Joint Working Party on Agriculture and the Environment

STOCKTAKING OF POLICY MEASURES ADDRESSING AGRI-ENVIRONMENTAL ISSUES

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SECRETARIAT NOTE

Delegates discussed an annotated outline of the study *Synthesis of Policy Measures Addressing Environmental issues in Agriculture* (COM/TAD/CA/ENV/EPOC(2007)43) at the JWP meeting in December 2007. It asked the Secretariat to prepare a first draft which was discussed at the July 2008 JWP (COM/TAD/CA/ENV/EPOC(2007)9). Amongst the suggestions on how to further develop this study, it was agreed that the title would be adjusted as follows so to better reflect the contents: *Stocktaking of policy measures addressing environmental issues in agriculture*.

The present document includes revised drafts of Chapters 1 and 3, and a first draft of Chapter 2 and the Executive Summary. It is based on comments provided at the JWP meeting of July 2008 as well as written comments provided by Delegations. It is also based on new information provided by some Member countries and information available in the OECD PSE/CSE database and its documentation. The present document is submitted to the JWP for declassification.
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STOCKTAKING OF POLICY MEASURES ADDRESSING AGRI-ENVIRONMENTAL ISSUES

Executive Summary

1. Agricultural production affects water, air and soil quality, influences eco-systems and biodiversity, and shapes rural landscapes. Many of these environmental effects exhibit the characteristics of negative or positive externalities or public goods, for which private markets do not exist or are poorly functioning. In the past decades, the agricultural sector in OECD countries has experienced important technological and economic developments and the closer integration of agriculture into the global agri-food sector. Agricultural productivity and output have increased across OECD countries. The sector is characterised by a significant decree of policy intervention. Increasing public awareness, together with the availability of more information, has led to a greater societal demand to improve the environmental performance of agriculture.

2. In response, agri-environmental policy measures have been developed in OECD countries, and in many cases their share in total support to agriculture has been increasing. It should be recalled, that the Inventory of policies addressing environmental issues in agriculture (Inventory) focuses not only on agricultural policies addressing environmental issues (agri-environmental policies) but also on environmental measures (e.g. regulatory requirements) affecting agricultural production and practices. This Stocktaking report focuses on the developments in the overall range of policies addressing environmental issues in agriculture in OECD countries in the past decade (since the mid 1990s). This stocktaking of policies is undertaken: (i) from the perspective of the policy measures used; and (ii) from the perspective of the environmental objectives pursued by the policies.

Policy instruments used to address environmental issues in agriculture at farm level

3. OECD countries use different mixes of policy instruments to achieve their various environmental objectives. The policy instruments applied are the reflection of the overall policy approach to the sector; the specific environmental issues and their perceived linkage to agriculture activities; the nature of property rights related to the use of natural resources (land, water); and societal concerns related to environmental issues.

4. Although less visible in policy analysis and policy debate, environmental regulations (regulatory requirements) are the core of the policies addressing environmental issues in agriculture. All OECD countries impose a complex set of regulations to prevent the negative impact of agriculture on the environment (preventive measures). Most of these regulations are related to the use (storage, handling, plant and animal application) of agricultural inputs (pesticides, industrial fertilisers, manure) which have the potential to cause negative environmental effects (soil, water, air pollution). These regulatory requirements range from outright prohibitions, to input standards and resource-use requirements. Most of

1. A comprehensive stocktaking of the environmental performance of agriculture in OECD countries since 1990 is in a recently published OECD report. OECD (2008a).
these regulations are both restrictive (banning the use of some products and/or practices or technologies) and prescriptive (setting the rules for application of the allowed inputs – technology, limits of use, etc.). Most of these regulations are applied generally. However, in areas with higher environmental values (natural reserves), drinking water catchment areas, environmentally sensitive areas, or close to population dense areas, stricter regulations are applied. Over time, these regulatory requirements have generally broadened in scope and become more stringent. Some countries provide financial assistance to farmers (in general in the form of investment subsidies) to comply with stricter environmental regulations. An increasing number of regulatory requirements also derive from state, provincial, regional or local measures under the framework of over-arching national legislation, in order to accommodate the local nature of many environmental concerns.

5. Some OECD countries (Australia, New Zealand, to some extent Canada) rely mostly on regulatory requirements to address environmental issues in agriculture. Besides the regulations, specific environmental issues are addressed mainly through environmental programmes targeting specific areas. In many cases farmers and land owners (grouped in local initiatives) are involved in these programmes. Any financial support is provided in the form of technical assistance and extension, with some of that support going to investments in infrastructure and investment on farms.

6. Other countries (mostly EU countries, Norway, Switzerland and United States) have also developed a wide range of voluntary programmes providing incentives (payments) to farmers to adopt specific farming practices with positive environmental effects and/or providing public goods (such as landscape, biodiversity, etc). Although, these programmes offer a large variety of measures, most of the payments are related to the support of extensive forms of farming (mostly on grassland – extensive management of grassland, extensive pastures). Such programmes exist in all countries and represent the most important part of spending on agri-environmental programmes. In Japan and Korea agri-environmental payments have only been introduced recently and they represent a very minor share in the total support to agriculture.

7. Organic Farming is supported in most OECD countries, some of which is linked to the perceived environmental benefits associated with organic production methods. While in some countries the support is limited to the development of organic production regulation and the setting of certification institutions, other countries provide also direct support to farmers adopting organic farming practices. In some countries the financial support is granted to farmers in the period of transition from conventional farming to organic farming, while some other countries provide longer term payments for organic farming (mostly in the form of area payment).

8. Programmes providing payments for retirement of agricultural land from production are also implemented in a range of countries (European countries, Canada, United States). These programmes mainly provide payments for conversion of agricultural land to wetlands or forest. However, in most countries these programmes have a rather limited importance, with the exception of the United States, where payments for retirement of agricultural land (Conservation Reserve Program) account for the most important share of US agri-environmental payments.

9. Some OECD countries do not appear to feature prominently in the use of agri-environmental payments. For example, in Mexico and Turkey, this may be due to the fact that these countries have relatively high shares of agriculture in the economy and employment, which may impede the use of agri-environmental policy measures that would incur high budgetary costs. These countries may have other priorities for available resources.

10. Environmental taxes and charges are applied in some countries on the sale of inputs identified as having a potentially adverse impact on the environment. Taxes and charges are currently levied on
pesticides in some provinces in Canada, Denmark, Finland, Italy, Norway and Sweden, while fertilizer levies are applied in Italy, Sweden and some states of the United States.

11. Other economic instruments, such as tradable rights and quotas, are used in a limited number of countries. These include tradable rights for the development of wetlands in the United States, tradable water extraction rights (implemented on a state/regional basis in the United States), and implementation of tradable water rights in Australia’s Rural Water Reform (2001). Tradable rights based on environmental quotas, permits and restrictions do not yet appear to play a significant role in agri-environmental policy, despite the growing use of such measures for environmental policy in other sectors.

12. Environmental Cross-compliance – measures linking minimum environmental standards to agricultural support programmes, are well established in the United States, Norway and Switzerland, and have been implemented more recently in Korea. Some EU member states (e.g. United Kingdom) have been using the environmental cross compliance since the 1990s. From 2005, cross compliance (including environmental components) has been adopted in all European Union member states.

13. A number of countries, including Australia, Canada and New Zealand, place emphasis on the use of community-based approaches to address environmental issues, through supporting collective action to address environmental pollution. These approaches tend to target farmers’ mutual self interest in environmental conservation in a specific catchment area and make use of local expertise in solving environmental problems.

Policy instruments used to address environmental issues in agriculture at the sector level

14. Most OECD countries have directed greater attention towards improving the knowledge-base relating to environmental issues in agriculture in the past two decades, through increased spending on agri-environmental research, often undertaken in co-operation with private sector interests. One notable trend in this area has been the development of agri-environmental indicators in a number of OECD countries to track environmental performance.

15. Greater emphasis has also generally been placed on communicating information to farmers on environmental issues via technical assistance and extension, in order to induce voluntary changes in farming practices to improve environmental outcomes. Such measures feature an increasingly comprehensive array of information, and now employ a wide range of communication tools such as the Internet.

16. More attention has also been directed at providing consumer information on the environmental attributes of products, in order to meet the demands of an increasingly well-informed and discriminating public. In particular, a range of eco-labelling standards and certification processes have been employed in OECD countries in the past two decades, particularly for organic agriculture.

Targeting policies to environmental objectives in agriculture

17. Agriculture is a major user of natural resource in particular land and water. Many policies provide incentives to specific farming practices on farm land (conversion of arable land to grassland land, extensive pasture, green cover, etc.) or for land retirement (long term set-aside, land conservation, afforestation of agricultural land, etc.) and are often described as combining several environmental objectives, including improving soil quality, water quality, biodiversity and landscape. Which objectives are most important depends on the local conditions. These types of policies also represent the most important part of agri-environmental policies in terms of either payments provided or the land area included in the programme.
18. Some measures are targeting specific areas to address specific environmental issues (e.g. Australia – Murray-Darling Basin, United States – Great Lakes; EU Nitrate Directive applied in areas with high level of nitrate pollution). Increasingly agri-environmental programmes are applied under an overarching framework (at the National, EU level) which sets the main guidelines, but the specific policy measures are defined and applied at lower administrative levels (at the State, Provincial level). This is the case in Australia, Canada, and the United States. In the EU the policies are implemented at member states level and even at lower administrative levels (such as Provinces, Landers). This is for example the case in Austria, France, Germany, Spain, and the United Kingdom.

19. Regulatory requirements and some other measures such as tradable rights and quotas, are generally related to a specific environmental (resource use) issue and the objectives are precisely defined and ready to be measured in order to implement the policy. On the other hand, only for limited numbers of programmes providing agri-environmental payments are the environmental objectives (and outcomes) precisely defined. Most of these payments are for specific (well defined and controlled) management practices which are considered to provide for environmental outcome over and above what is defined by the reference level. In their evaluation these programmes are in most cases quantified by the area which is under a specific management practices.

20. Overall, it is not yet clear whether the compatibility between agricultural, agri-environmental and environmental policies (policy coherence) has improved in the past two decades in relation to environmental issues in agriculture. Some OECD countries have taken steps to streamline agri-environmental policies measures within over-arching frameworks or action plans addressing environmental or rural development objectives. In the broader context, however, where agri-environmental policies offset the damaging environmental effects of input and production-linked policies, the costs of improving the environment are higher than they would be in the absence of such support measures. In this respect it should be noted that the share of support linked to production and input use (i.e. potentially the more harmful for environment) fall in OECD countries from 82% in 1986-88 to 55% in 2005-07.

21. It is expected that agri-environmental policy in many OECD countries will continue to increase in importance in the future, in response to both domestic and international pressures – many environmental issues cross boundaries (GHGs, water pollution, biodiversity, for example) and require coordinate national responses. International agreements are also important in this context. This highlights the importance of evaluating policies and the benefits they pledge to deliver relative to their costs. Despite wide ranging and increasing experience with the use of agri-environmental measures, evidence concerning their cost-effectiveness and environmental impacts is often quite limited. However, a number of OECD countries are now turning greater attention to evaluating the effectiveness and efficiency of these measures.
Introduction

Background

22. Agriculture has a complex relationship with the environment as user and polluter of natural resources, and as provider of ecosystem and cultural landscapes. Overall, across the OECD area, agriculture uses roughly 40% of available land water resources. It is a major source of water pollution from nutrient and pesticide run-off. It has a significant impact on biodiversity and shapes the landscape. It creates greenhouse gas emissions but also acts as a carbon sink. An overall and comprehensive review of the environmental performance of agriculture in OECD countries since 1990 is provided in a recently published OECD report (OECD, 2008a).

23. Agriculture is a sector in which policy plays a significant role in most OECD countries. Agricultural policies provide monetary transfers that influence—directly or indirectly—what and how much to produce and where and under what conditions. Environmental regulations require farmers—either at their own cost or with the aid of subsidies—to adopt certain practices or deliver particular outcomes determined by governments. The overall set of policies applied leads to a complex web of incentives and disincentives provided to farmers, with an equally complex set of multiple environmental effects. Governments in OECD countries have been increasingly interested in tracking the environmental performance of agriculture, identifying possible future environmental problems associated with agricultural activities, and trying to better understand the effects of different agricultural policy measures on the environment.

24. Environmental problems caused by agriculture have often been exacerbated by overall agricultural support policies. The predominant forms of agricultural support in OECD countries in the past forty years have been closely linked to outputs and the use of inputs. These policies have in many cases provided incentives to producers to increase the intensity of production and to expand farming onto environmentally sensitive land, thereby contributing to a number of environmental problems, such as the pollution of water, soil and air, and the over-use of scarce resources – particularly water (OECD, 2001). However, such policies have also helped to maintain certain agricultural production activities that are associated with environmental benefits in a number of OECD countries.

25. By the early 1990s a number of OECD countries had begun reforming their agricultural policies with the long term aim of moving to policies less linked to production, in order to reduce production and trade distortions. These reforms have in some cases reduced pressures on the environment – e.g. through lowering the demand for chemical and mechanical inputs and reducing grazing pressures and manure surpluses. Pressures on the environment have been further reduced in some cases where reforms have been accompanied by restrictions on outputs (e.g. quotas and supply management schemes and environmental regulation.

26. Support to OECD farmers (as measured by the OECD Producer Support Estimate indicator) currently (2005-07 average) accounts for about 26% of total farm receipts (compared with 37% in 1986-88), most of which (55%) is still linked to production and input use, but down from 82% in 1986-88. Maintenance of land in agriculture often increases pressure on the environment than would otherwise be the case in the absence of this form of support. But there has been a shift away from “production-linked” policies and greater use of measures intended to improve the environment. National and international environmental policies are also exerting a growing influence on the environmental impact of farming, especially concerning water quality and availability, ammonia emissions, biodiversity, and most recently climate change.
Objectives and structure of the report

27. This report takes stock of developments in the use of agri-environmental policy measures in OECD countries, drawing at both similarities and differences in the approaches adopted. The report also reviews which environmental objectives are targeted by these policies and how these objectives are defined. It also relates the agri-environmental policies to the context of the whole set of agricultural policies applied and resulting overall support to agriculture. The stocktaking does not attempt a comprehensive evaluation of the measures outlined in terms of their environmental effectiveness or economic efficiency. However, the information contained in the report will be drawn upon as part of ongoing OECD work on policy evaluation (e.g. the Monitoring and Evaluation reports) and will contribute to “making greater use of the tools (indicators, inventory, modelling) in analytical policy studies in OECD work, in particular the Study on developing Guidelines for the design and implementation of cost-effective agri-environmental policy measures (COM/TAD/CA/ENV/EPOC (2008)20/REV1).

28. The report is divided into three chapters. Chapter 1 provides an overview of developments in the use of policy measures to address environmental issues in agriculture in OECD countries. In this part, policy measures are examined in terms of the type of policy measure used, drawing on the classification of measures in the Inventory of Policy Measures Addressing Environmental Issues in Agriculture (Inventory) and the OECD PSE/CSE database and its documentation. The second part provides an overview of environmental objective pursued by these policies and how these objectives are defined in the various policy measures. The third part analyses the agri-environmental policies in the overall context of agricultural policy measures applied and the overall support to agriculture. In contrast with the two previous parts, this part focuses only on agri-environmental measures providing transfers to farmers and hence included in the OECD estimates of support to agriculture (PSE). The Executive Summary highlights the general policy trends and similarities and differences in the approaches adopted by OECD member countries.

1. Policy measures addressing environmental issues in agriculture

29. All OECD countries share the goal of moving toward a path of long-term sustainability in which improving the environmental performance of agriculture has become a high policy priority. The key challenge occurs because the environmental effects (externalities) of agriculture are not always reflected in market prices, and thus the market alone will not lead to an economically and environmentally efficient allocation of resources.

30. Increasing public awareness, together with the availability of more research and information, has heightened the demand to improve the environmental performance of agriculture in OECD countries over the past decades. In response, since the mid-1980s, a large number of policy measures have been introduced addressing environmental issues in agriculture. Some of these policy measures have been specific only to the agricultural sector, while others have been part of broader national environmental programmes affecting many sectors including agriculture. In this report all such policy measures are broadly categorised as agri-environmental policy measures. Other policies that may affect environmental outcomes but are introduced primarily for other reasons – such as supply control measures – are beyond the scope of this stocktaking.

31. This part of the report outlines some of the major developments in agri-environmental policy measures across OECD countries. In compiling this information extensive use was made of the OECD Inventory of Policy Measures Addressing Environmental Issues in Agriculture (hereafter the Inventory) and other available sources such as the country chapters in the agri-environmental indicators report (OECD, 2008a) and the Database on instruments used for environmental policy of the OECD Environment Directorate. The Inventory was established to collect information and data on agri-environmental policy
measures in OECD countries, and classifies this information, inter alia, according to the type of policy measure. Table 1.1 summarises in broad terms the main types of policy instruments used in OECD countries.

Table 1.1. Measures addressing environmental issues in agriculture in OECD countries

<table>
<thead>
<tr>
<th>Measure / Country</th>
<th>AUS</th>
<th>CAN</th>
<th>EU</th>
<th>JAP</th>
<th>KOR</th>
<th>MEX</th>
<th>NZL</th>
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<td>NA</td>
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</tr>
<tr>
<td>Payments based on farming practices</td>
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<td>X</td>
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<td>Tradable rights/permits</td>
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<tr>
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</tr>
</tbody>
</table>

NA – not applied or marginal; X – low importance; XX – medium importance; XXX – high importance

Box 1. Policy measures addressing environmental issues in agriculture

The Inventory has to be seen in the context of the OECD work on agricultural policy reform and sustainable development and therefore as a complement of the OECD databases on agricultural support policies and agri-environmental indicators. The policy measures included in the Inventory cover a broad range of policy measures addressing environmental issues in agriculture, namely:

- Agricultural policy measures where environment outcomes are the primary objective;
- Mechanisms tying general agricultural support programmes to environmental conditions; and
- General environmental policy measures which have a significant impact on agriculture.

It should be stressed that other agricultural and economy-wide policy measures also influence the overall impact (positive or negative) of agriculture on environment - either directly or indirectly - but such policy measures are beyond the scope of the Inventory, although they are relevant for the evaluation of policies. The whole scope of agricultural policies providing transfers to farmers is described and analysed in the annual Monitoring and Evaluation of Agricultural Policies, and available in the PSE database.

Economic Instruments

32. Economic instruments affect the costs and benefits of alternative actions open to farmers, with the intended effect of influencing behaviour in a way that improves environmental outcomes. These instruments typically involve either a monetary transfer – i.e. payments (including credit subsidies or tax relieves) (section 1.1) and charges/taxes (section 1.2.); or the creation of new markets – i.e. tradable rights or permits for the purpose of environmental protection (section 1.3).

1.1. Payments to farmers

33. Most OECD countries offer monetary payments (including implicit transfers such as tax and interest concessions) to farmers and other landholders to address environmental problems (e.g. to reduce pollution) and/or to promote the provision of environmental amenities associated with agriculture. However, the relative amounts of those payments (i.e. their share on total budgetary spending on
agriculture or in total transfers to farmers varies (see part 3.) Most of these payments are provided within programmes applied on voluntary basis. However, there are also payments (mainly investment subsidies) provided to farmers to assist them to comply with environmental regulations. In practice, many agri-environmental payments tend to be linked to land or other factors of production, while payments directly tied to environmental outputs – such as ‘improved landscape’ or ‘more diversity’ – are rare, and this patterns tends to be maintained even in the currently applied policies.

34. There are also differences concerning how the level of payments is established: *i.e.* as a result of a competitive tender (auction), based on fixed rates for a region or whole country, fixed share of the investment costs. The intention is generally to reimburse farmer compliance costs on the principle of profit forgone, sometimes with the addition of an incentive element. In many cases programmes also include the provision of training and technical advice to assist farmers in carrying out targeted activities.

35. Many OECD countries have made payments available to farmers, on a voluntary basis, to encourage them to implement more environmentally-friendly farming practices. In particular, the European Union, Norway, Switzerland and the United States have substantially increased the use of agri-environmental payments. Between 1995 and 2007 these payments have increased in all mentioned countries, although the pace and regularity of this growth varies and in EU the payments tend to stagnate or even decline after 2000 (Figure 1). The United States and Switzerland have already provided relatively important agri-environmental payments for a longer time and the trend is more regular. Norway has a relatively sharp increase of agri-environmental payments but from a relatively low base. Under his 2003-08 Agricultural Policy Framework, Canada has introduced new agri-environmental programmes and the agri-environmental payments have increased between 2003 and 2008. More recently, other countries, e.g. Japan, Korea and Mexico have also begun to make use of these measures.

**Figure 1. Public expenditure on agri-environmental payments 1995 – 2007 (Index 1995 = 100)**

![Figure 1. Public expenditure on agri-environmental payments 1995 – 2007 (Index 1995 = 100)](image)

36. The main types of agri-environmental programmes providing payments to farms, classified according to the categories used in the *Inventory* are outlined in sections 1.1.1 – 1.1.3 below.

1.1.1. Payments based on farming practices

37. Payments based on farming practices are policy measures granting annual monetary transfers (including implicit transfers such as tax and credit concessions) to farmers to provide incentives to implement more environmentally friendly farming practices going beyond those required by regulation and/or defined as good farming practices.

38. Such payments have been increasingly applied in most of the OECD European countries (All EU countries, Norway and Switzerland) and the United States. More recently such payments were introduced in Canada, Japan and Korea.

39. The European Union co-finances with EU member states a wide range of agri-environmental payment programmes based on farming practices under a policy first established in 1992 under the Agri-environment Regulation (No 2078/92), and later included under the Rural Development Regulation (No 1257/99) and from 2007 the Commission Regulation (EC) No 1974/2006 (Box 1).

40. Prominent among these measures are payments to support the adoption of less input-intensive farming practices. By the mid 1990s most EU member states had introduced a variety of national or regional programmes to support organic agricultural production. These schemes generally provide area-based support to farmers for at least five years to encourage the conversion from conventional to organic farming. Most-member countries provide also regular annual payments to organic farming beyond the initial conversion period.

41. EU member states also implement a variety of programmes providing payments to encourage other forms of less input-intensive and/or more environmentally friendly farming practices. This includes, for example, integrated production, and programmes to promote the extensive crop production (low use of fertilisers and pesticides) and extensive management of grassland (livestock grazing with restricted uses of fertilisers and low stocking densities, extensive meadows with restricted mowing practices).

42. Most EU member states also offer agri-environmental payments based on farm practices to target biodiversity and cultural landscape objectives. These programmes are either applied in the whole country or targeted to specific areas with a high potential to provide the desired outcomes. For example in the United Kingdom, under the Environmentally Sensitive Areas Scheme (ESA), incentive payments per hectare are offered under 10 year contracts to farmers who adopt agricultural practices to safeguard and enhance in areas of particularly high landscape, wildlife or historic value. In Sweden some of these programmes are available in specific regions and moreover due to budgetary limits the support goes to projects with most environmental benefits.
Box 2. Agri-environmental payments in the European Union

In 1992, EU member states were required to implement agri-environmental payment programmes under the Agri-environmental Regulation (No 2078/92). In 2000 this policy was integrated with other rural development measures under the Rural Development Regulation (No 1257/99). These regulations have provided the over-riding framework within which the European Union’s agri-environmental payment programmes have been shaped within each member state. Although implementation of programmes is obligatory at the member state level, farmers may choose whether to continue their normal farming practices or to join – usually by contract – particular programmes. The programmes supported fall into several broad categories:

- ways of using agricultural land which are compatible with the protection and improvement of the environment, the landscape and its features, natural resources, the soil and genetic diversity;
- environmentally-favourable extensification of farming and management of low-intensity pasture systems;
- conservation of high nature-value farmed environments which are under threat;
- the upkeep of the landscape and historical features on agricultural land; and
- the use of environmental planning in farming practice.

Programmes are required to achieve environmental benefits that go beyond those obtained through the application of ‘good farming practices’ (which are defined as levels of environmental quality that should be achieved at the farmer’s own expense). Often farmers may select particular activities from a complementary ‘menu’ of programmes. The payment rates are calculated based on the costs incurred or income foregone by farmers as a consequence of entering into these activities, sometimes with the addition of an incentive element. Payments are made to farmers in relation to the environmental obligations taken on, with support based on the area of the holding to which agri-environmental commitments apply. In general, the programmes were for a minimum duration of 5 years, except for long-term set-aside, which is for a period of at least 20 years. The Community co-funds up to 75% of the cost of programmes in Objective 1 areas (defined as less-developed regions), and up to 50% in other regions.

The Rural Development Regulation (No 1257/99), developed further the framework for the implementation of agri-environmental programmes in the EU member states, however the main principles for developing those programmes remained broadly unchanged. EU member states have adopted a wide range of agri-environmental programmes which were often established at different administrative levels (national, sub-national, and regional).

Detailed rules for monitoring of the application of the Rural Development Regulation (No 1257/99) are outlined under the Common Indicators for Monitoring Rural Development Programming Regulation (No 445/02), which specifies that monitoring is to be carried out by reference to pre-agreed specific physical and financial indicators. Member states are required to submit ex ante, mid-term and ex post evaluations for measures implemented under the Regulation for the period 2000-2006, based on European Commission guidelines.

For the period 2007-13, the Commission Regulation (EC) No 1974/2006 of 15 December 2006 are laying down detailed rules for the application of Council Regulation (EC) No 1698/2005 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD). In its axis 2 the regulations defines under part (a) measures targeting the sustainable use of agricultural land through:

(i) Natural handicap payments to farmers in mountain areas;
(ii) Payments to farmers in areas with handicaps other than mountain areas;
(iii) Natura 2000 payments and payments linked to Directive 2000/60/EC;
(iv) Agri-environmental payments;
(v) Animal welfare payments
(vi) Support to non-productive investments.

Under its part (b) for sustainable use o forestry land the regulations provides for payments for:
(i) First afforestation of agricultural land; and
(ii) First establishment of agroforestry systems on agricultural land.
43. A variety of payment programmes also exist under the Rural Development Regulation in a number of EU countries to encourage farm practices to preserve specified cultivated areas (e.g. Portugal, Sweden, Italy), rare (endangered) animal breeds/crop varieties or other flora and fauna (most of EU countries). To prevent soil erosion some countries support conversion of arable land to extensively used grassland (pastures or meadows). Other countries (Belgium, France, Finland, Italy, and Sweden) provide payments for catch crops or green/winter cover. Table 1.2 provides a general overview of agri-environmental payments applied in EU member countries in the period 2000-06.

Table 1.2. Agri-environmental payments applied in EU member countries

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<thead>
<tr>
<th>Programme/Country</th>
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<th>BEL</th>
<th>CZE</th>
<th>FIN</th>
<th>FRA</th>
<th>GER</th>
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<td>Land improvement (liming, soil erosion prevention)</td>
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<td>Extensive crop production</td>
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<td>Integrated production wine, fruits&amp;vegetables</td>
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<td>Traditional methods of cultivation</td>
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<td>Extensive grassland management (pastures/meadows)</td>
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<td>Conversion of arable land into grassland (pastures/meadows)</td>
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<td>Grassland/biodiversity/habitat schemes</td>
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<td>Maintenance of wetlands and ponds</td>
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<td>Protected environmentally sensitive areas/vulnerable zones</td>
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<td>Payments for land retirement</td>
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<td>Long term set-aside</td>
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<tr>
<td>Conversion of farm land into wetland and ponds</td>
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44. In most EU member countries the programmes providing payments based on specific farming practices are available on a voluntary basis to farmers who may select an appropriate combination of those practices and receive relevant payments. However, some countries (e.g. Finland, Ireland) have set basic scheme programmes requiring farmers to comply with a set of practices required by these schemes (five basic measures + one optional in Finland; 11 measures in Ireland) to obtain the payment.

45. Payments based on farming practices have also been implemented in non-EU European countries. In Switzerland the Federal Agricultural Law from 1996 (applied in 2000-2003) and amended in 2003 (for the period 2004-07) offers a range of payments based on different standards of agricultural practices. Most of these payments continue to be applied under the Agricultural Law for 2008-11. Under
voluntary programmes payments are provided to farmers for specific biotypes, such as extensive grasslands, floral fallows, high stem fruit trees, and hedges. Payments are also provided for support of extensive cultivation of grains and oilseeds and for organic farming. Norway introduced payments to support organic farming in 1991, and currently offers an organic conversion payment, which is paid per hectare, together with on-going area and headage payments for organic farmers. In the period 1994-2001 payments were also granted to support mountain dairy farming in order to contribute to the maintenance of the cultural landscape through summer animal grazing in mountain areas. From 1994 under payments for changed soil conservation - a per-hectare payment is granted for not cultivating erodible soils in autumn and for planting cover crops in cereal fields and for grass strips around water courses. In 2004, Norway introduced a general landscape payment under which a fixed rate payment is granted per hectare of all agricultural land provided that the farmer complies with good farming practices.

46. The United States provide payments to support voluntary adopted environmental friendly farming practices, based on a cost share and incentive basis, through a wide range of programmes. Some of these programmes are applied throughout the country, while others are targeting specific areas with a specific environmental or natural resource concern. Most of these programmes is also financing technical assistance on farms to develop and implement those programmes. The Environmental Quality Incentives Program (EQIP) was established by the 1996 Farm Act (amended under the 2002 FSRI Act) to provide financial and technical assistance to farmers to promote the adoption of environmentally-sensitive practices in environmentally sensitive areas, mainly to reduce soil and water resource problems. EQIP provides assistance of up to 75% of the costs of certain conservation practices, such as nutrient management, manure management, integrated pest management, irrigation water management, and wildlife habitat management (at least half of the fund is spent to improve livestock manure management). Farmer contracts are for 5 to 10 years. Around USD 750 million was spent under EQIP annually (in 2005-07). The Conservation Security Programme (CSP), (part of the 2002 FSRI Act), was implemented from 2004. This voluntary programme provides payments to producers for adopting or maintaining a wide range of farm practices that address one or more resources of concern, such as soil, water or wildlife habitat. It provides equitable access to benefits to all producers, regardless of size of operation, crops produced, or geographic location. In contrast to other conservation programmes, CSP is focused on operations that already have addressed environmental problems, while keeping the land in production. The program provides three tiers of participation that differ in contract length and total payments according to the amount of treatment and the portion of the agricultural operation being offered. Payment limits per farms are set for the three tiers. Around USD 200 million were spend yearly in 2005 and 2006. Other programmes providing payments for farming practices such as the Ground and Surface Water Program (GSWP), the Farmland Protection program (FPP), and the Grassland Reserve Program (GRP) carried altogether annual payments around USD 200 million.

47. In Canada, the main agri-environmental programmes are implemented under the Agricultural Policy Framework (APF) applied in 2003-08. These programmes are financed (or co-financed) from federal budget, but the delivery mechanism is developed and implemented by Provinces. The National Farm Stewardship Program provides payments based for specific farming practices and technical assistance. In 2008 the annual spending was CAD 112 million and around 44 000 contracts for Beneficial Management Practices (BMPs) were signed. Green cover Canada provides also financial and technical assistance to farmers and focuses on land conversion, critical areas, watershed evaluation of BMPs and shelterbelts (expenditures raised from CAD 4 million in 2003/04 to CAD 29 million in 2007/08). The Land and Water Stewardship program carries annual payments around CAD 35 million (2003-2008); includes various programmes which are developed and implemented by Provinces, while the National Water Supply Expansion Program provides technical and financial assistance to Canadian producers to help develop, protect and enhance long-term agricultural water supplies (expenditures raised from CAD 5 million in 2003/04 to CAD 28 million in 2007/08).
48. In Mexico, a programme for sustainable agriculture and productive reconversion in recurrent zones of natural disasters, provide area and headage payments to farmers that present a rural sustainable development project and/or a productive project of conversion.

49. In 1999, Korea introduced direct payments to farmers eliminating or restricting the use of fertilisers and pesticides in drinking water conservation areas. The programme was revised in 2002 to expand the application of incentive payments to the whole country. Three basic schemes are available to farmers voluntary joining the programme (organic farming: no pesticides, no chemical fertilisers; pesticide-free: no pesticides, limited use of chemical fertilisers; and low agrochemical: limited use of pesticides and chemical fertilisers). In 2004, Korea introduced payments to support environmentally friendly livestock farming to farmers applying specific manure management practices and maintaining limited stocking densities. Additional payments per farm are provided to farmers managing appropriate landscape architecture (elements) around farm livestock facilities. In 2005, Korea introduced a pilot project to provide financial support to greenhouse and horticulture producers replacing the use of chemical pesticides by natural enemies. In 2007, Japan introduced direct payments for environmentally friendly farming to farmers committing themselves to reduce the use of chemical fertilisers and pesticides to a half of the conventional farming practice in the region.

50. In Australia, the National Heritage Trust activities were extended form 2002/03 to 2006/07 and the Trust’s existing 23 programmes were consolidated and simplified into four overarching programmes: (i) Landcare Program – reversing land degradation and promoting sustainable agriculture; (ii) Bushcare Program - conserving and restoring habitat for Australia’s unique native flora and fauna which underpins the health of landscapes; Rivercare Program – improving water quality and environmental condition in Australia’s river systems and wetlands; and Coastcare Program – protecting coastal catchments, ecosystems and the marine environment. Especially the Landcare and Bushcare programmes, and to some extent the Rivercare programme, include measure providing payments for specific farming practices, mostly implemented through farm groups and communities.

1.1.2. Payments based on land retirement

51. Programmes under this category provide incentive payments to remove land or other factors of production from production for environmental purposes. Such programmes have dominated agricultural conservation expenditures in the United States since the mid-1980s. The major land retirement programme is the Conservation Reserve Program (CRP), which was introduced under the 1985 Food Security Act. The CRP provides farmers an annual rental payment to farmers who enrol in 10-156year contracts to retire land from production. Since 1996, CRP rental payments have averaged more than USD1.5 billion a year, or around 95% of the total spent on land retirement. As part of the 2002 FSRI Act, the maximum acreage eligible for CRP payments was increased from 14.7 million hectares to 15.8 million hectares. Correspondingly, the annual CRP payments increased to range from USD 1.8 to 1.9 billion in 2002-2007.

52. In 1993, Switzerland introduced land retirement payments under its Green Fallow and Floral Fallow programmes, in order to promote biodiversity and habitat protection. Agri-environmental land retirement payments are also common in the European Union. Most EU member states have implemented various land retirements programmes for various environmental purposes – particularly to protect water supplies and biotope reserves – under the Agri-environment Regulation (No 2078/92) and the Rural Development Regulation (No 1257/99). For example, as part of the PDRN programme (2000-2006), a number of EU member states implemented a range of land retirement payments targeting a variety of environmental objectives, including the conversion of arable land to (extensively managed) grassland, long-term set aside. An increasing number of EU member countries are also providing payments to take former wetlands out of agricultural production, re-establish and manage them (see Table 1).
53. In 1992, the **European Union** also introduced a forestry scheme (Council Regulation No. 2080/92), later encompassed under the Rural Development Regulation (No 1257/1999), granting support to contribute to the planting costs for the afforestation of agricultural land. Its objectives are to improve forest resources, reduce the shortage of wood in the EU, encourage forms of countryside management more compatible with the environment, and combat the greenhouse effect. Co-financed by the EU, payments may also cover forestry management costs over a period not exceeding five years; and income compensation up to a period of 20 years.

54. The payments supporting afforestation of agricultural land were also provided in a number of other OECD countries (**Australia**, **Mexico**, **Japan**, and **United States**). The **Wetland Reserve Program** in the **United States** provides annual cost-share payments or lump-sum payments and technical assistance to producers for implementing an approved wetland restoration and conservation plan and providing a permanent or long-term easement. The annual spending under this programme ranged from USD 250 to 300 million in 2002-2007.

55. Finally, measures to reduce the negative impact on the environment of certain farming practices by financing the exit of farmers from specific activities have been recently implemented in some countries. In early 2000, the **Netherlands** and **Belgium** (Flanders Region) introduced a package of measures to buy out pig production quotas. It is anticipated that this buy-out scheme will reduce the national manure surplus and release environmental pressure.

1.1.3. Payments based on farm fixed assets

56. Payments based on farm fixed assets are policy measures granting a monetary transfer (including implicit transfers such as tax and credit concessions) to farmers to offset the investment cost of adjusting farm structure or equipment to adopt more environmentally friendly farming practices. A wide range of such payments have been implemented in OECD countries in the past twenty years.

57. In the **United States**, the **Environmental Quality Incentives Program (EQIP)** grants payments to farmers covering up to 75% of the investment cost of installing or implement structural changes to promote environmental objectives, with a particular emphasis on addressing environmental problems associated with the livestock sector — e.g. building animal waste management facilities and creating filter-strips (see also section 1.1.1). In 2000, **Agriculture Management Assistance (AMA)** was also made available in fifteen states to provide cost-share payments to farmers to carry out activities to address environmental issues, including the construction or improvement of water management structures, irrigation structures, and the planting of trees for windbreaks or to improve water quality.

58. A number of structural payment programmes have also been implemented in the **European Union** under the **Rural Development Regulation (No 2057/99)**. Almost all member countries implemented programmes providing subsidies for investment in manure storage, processing and application capacities. In many cases these investments were necessary in order to comply with the strengthened environmental regulatory requirements.

59. Tax and credit concessions are sometimes used to offset the investment cost of adjusting farm structure or equipment to promote environmental improvements. For example, since 1999, **Japan** has provided concessionary loans to farmers for capital expenditure to promote more environmentally sustainable farming. Supported projects are administered by prefecture authorities and include the purchase of agricultural machinery, such as compost storage facilities, compost spreaders, and infrastructure improvements, such as manure storage facilities. Commonwealth tax concessions were introduced in **Australia** in the 1980s in order to promote a range of environmental objectives, including the prevention of land degradation and water conservation. Payments in kind have also been introduced in some countries.
For example, in Canada, under the Shelterbelt Program, trees and shrubs are distributed (free of charge) to qualifying landowners in the Prairie Provinces for shelterbelt planting in agricultural areas, in order to enhance environmental sustainability and biodiversity. This programme was supplemented in 2001 with the introduction of the Shelterbelt Enhancement Programme, which is aimed at improving shelterbelt planting success to promote the sequestration of greenhouse gas emissions, as part of Canada’s Action Plan 2000 on Climate Change.

60. One further trend has been the introduction of structural cost-share programmes specifically to assist farmers in meeting the costs of environmental regulatory requirements. For example, in 2000 the United States introduced Soil and Water Conservation Assistance to help landowners comply with Federal and State environmental laws and make beneficial, cost-effective changes to cropping systems, grazing management, nutrient management, and irrigation.

1.2. Environmental taxes/charges

61. Policy measures imposing a tax or charge relating to pollution or environmental degradation include taxes and charges on farm inputs or outputs that are a potential source of environmental damage. The implementation of taxes and charges appears to be rare in agriculture, compared to other sectors. This may at least partly reflect practical problems of measurement – unlike a factory where pollution can normally be monitored at “point”, the pollution from agriculture is much more dispersed, as it tends to originate from many different independent farms and in varying intensities.

62. Nonetheless, some examples of these policy measures do exist. Since 1998, the Netherlands has tackled the measurement problem by introducing a range of levies on off-farm nutrient emissions above a set limit. Since 2006, the system directly regulates the maximum amount of fertilizers (animal manure plus maximum amounts of nitrate and phosphate) that may be used on the farm. The former system (MINAS) regulated emissions, not usage, to comply with the EU nitrate directive. Similar taxes on the estimated on-farm generation of nutrients over set levels are also in place in Belgium and Denmark. The Czech Republic applies taxes on ammonia emissions per head of ruminants in large scale enterprises.

63. In agriculture, environmental taxes are more often applied on the sale of inputs identified as having a potentially adverse impact on the environment. For example, various taxes and charges are currently levied on pesticides in Canada (British Columbia), Belgium (abolished in 2007 and replaced by stricter regulation), Denmark, Finland, Italy, Norway and Sweden, while fertilizer levies are applied in Italy, Sweden and some states of the United States. Input-based taxes are generally inexpensive to administer, but may be less effective than a tax on pollution itself, as they do not discriminate on the basis of actual loading on the environment.

1.3. Tradable rights/permits

64. Tradable rights based on environmental quotas, permits and restrictions also do not yet appear to play a significant role in agri-environmental policy, despite the growing use of such measures for environmental policy in other sectors (there is already experience with tradable CO₂ permits within the energy sector). However, in the past decade the Netherlands has implemented systems of tradable permits in relation to the volume of manure produced by farms.

65. There are also examples of tradable schemes that are applied across a number of sectors, including agriculture. These include tradable rights for the development of wetlands (“Wetland Mitigation Banks”) in the United States, and tradable water extraction rights, which have been implemented on a state/regional basis in the United States. Australia implemented a more market-based system for water in its Rural Water Reforms (implemented in 2001) – under which water pricing reflects the full cost of
providing water, remaining subsidy elements are more transparent and water rights no more tied to land and become tradable. **New Zealand** is planning a nutrient surplus trading scheme.

**Community based measures**

66. In some countries—**Australia**, **Canada** and **New Zealand**—government-led information policies are supplemented by the growing use of community-based approaches promoting the exchange and transfer of information, variously known as **landcare groups or conservation clubs**. These approaches make use of local expertise in solving environmental problems that thereby enhance environmental conservation, and rely upon the self interest of farmers. Such groups seem especially well-suited to address issues that are local in nature, but which extend beyond the borders of a single farm. Some of these groups receive administrative or financial support from central or regional authorities, while others are entirely self-financed and independent.

**Regulatory measures**

67. Measures classified under this category involve a compulsory restriction on the choice of economic agents, i.e. they are left with no choice but to comply with specific rules or face penalties (including the withdrawal of financial support).

**1.4. Regulatory requirements**

68. Regulatory requirements are compulsory measures imposing requirements on producers to achieve specific levels of environmental quality, including environmental restrictions, bans, permit requirements, maximum rights or minimum obligations. Enforcement mechanisms, such as legal redress or fines, are used where producers are found to be in breach of regulations or other legal requirements.

69. Regulatory requirements play a role in addressing environmental issues in agriculture in all OECD countries. Some of these requirements are specific only to agriculture, while others are part of broader national environmental legislation affecting many sectors, including agriculture. Regulatory requirements tend to be less flexible than economic instruments, as they do not allow producers the freedom to determine for themselves the most appropriate ways of meeting environmental objectives. However, they also tend to minimize risk and uncertainty, and therefore constitute a vital element of environmental policy in most OECD countries, particularly with respect to acute environmental problems.

70. All OECD countries have applied legislative requirements to deal with problems relating to pollution, and the degradation and depletion of natural resources. The main categories of these requirements include: the availability of certain inputs to farmers, (for example, through the registration of pesticides and other agrochemicals); farm practices, (for example, the setting of limits on the spreading of manure and stocking limits); and the application of mandatory procedures, (for example, planning or consent processes relating to land use, water extraction and the construction of livestock and manure storage facilities). Regulatory requirements are also common to protect specific valuable wildlife and habitats, and to protect agriculture and the environment from damage from invasive species and new organisms.

71. Over the past two decades, there has been a trend towards more regulation and binding constraints, but not always uniformly across the whole sector—such as for large animal units in the U.S., but not small ones. A significant proportion of requirements imposed in OECD countries are applied at local and regional levels. For example, in the European Union, standards are developed at a range of levels, stretching from the Union itself down to individual regions in Member States. Regulatory requirements are often applied under the framework of over-arching legislation at the national, federal (or EU-wide) level; (for example, New Zealand’s Resource Management Act (1991) tasks Regional Councils with the
responsibility of environmental resource-use policy). However, while the EU Nitrate Directive, which sets a benchmark limit on nitrate levels, associated with the application of manure in the European Union, it leaves Member States free to determine their own action programmes with respect to designated nitrate vulnerable zones.

72. Regulatory measures can tackle agri-environmental objectives in a variety of different ways, imposing differing degrees of restrictiveness on landowners. Three main categories are used below to highlight some of the most prominent policy measures.

I.4.1 Reducing pollution

73. Since the 1980s there has been a general expansion in regulatory measures to protect waterways and groundwater, and to reduce air pollution, particularly in the following areas.

- **Inputs.** An important aim in all OECD countries is to reduce pollution generated by the use of agricultural inputs is laws regarding the marketing and sale of Chemical inputs, particularly pesticides. Laws have typically been amended over time such that many countries now approve new pesticides for a limited period only (commonly five to ten years). Some requirements relating to inputs have been implemented in response to international pressures – for example, the phasing out of the marketing and use of methyl bromide pesticides under the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer.

- **Use of Pesticides.** All OECD countries set strict rules concerning the storage, and application of chemical fertilisers and pesticides. The aerial spraying of pesticides is now prohibited in some parts of the European Union and Australia. It is heavily controlled in many other regions and countries, with licences or permits commonly required. In many OECD, the use of pesticides is also now restricted within a certain distance of watercourses. In the European Union a process is underway to enhance the entire pest management regulation. The most relevant regulations will be probably adopted during 2009.

- **Nutrient Management.** While laws prohibiting the direct discharge of animal waste to surface waters have existed in most OECD countries since the early 1970s, a large number of restrictions have since been applied in relation to general farming practices associated with pollution from nutrients. In particular, OECD countries have introduced a variety of requirements relating to manure management in order to limit nutrient pollution from livestock farming, including restrictions on the quantity of manure that can be spread; seasonal bans on manure application; manure storage requirements; and limitations on livestock densities and on the expansion of livestock units. Such measures have become particularly common in the European Union, where the Nitrate Directive (No 91/676) requires member states to limit the application of manure in nitrate vulnerable zones to 170kg/hectare/year. Many other OECD countries have also tightened regulatory requirements relating to the application of nutrients, either at the national or state/regional level. In New Zealand, Regional Councils place limits on the permissible levels of nitrogen applied in dairy effluent, such that farmers spreading effluent from milking shades are limited to 150-200 kg N/ha/year. Increasingly Canadian provinces are mandating manure management plans through regulatory changes.

- **Scale of production.** In some OECD countries large-scale livestock production units are controlled through permitting systems, either at the national or regional level. For example, the European Union Integrated Pollution Prevention and Control Directive, which has been applied since 1999 to new facilities (and is to be applied to existing facilities from 2007), requires member states to impose emission limits in environmental permits which are mandatory for
potentially polluting plants of a given scale – in particular very large pig and poultry facilities. In Japan, under the Water Pollution Control Law and other associated legislation, upper limits are set for discharges of pollution for specified agricultural facilities, including large-scale pig and cattle facilities, and stables.

- **Buffer strips and catch crops.** Buffer strips around water courses and groundwater sources have become a common requirement to limit nutrient leaching in many OECD countries, including Australia, Canada, and New Zealand. Some governments have also established regulations requiring farmers to maintain a minimum level of green cover during certain times of the year (catch crops). Requirements for catch crops are most stringent in Denmark and some parts of Sweden.

1.4.2 Use of natural resources: water and soil

74. Restrictions to limit the quantitative extraction of water for irrigation purposes are becoming increasingly common in regions where water is scarce. For example, in Australia, caps on water extractions in many irrigation zones were set in the 1990s, and in some cases embargoes exist on further irrigation licences to extract groundwater. These caps have sometimes also been combined with the creation of tradable rights (see section 1.3). Restrictions on water extraction are now also common in some states in the United States – for example, in Florida 5-10 year permits must be obtained to extract water, construct wells and install new water surface management systems. In New Zealand, irrigators are required to apply for permission to use water and comply with any conditions imposed, including reductions in usage to protect minimum flows in rivers.

75. Regulatory requirements regarding land use have become increasingly common in relation to soil quality, either at the national or state/regional level. For example, Switzerland’s Act on Soil Damages, introduced in 1998, requires farming practices preventing long-term soil compaction and soil erosion in order to maintain the long-term fertility of soils. In Queensland, Australia, the Soil Conservation Act 1986 requires land owners to apply for approval of ‘property plans’, which must specify soil conservation measures and can also relate to land clearing practices and other aspects of land management.

1.4.3 Biodiversity

76. Most OECD governments at federal and provincial/state level have well established legislation to protect valuable wildlife and habitats, which can influence on-farm practices. These measures have been shaped by international as well as domestic considerations, including the obligations of OECD member countries to stem the loss of biodiversity under the International Convention on Biological Diversity (CBD), which was agreed at the UN Conference on the Environment and Development in 1992.

77. Under the Birds Directive (No 409/79) and the Habitat Directive (No 43/92), European Union member states are required to take steps to protect endangered species, as well as the habitats upon which they depend for feeding and breeding. Similarly, in the United States, the Endangered Species Act (1973) protects endangered species and their habitats, and requires federal permits for certain practices, such as filling wetlands for the purpose of agricultural production. Many OECD countries have also legislated to protect remaining valuable non-farm habitats which are often adjacent to farmland, such as wetlands, hedgerows, bush and forests. For example, in 1997, the United Kingdom introduced legislation administered by local authorities to protect important hedgerows bordering agricultural land from deliberate removal. In 1992, Switzerland introduced legislation imposing stricter limitations on farm land use, including bans or limitations on the use of agri-chemicals, in specific regions such as marshes and wetlands.
78. Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora establishes a European ecological network known as "Natura 2000". The network comprises "special areas of conservation" designated by Member States in accordance with the provisions of the Directive, and special protection areas classified pursuant to Directive 79/409/EEC on the conservation of wild birds. Special areas of conservation are designated in three stages. Each Member State must draw up a list of sites hosting natural habitats and wild fauna and flora. On the basis of the national lists and by agreement with the Member States, the Commission will then adopt a list of sites of Community importance. No later than six years after the selection of a site of Community importance, the Member State concerned must designate it as a special area of conservation. Member States must take all necessary measures to guarantee the conservation of habitats in special areas of conservation, and to avoid their deterioration. The Directive provides for co-financing of conservation measures by the Community.

79. Regulatory measures to protect agriculture from invasive species are well established in OECD countries, and are particularly prominent in countries where farm production and ecosystems are most vulnerable, such as Australia and New Zealand. In addition, measures regulating the introduction and use of new organisms – including new agricultural biotechnological products – have in many cases been further developed or strengthened.

1.5. Cross compliance approaches

80. Cross-compliance mechanisms are measures requiring farmers to fulfil specific environmental requirements or levels of environmental performance in order to be eligible for payments from specific agricultural support programmes. Where support payments remain relatively high, cross-compliance may be characterised as de-facto regulatory requirements for farmers that are eligible for payments.

81. In the past two decades, many OECD countries have made general support programmes, which provide payments to agricultural producers, conditional upon the respect of certain environmental constraints or the achievement of a particular environmental outcome. Such conditions are a significant part of agri-environmental policy in the United States, where an estimated 44 million hectares of highly erodible cropland and 31 million hectares of wetlands are subject to cross-compliance provisions, reflecting the high participation rate in general farmer support programmes.

82. Since the late 1990s, most general direct payments offered to farmers in Switzerland, including area and headage payments, and payments based on historical entitlements, have also been made conditional on farmer compliance with environmental standards and farm-management practice requirements (integrated farming). Norway offers various forms of area-based payments and headage support for livestock on the condition that farmers meet environmental requirements.

83. Environmental cross-compliance conditions have also become important in the European Union, following the inclusion of such conditions as an option in the implementation of direct payments, as part of the Agenda 2000 CAP reform package. Cross-compliance conditions, including for the environment, have been extended to most payments received by farmers following the 2003 CAP reform (Box 3).
Box 3. EU Cross-compliance

The principle that farmers should comply with environmental protection requirements as a condition for benefiting from market support was incorporated into the Agenda 2000 reform. The 2003 CAP reform put greater emphasis on cross-compliance which has become compulsory.

The Agenda 2000 CAP reform introduced the requirement for Member States to take the environmental measures they consider appropriate in view of the situation of the agricultural land used or the production concerned. This requirement was incorporated in the "Horizontal Regulation" (No 1259/1999), which provides the common rules in relation to all payments granted directly to farmers.

Member States had three options for fulfilling this obligation: giving support for agri-environmental commitments, fixing general mandatory environmental requirements (based on environmental legislation), and setting out specific environmental standards. Where farmers do not respect the environmental requirements, appropriate sanctions are to be applied, which may include the reduction or even the withdrawal of direct aids. Examples of environmental conditions are adherence to maximum stocking rates for cattle or sheep, compliance with specific conditions for the cultivation of sloping land, respect of maximum permitted volumes of fertilizers per hectare, and compliance with specific rules concerning the use of plant protection products.

From 2005, all farmers receiving direct payments will be subject to compulsory cross-compliance (Council Regulation No 1782/2003 and Commission Regulation No 796/2004). 19 legislative acts applying directly at the farm level in the fields of environment, public, animal and plant health and animal welfare have been established and farmers will be sanctioned in case of non-compliance (partial or entire reduction of direct support). Beneficiaries of direct payments will also be obliged to keep land in good agricultural and environmental conditions. These conditions will be defined by Member States, and should include standards related to soil protection, maintenance of soil organic matter and soil structure, and maintenance of habitats and landscape, including the protection of permanent pasture. In addition, Member States must also ensure that there is no significant decrease in their total permanent pasture area, if necessary by prohibiting its conversion to arable land.

Advisory and institutional measures

1.6. Research and development

Across all OECD countries, governments fund research into the relationship between agriculture and the environment. This research is often undertaken in order to establish best management practices to be communicated to farmers through on-farm technical assistance, or to establish the most appropriate regulations or other policy measures. It covers a broad range of scientific enquiry including ecology, engineering, farm management practices, farmer behaviour, and economics.

1.7. Technical assistance/extension

These measures provide farmers with on-farm information and technical assistance to plan and implement environmentally friendly farming practices. Most OECD countries have long-established programmes for assisting farmers to adopt technology and improve agricultural practices. These programmes have traditionally focussed on improving on-farm productivity, but in the past two decades much greater emphasis has been placed on increasing farmers’ understanding of resource and environmental issues, in order to induce voluntary changes in farming practices to improve environmental outcomes.

In some OECD countries such as Australia, Canada, New Zealand, and the United States, a part of financial expenditure for agri-environmental programmes are spend to finance technical assistance to farms related to the implementation of the practices required by the various programmes. These programmes (mainly in Australia and New Zealand) the financing of technical assistance is more important than the direct financial assistance to farms. Also in the EU countries technical assistance is part
of some agri-environmental programmes, but it is difficult to estimate the share of spending on technical assistance from direct financial assistance.

87. Some programmes are focused specifically on technical assistance to farms. For example in Canada, under the Environmental Farm Planning Program assistance is provided to farmers to develop their Environmental Farm Plan (EFP) to systematically identify environmental risks and benefits from their own farming operation, and to develop an action plan to mitigate the risks (expenditures rose from CAD 1 million in 2003/04 to CAD 21 million in 2007/08, and as of March 31, 2008, 76,900 producers and ranchers had participated in the National EFP Initiative with 56,700 reviewed EFPs completed). Canada also develops a National Land and Water Information Service (NLWIS), an Internet-based service to provide on-line access to agri-environmental information to help Canadians make responsible land-use decisions (2006-09 phased approach to develop the system due to be operational in 2009).

1.8. Labelling/standards/certification

88. In the past decades, greater attention has also been directed at providing information on the environmental attributes of commodity outputs in order to meet the demands of an increasingly well-informed and discriminating public. In particular, standards for “eco-labels” have been established in many OECD countries, backed-up by certification processes to verify their authenticity, in order to assist customers in distinguishing commodities grown without chemical fertilizers or pesticides from conventionally-produced agricultural commodities. Products from such commodities tend to command discernible price premiums in many markets.

89. Some of these eco-labelling schemes are entirely market-based, often introduced by producer groups at the behest of supermarkets or other retailers. Others are government-backed. For example, a large number of OECD countries—including Australia, the European Union, Canada, Norway, the United States and Switzerland—have introduced government-enforced national organic labelling standards.

2. Environmental objectives of policies addressing environmental issues in agriculture

90. This chapter provides an overview of the main objectives set by agri-environmental policies and the policy measures used to achieve them. It will also focus on issues such as how objectives are defined (whether they are quantified or not), which is also related to the issue how the policies are monitored in terms of achieving the set objectives. Another issue is whether a policy measure targets a single environmental objective or various objectives.

91. As mentioned above, agriculture is a major user of natural resource such as land and water. As such it has also the potential to have an impact on biodiversity and is shaping the landscape. In fact may policies such as good farming practices or policies providing incentives to specific farming practices on farm land (conversion of arable land to grassland land, extensive pasture, green cover, etc.) or land retirement (long term set-aside, land conservation, afforestation of agricultural land, etc.) are often described as combining several environmental objectives such as: soil quality, water quality, biodiversity and landscape. It depends on the local conditions to define which of these objectives is the most important. Some countries are applying programmes to protect soil, water and other environmental resources in specific areas (e.g. Australia – Murray-Darling Basin, United States – Great Lakes).

2.1. Soil quality/soil protection

92. The main issue of soil quality, reflected in the design of policies, is the risk of soil erosion. The soil erosion risk comes from natural forces (water erosion, wind erosion) and from soil cultivation practices (cultivation of fragile soils, overgrazing, poor uptake of soil conservation practice, etc.). The soil
contamination comes from excessive and inadequate use of chemical inputs used in agriculture and from soil *immissions* from industry pollution – such as contamination by heavy metals (the later is beyond the scope of agri-environmental policies and is addressed by environmental legislation). (see part 1.4.2).

93. Soil erosion issue is primary addressed in the basic *environmental regulation* concerning soils, including the set of *good farming practices* developed in most OECD countries. Many OECD countries have also developed specific programmes promoting specific farming practices to reduce the risk of soil erosion. More specifically the main farming practices promoted to reduce the risk of soil erosion are: transfers of arable land to grassland, extensive use of pastures, green cover (mainly in winter period), no or low tillage practice, etc. These programmes are applied mainly in the European countries and in the United States and Canada (See section 1.1.1). Some countries use programmes promoting a long term retirement of vulnerable land from agricultural production. Afforestation of agricultural land is promoted in many OECD countries. However, in term of land transferred they are of minor (or local) importance. In the United States, the *Conservation Reserve Program* (CRP) is the most important agri-environmental programme in terms of budgetary expenditure and area covered (see section 1.1.2). The main purpose of the CRP was initially to combat soil erosion, but, as the programme evolved, other objectives were added, including habitat and water quality improvements, carbon sequestration and air quality improvements.

94. Other soil degradation processes (compaction, acidification, toxic contamination, and salinisation) largely relate to specific regions in some countries and are addressed both by regulatory requirements and policies designed and implemented at regional (local) levels.

95. Apart financial incentives provided to farms, budgetary expenditure are also provide to finance technical assistance to farms to address the soil erosion issues.

2.2 Water quality/water protection (including reduction of pollution)

96. Across all OECD countries most of the policies addressing environmental issues in agriculture are related to water resources and water quality. In fist instance the issue of water quality is addressed by a wide set of *regulations* (see part 1.4.1 for water pollution, and 1.4.2 for water use). These regulations concern not only the use of water and management of water resources, but also strict regulations for the use of potentially polluting inputs such as pesticides, industrial fertilisers, manure (storage, management and field application).

97. On top of the *regulatory requirements*, a wide set of policy instruments related to water are used across OECD countries. Irrigation accounts for a major share of water use in most OECD countries and excessive groundwater extraction levels are a concern in many areas, particularly in the drier regions of the Australia, Southern Europe and the United States. Some countries (Australia, some states in the United States) are managing a system of water abstraction rights and *tradable quota and permits* for water use.

98. *Water quality* and reduction of *water pollution* are a dominant issue in most OECD countries. Apart the above mentioned regulatory requirements a range of policy measures are applied to address this issue. The most common is a wide range of policy measures providing payments for agricultural production with a reduced use (or no use) of pesticides and chemical fertilisers (*extensive production, integrated production, organic farming, etc.*), green cover, buffer strips. These measures are applied mainly in European countries, and more recently in Japan and Korea.

2. In general, the *good farming practices* address also other environmental issues such as water pollution and biodiversity.
99. The EU Nitrate Directive defines areas with high nitrate pollution in its member countries, and sets the levels to which this pollution is to be reduced. The EU member states are designing and implementing specific policies to reach this objective. Reduced use of chemical inputs, transfers of arable land to extensive grassland (pasture), green cover, crop rotation, are the main instruments implemented by member countries to reach this objective.

100. Also in areas with higher societal values (such as catchment areas for drinking water, natural reserves) or environmentally vulnerable zones (ESAs), many OECD member states apply stricter regulation concerning the use of agricultural inputs and farming practices. Some countries provide compensations to farmers in these areas.

101. As mentioned above, many of the policy measures addressing the issue of water quality and water pollution may have also positive effects also on soil quality, biodiversity and landscape.

2.3 Biodiversity

102. Agricultural biodiversity is largely created, maintained and managed through a range of farming systems. In this regard agricultural biodiversity stands in contrast to “wild” biodiversity which is most valued in situ and as a product of natural evolution (OECD, 2008a). OECD countries employ a variety of policies and approaches to reconcile the need to enhance farm production, drawing on plant and livestock genetic resources, and yet reduce harmful biodiversity impacts, especially on wild species and habitats.

103. The policies applied to enhance or preserve agricultural biodiversity can be structured along three levels of agricultural biodiversity (i) Genetic diversity; (ii) Wild species diversity; and (iii) Ecosystem diversity.

104. **Genetic diversity** – Most of OECD countries carry plant and livestock genetic resource conservation activities either in the form of In situ (on farm, in field) or Ex situ (gene bank) conservation. Under the Rural Development Regulation, most of the EU member countries provide payments to farms per hectare of endangered crop species and or per head of endangered livestock species. In the United State the In situ conservation this is primarily a private sector activity and no financial assistance is provided. A detailed list of In situ and Ex situ conservation activities for crop and livestock in OECD countries is available in OECD (2008a) Tables 1.8.2. and 1.8.3. (p. 139 and 144).

105. **Wild species diversity** – Policies in these areas are targeting wild species that use agricultural land as primary habitat, and populations of selected groups of breeding bird species that are dependent on agricultural land for nesting and breeding. Policies addressing the issue of wild species diversity are implemented mainly by European countries. Farmers are remunerated for voluntary adopted farming practices which contribute to preserve wild species on agricultural land (e.g. reduced use of chemical inputs, extensive management of grassland with late mowing, creation and maintenance of field strips, hedges, shrubs, etc.).

106. **Ecosystem diversity** – Policies set to achieve the objectives related to ecosystem diversity are promoting the land use pattern. Either agricultural land exists (i.e. afforestation, wetlands and ponds) or creation of semi-natural habitats on agricultural land (i.e. farm woodlands, fallow land). Some (most) of these activities are considered to contribute also to the Landscape objective.

107. Policies addressing objectives such as wild species diversity and ecosystem diversity are more prominent in the European countries. Indeed, in Europe, many of the most valued areas for wildlife tend to be semi-natural habitats, where species have co-evolved with traditional agricultural practices over many centuries. Such habitats have come under increasing pressure from changes in farming practices – including increased field size, reduced crop rotations and increased fertiliser and pesticide use, and the
current policies try to repair this situation. By contrast, in countries such as Australia, New Zealand and North America, valued habitats are predominantly associated with natural areas including grasslands, wetlands, native forests and bush; areas which have in some cases been placed at risk by the development of agriculture – for example, in the United States, the conversion of grasslands and wetlands to cropland has been attributed with contributing to the decline of a number of rare species. Some of the currently applied policies are designed to correct this trend, and are mostly applied in specific localities.

2.4. Landscape

The landscape objective is a very generic one and is associated with various set of policies. It is implemented mainly in the European countries, where the landscape is shaped by agriculture for centuries. EU member countries and Switzerland provide payments to build, improve and/or maintain specific (fixed) landscape elements such as: trees (individual or ranges), hedges, shrubs, stonewalls, ponds and marshes, etc.

The Landscape objective is also associated with payments supporting changes in land use either in the form of exit from agricultural land (afforestation, agricultural woodland, creation or restoration of wetlands and ponds) or changes in agricultural land use (transfer from arable land to grassland, green fallow, floral fallow, etc.).

Norway associate the landscape objective with a general payment to all agricultural land, provided that farmers comply with good farming practices.

2.5. Climate change - Air pollution

According to OECD (2008a), farming accounted for about a quarter of total OECD acidifying emissions, 8% of the use of potential ozone depleting substances and 8% of greenhouse gases (GHGs) in 2002-04. Shares are higher for specific air pollutants: 90% of anthropogenic ammonia emissions; nearly 75% of methyl bromide use, and for GHGs about 70 of nitrous oxide and over 40% of methane.

Many countries are adopting policies to motivate farmers to alter their farming practices, such as changing livestock manure disposal methods and soil tillage practices, which can lower GHGs emission rates per unit output volume and which can also have co-benefits in reducing ammonia emissions and increasing soil carbon stocks. The uptake of these technologies and practices was in some cases enforced by regulations with possibly some investment subsidies (manure storage and management) or encouraged through government farm extension services and financial assistance to farmers.

Also programmes providing incentives for less intensive use of agricultural land, lower and better managed use of pesticides and fertilisers (see above) contribute to reduce air pollution, ammonia and GHGs emissions, as well as the programmes taking land out of agricultural production (afforestation, land conservation programmes, extensive use of grassland). The latter also contribute to carbon sequestration.

Some countries (Czech Republic) use environmental charges per head of livestock in large scale units to address the issue of GHGs emissions.

3. Agri-environmental policies in the overall context of agricultural policy measures

Current environmental conditions and concerns in many OECD countries are to an extent the result of past and ongoing agricultural policies providing substantial production-linked support that have boosted farm output and affected resource use, farming practices and environmental quality. Thus, improving environmental performance of agriculture in many countries depends on the reform of agricultural policies. Therefore the policy measures in place to address environmental issues in agriculture
have to be considered as part of the whole set of agricultural policy measures applied and evaluated in the broader context of the monitoring and evaluation of agricultural policy reform. Given the information available, this chapter will focus only on agri-environmental policies providing transfers to farmers (i.e. it focuses on policies described in Chapter 1, sections 1.1.1.-1.1.3.).

3.1. Transfers through AE programmes within the overall transfers to producers (PSE)

116. Output-linked support measures based on commodities produced or inputs used remain dominant and only a small share of support can be identified as directly targeted toward environmental improvement. Nevertheless, other payment programs are often conditional on: farmers adopting environmentally-friendly practices (cross-compliance); the availability of services provided to farmers with a high environmental content (such as research, education, training and information); and the subjugation of agriculture to environmental regulations (polluter pays principle) on, for example nutrient loading in water courses or pesticide residues in food. Although effective agri-environmental policies reduce environmental degradation and conserve natural resources, they can also alter relative prices and thus effect production and trade patterns.

117. In this part of the study the analysis is based on the Inventory information and on the information on payments to specific programmes contained in the OECD PSE/CSE database and its documentation. The agri-environmental payments are presented in the context of the overall agricultural policies applied and the total level of support to farms and its structure (by country). The figures are presented for the European Union3, United States, Norway, Switzerland, and Canada (from 2003). These are also the countries that have developed the most programmes providing agri-environmental payments to farmers.

![Figure 2. Share of Agri-environmental payments on PSE](image-url)

*Source: OECD PSE/CSE Database, 2008.*

3. For comparability and consistency of the figures in the analysed period 1995-2007, the payments are for EU 15.
118. Figure 2 provides information on the share of agri-environmental payments in the total transfers to farmers as estimated by the Producer Support Estimate (PSE). In countries with high level of support to agriculture such as Norway and Switzerland the share of agri-environmental payments on total support remains low although there was some increase in the analysed period.

119. In the European Union the overall level of support is lower than in Norway and Switzerland but important payments (other than agri-environmental) are provided to farmers within the CAP and hence the share of agri-environmental payments on total support remains within 5 to 6% of total support in 2001-07, after having increased from 2 to 6% in the period 1995-2001. Indeed, in the EU the share of agri-environmental payments on total budgetary payments has been increasing in the period 1995-2000, but declined again in the period 2000-07 (Figure 3). In fact from 2001, the agri-environmental payments were decreasing even in nominal terms (Figure 1).

120. The higher share of agri-environmental payments in the United States combines the relatively low level of total support to agriculture and the importance of budgetary spending on agri-environmental payments. Also the development of the share of agri-environmental payments in total support corresponds to the developments of its share on budgetary payments to farms (Figure 3).

![Figure 3. Share of agri-environmental payments in budgetary payments to farmers](image_url)

Source: OECD PSE/CSE Database, 2008

121. As the estimates of the PSE are made for the EU as a whole, it is not possible to carry the analysis presented above for the single EU member countries, from the data in the PSE database. The only information which can be compared at the level of EU countries is the share of budgetary spending on agri-environmental payments (including both the national and EU Fund financing) on total budgetary transfers to agriculture.

4. In the PSE/CSE database detailed information by country is available for national expenditures for various agri-environmental programmes, but the detail by country on co-funding from EU funds is not available for most of the EU member countries.
3.2. How the agri-environmental payments are implemented

122. The agri-environmental payment is a generic title and includes a wide range of policies which may differ in many ways, in term of their characteristics:

- Spatial targeting (i.e. applied to a specifically defined area – mostly using environmental criteria; within an administrative region, whole country);
- Time duration (i.e. one-off/transitional; medium term; long term);
- What is the basis of the payment/implementation criteria (i.e. based on input use; payment per area/head, resource retirement, non-commodity outputs);
- How the level of payment is defined (i.e. valuation of a specific project, using an auction system, using fixed rates – specific region/whole country, share on investment costs).

123. This part provides an insight on what is the basis of the agri-environmental payments in various OECD countries using the implementation criteria of the PSE classification (Box 4).

Box 4. How are agri-environmental payments classified in the PSE?

The PSE classification is based on implementation criteria. This means, for example, that the category “payments based on non-commodity outputs” includes only those agri-environmental policies where payments are directly related to (based on) the provision of specific non-commodity outputs. However, policies that are based on area or animal numbers or some other implementation criteria, although implemented to improvement of environmental performance, will be classified according to the primary basis on which the policies are implemented. Such policies are currently classified as “payments based on area/animal numbers/receipts/income”, or in the case of payments financing investment, they are classified as “payments based on input use”. In these cases further information concerning the nature of the policies is given through the use of labels. With respect to agri-environmental programmes the label based on input constraints is often appropriate. These policies require farmers to reduce the use of inputs or apply specific farming practices. Work is on-going to further refine the new classification in order to provide comprehensive information about the content of categories and sub-categories that currently may contain rather heterogeneous measures. This should allow in future for attention to be drawn to the fact that a significant share of support has input constraints attached relating to environment, animal welfare, or other issues, where this is the case.

124. Under the current classification the agri-environmental payments are classified in the following categories:

1. Payments based on input use – with input constraints (mostly payments to investments to improve environment);
2. Payments based on current area/animal numbers – with input constraints;
3. Technical assistance/extension
4. Long-term resource retirement;
5. A specific non-commodity output.

125. Figure 4 provides the information on the share of these categories in the total agri-environmental payments in selected OECD countries. The payments based on farm fixed assets associated to input constraints (e.g. support to investments to environmental friendly technologies) are relatively important in Korea, Norway and recently in Canada, while the payments based on areas or animal numbers with input constraints (e.g. specific management practices on agricultural land) dominate in EU and Switzerland. The land retirement programmes are the most important part of the United States agri-environmental payments, although their share have declined between 1996-98 and 2005-07. The United States also have a relatively high share on spending on technical assistance to farms. Figures in Annex 1, provide a more detailed...
information on the level and the composition of agri-environmental payments in these countries for the period 1996-2007.

**Figure 4. Structure of Agri-environmental payments in selected OECD countries in 1996-98 and 2005-07**

Source: OECD, PSE CSE database, 2008

126. However, it should be reminded that the analysis in this Chapter is focused only at those agri-environmental measures that provide payments to farms. As illustrated in Chapter 1, the mix of the policy instruments to address environmental issues in agriculture vary from one country to another. So the analysis of the level and structure of agri-environmental payments should be evaluated in this wider concept.
BIBLIOGRAPHY

OECD (2001a) *Environmental Indicators for Agriculture: Volume 3, Methods and Results*, Paris, France


OECD (2008a), *Environmental Performance of Agriculture in OECD Countries Since 1990*, Paris, France

ANNEX 1. LEVEL AND COMPOSITION OF AGRI-ENVIRONMENTAL PAYMENTS IN SELECTED OECD COUNTRIES

Figure A.1. Canada: Level and composition of total agri-environmental payments, 2003-2007

Figure A.2. EU 15: Level and composition of total agri-environmental payments, 1996-2007

Figure A.3. Korea: Level and composition of total agri-environmental payments, 1996-2007


Figure A.4. Norway: Level and composition of total agri-environmental payments, 1996-2007

Figure A.5. Switzerland: Level and composition of total agri-environmental payments, 1996-2007


Figure A.6. United States: Level and composition of total agri-environmental payments, 1996-2007