May 2011) 20 Member States have adopted their plans (AT, BG, CZ, DE, EE, FI, FR, HU, IE, IT, LT, LU, LV, MT, NL, PL, RO, SE, SK and UK). 2 Member States have finalised the plans and are expected to adopt them in the coming weeks (CY and SL). The remaining 5 Member States (BE, DK, EL, ES and PT) accumulate more important delays although they are all expected to complete their plans by early 2012. Updated information can be found on the following website: [http://ec.europa.eu/environment/water/participation/map\\_mc/map.htm](http://ec.europa.eu/environment/water/participation/map_mc/map.htm)

The programmes of measures have to be made operational at the latest by end 2012 (article 11.7 of the WFD).

The Commission is expected to table a '[Blueprint for Safeguarding Europe's Water](#)' by 2012.

The Blueprint will synthesise policy recommendations building on four on-going assessments:

- The assessment of the River Basin Management Plans delivered by the Member States under the Water Framework Directive;
- The review of the EU action on Water Scarcity and Drought;
- The assessment of the vulnerability of water resources to climate change and other man made pressures and,
- The Fitness Check which will address the whole EU water policy in the framework of the Commission Better Regulation approach.