Agriculture has significant impacts on the environment, using on average over 40% of water and land resources in OECD countries. Impacts occur on and off farm, and include both pollution and degradation of soil, water and air, but also the provision of environmental services, such as biodiversity, flood and drought control, and a sink for greenhouse gases. OECD countries use different mixes of policy instruments to achieve their environmental objectives, including regulations, cross-compliance, agri-environmental payments, taxes, tradable rights and technical assistance. The development and follow-up of indicators that are consistent over time and across countries, but which acknowledge the diversity of agri-environmental conditions in the OECD, is a powerful tool for policy evaluation. Overall, environmental performance of agriculture across OECD has improved, with a decrease in agricultural nutrient balance surpluses and a decline in pesticide use, but with significant variations across countries and increasing pressure on water.

Natural resources and agriculture

Agriculture is a major user of natural resources and its environmental performance needs to be monitored and evaluated. Many of its environmental effects are either negative or positive externalities or public goods. To a large extent these effects are determined by farmers' choices of how and what to produce. Agri-environmental policies attempt to incorporate these potential external effects on farming decisions. As indicated in the Inventory of measures addressing environmental issues in agriculture, developed by OECD, the member countries are using a wide set of measures.

Policy approaches

Regulatory requirements are the core of policies addressing environmental issues in agriculture. All OECD countries impose a complex set of regulations to prevent negative impacts on the environment. These include limits on the storage and application of chemicals and pesticides, prohibitions and requirements on waste and nutrient management, limits on the intensity of production, and buffer strips and green coverage requirements. Stricter regulations are applied in areas with higher environmental or resource conservation values. Over time, regulatory requirements have broadened in scope and have become more stringent.

Cross compliance mechanisms require farmers to fulfil specific environmental requirements in order to be eligible for specific agricultural support payments. In the European Union, United States and Switzerland, cross-compliance is significant.

Agri-environmental payments. Some OECD countries (EU countries, Norway, Switzerland and United States) have also developed a wide range of agri-environmental payments under voluntary programmes providing payments to farmers to adopt specific farming practices, with positive environmental effects and/or providing public goods (such as landscape, biodiversity, etc).

<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>
<th>NOR</th>
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</table>

Note: NA - not applied or marginal; X - low importance; XX - medium importance; XXX - high importance

The importance of the policy instruments in this table is related to the mix of the specific country. It is not designed to compare the importance of specific measures across countries.
Most payments support extensive forms of farming (extensive management of grassland, extensive pastures). Some measures go beyond offsetting environmental damage caused by agriculture and provide voluntary payments for additional environmental services (more or less precisely defined and targeted). Targets are typically defined in the form of a specific farming practice rather than specific (measurable) environmental outcomes that in many cases are not feasible or involve high transaction costs.

**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 improving market mechanisms to free up trade in water rights under implementation of tradable water rights in Australia. Tradable rights based on environmental quotas, permits and restrictions do not yet play a significant role in agri-environmental policy, despite the growing use of such measures for environmental policy in other sectors.

In the broader context, however, where agri-environmental policies offset the damaging environmental effects of input-linked and production-linked support policies, the opportunity costs of improving the environment are higher than they need to be.

**Methods and indicators**

There is growing awareness of the need for methods and indicators to evaluate agri-environmental policies. This is complex due to the site specificity of many environmental issues, difficulties in valuing and measuring environmental outcomes, and factors outside the control of farmers (e.g. weather).

Recent OECD reports have shown that OECD countries have also 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 cooperation with private sector. A number of OECD countries have developed agri-environmental indicators to track environmental performance. Greater emphasis has also been placed on communication to farmers on environmental issues via technical assistance and extension, in order to induce voluntary changes in farming practices to improve environmental outcomes.

According to the OECD’s *Environmental Performance of Agriculture at a Glance* (2008), the overall performance of agriculture across the OECD has improved due to the response from farmers, agro-industry and policy makers. Agricultural nutrient balance surpluses have decreased since the early 1990s, pesticide use has declined and soil erosion stabilised. Agricultural water use has grown more rapidly than total water use, mainly driven by an expansion in the total OECD irrigated area. However differences among countries are wide across all indicators.

**Policy challenges**

With rising food demand and the necessity to protect the environment, including biodiversity at local and global levels, and natural resources, OECD policy makers need to:

1. Recognise the complexity of the links of agricultural production to environmental issues, including their spatial dimension.
2. Internalise agricultural externalities (positive or negative) as much as possible to achieve expected environmental outcomes at the lowest cost to public finances.
3. Address knowledge and information deficiencies of farmers on environmental issues in order to induce voluntary changes in farming practices to improve environmental outcomes and resource management.

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**Gross nitrogen balance per hectare of total agricultural land (kg N/ha) 2002-04**

- Korea
- Japan
- EU15
- Norway
- Switzerland
- OECD
- New Zealand
- United States
- Canada
- Turkey
- Mexico
- Australia
- Iceland

**Change in irrigated area percentage change 1990-92 / 2002-04**

- France
- Australia
- United States
- OECD
- Spain
- EU15
- Greece
- Turkey
- Mexico
- Japan
- Korea

More information is available at [www.oecd.org/agriculture/env/indicators](http://www.oecd.org/agriculture/env/indicators)