



Agriculture and the Environment: A Sustainable Complementarity

The impact of agriculture on the environment is a major issue for agricultural policy in OECD countries. All of them recognise the importance of the sustainable management of natural resources. And with the reform of agricultural policy now underway, many countries are setting environmental conditions in granting support to farmers.

But what are the impacts, both harmful and beneficial, of agriculture and agricultural policies on the environment? Which policy measures are countries using to deal with environmental issues in agriculture? The OECD is about to publish three studies that explore aspects of these issues. One examines the scope for developing quantitative data on the environmental effects of agriculture. A second explores the environmental effects of land-diversion schemes. And the third study examines low-cost, farmer-led, co-operative approaches to tackling environmental problems.

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What is agriculture doing to the environment? And what impact do different policy measures have? These two questions underlie a new extension of OECD work, on the development of agri-environmental indicators, part of a major effort underway to develop environmental indicators in all sectors of the economy.¹

The rise in demand for information on the relationship between agriculture and the environment largely reflects the importance being given by the governments of different countries to environmental improvement as a part of agricultural practice. The UN Commission on Sustainable Development, for example, has requested countries to develop indicators to measure progress in reaching sustainable development, not least in agriculture – a goal which emerged from the United Nations Conference on Environment and Development (UNCED), held in Rio de Janeiro in 1992.

The supply of quantitative information of this sort is currently inadequate. But without it governments and others cannot identify the environmental problems, risks and benefits associated with agriculture. That makes it difficult to improve the targeting of agricultural and environmental programmes and to monitor and assess

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Environmental Indicators for Agriculture

these and related policies. The OECD has started to meet the demand for data by developing agri-environmental indicators (AEIs), by establishing broadly consistent definitions and methods of measurement, and encouraging member countries to share in their own experience in developing indicators.

The OECD set of indicators is intended to:

- provide information to governments and the public on the current state of the environment, and changes to it, as far as agriculture is involved
- help policy-makers understand the links between causes and effects in agriculture and the impact of agricultural policies on the environment, and guide their responses to changes in environmental conditions
- contribute to monitoring and evaluating the effectiveness of policies in promoting sustainable agriculture.

Identifying and Developing Indicators

Which indicators are relevant? Clearly, those chosen must address the major environmental issues, particularly as concerns the natural environment and human health. Each indicator should be relevant for policy, analytically sound, and presented at a degree of aggregation that can be used in policy, particularly in national policy.

The indicators are being developed within what is called a 'Driving Force-State-Response' (DSR) framework. The 'driving forces' are features of agricultural practice which can cause changes in the state of the environment, such as the over-use of chemical inputs, for example. But they may also be beneficial, such as the water-storage capacity of farming systems which can reduce problems of soil erosion and flooding. The 'state' refers to the environmental conditions that arise from these driving forces: their

impact on, for example, soil, water, air, biodiversity, natural habitats, landscape, and human health. The 'responses' refer to the reactions by farmers, consumers, the agri-food industry and government to perceived changes in the state of the environment. Such responses include, for example, the adoption by farmers of pest-management practices that reduce the employment of pesticides; the voluntary adoption by the food industry of higher environmental standards; and the use by some governments of payments to farmers to promote environmental benefits in agriculture.

Indicators are being developed for the measurement of thirteen agri-environmental issues which have been identified as priority categories by the OECD countries:

- nutrients – the balance between inputs and outputs of nutrients, such as chemical fertilisers and manure, since (for example) excessive nutrients in the soil can pollute water
- pesticides – the environmental risks of pesticide use on water and soil quality, on wildlife and human health from spraying and the danger of contaminating food products
- water use – water balances for both surface and groundwater resources so as to assess the efficiency of water use, particularly in irrigation
- land-use and conservation – the effect of changes, such as the conversion of wetland for use as farmland, and the role of agriculture in reducing landslides, erosion, and flooding
- soil quality – the impact on soil quality, in particular to reveal the risk of erosion
- water quality – the impact on surface and groundwater quality
- greenhouse gases – the contribution of agriculture to climate change through a net balance of the release and accumulation of such gases (expressed in CO₂ equivalents)
- biodiversity – the biodiversity of domesticated species used by agriculture, as well as the impact of agriculture on wild species

- wildlife habitats – changes in habitat in agricultural areas (grassland, for example), the fragmentation of habitats, and length of contact zone between agricultural and non-agricultural land
- landscape – changes in agricultural landscapes through, for example, establishing an inventory of physical features
- farm management – the impacts of farm-management practices on nutrients, pests, soil, irrigation and the farm as a whole
- farm financial resources – the environmental impact of varying and different sources of financial resources for farms, so as, for instance, to be able to purchase new technologies
- socio-cultural aspects – the impact of the socio-cultural structure of rural communities on the environment, for example, through changes in rural-urban populations.²

The initial phase of OECD work on AEIs has concentrated on developing a conceptual understanding of the links between agriculture and the environment, to help identify which indicators might be developed to improve policy analysis and monitoring. In addition, a considerable effort is currently underway to establish relevant indicators and methods of measurement for these 13 agri-environmental categories.

For some issues this methodological work is well advanced, such as the measurement of nutrient balances to capture how well agricultural nutrients are used in the environment. For others – the landscape indicators, for example – more work is necessary to develop suitable methods of measurement. Where methods of measurement have already been identified (for nutrient balances, for example), work is now beginning to collect data and assess indicators.

A central part of the work to develop AEIs is being undertaken through the efforts of 'lead' OECD countries. In essence, the 'lead' country

1. *Environmental Indicators for Agriculture*. OECD Publications, Paris, forthcoming 1997.

2. See pp. 22–26.