OECD MULTILINGUAL SUMMARIES

Agriculture, Trade and the Environment

The Arable Crops Sector

Summary in English

HIGHLIGHTS

- Policy concerns over the environmental effects of arable crop farming (grains, rice and oilseeds) have increased over the last two decades, due largely to more intensive use of land; and a rise in the value placed on many environmental services provided by agriculture.
- The main environmental issues associated with the production of arable crops include: soil (erosion, nutrients, waterlogging and salinisation); water (use and pollution); air quality (greenhouse gas emissions); landscape and biodiversity (such as pasture conversion to cropland or land abandonment).
- Environmental impacts vary across countries and regions, depending on the specific resource base and on prevailing farming practices and policies. Significant problems occur in many regions, but their scope and severity vary and tend to be greater where production pressure is concentrated and natural resources are vulnerable.
- Agri-environmental indicators related to arable crops present a mixed picture of improvements and degradation in different countries. Soil erosion in the United States has decreased, while water-use issues continue to be a cause of serious concern in parts of Australia, the United States and some EU countries. Lack of crop biodiversity is a concern in certain countries, although some have diversified and produce a greater variety of crops. Arable crop farming is a less important cause of air pollution than livestock production, accounting for only 6% of greenhouse gas emissions from agriculture.
- A plethora of policy approaches has been adopted, reflecting the diversity of agri-environmental conditions in OECD countries. Most agri-environmental measures are not targeted at a particular arable crop sector or at a specific environmental outcome, but focus mostly on controlling the quality and quantity of production inputs, as exemplified by temporary or permanent land retirement.
- Payments based on: (i) farm fixed assets; (ii) resource retirement; and (iii) farming practices currently have the largest potential to influence production and trade, based on the level of support afforded to the arable crop sectors, although in certain cases some regulations also exert significant effects.

- Support for arable crops is high relative to other agricultural sectors, varies greatly between countries and crops, and is mainly provided through policy instruments that are the most production and trade distorting.
- Although the cause-effect linkages between support levels and environmental pressures are complex, correlation does not necessarily imply causation.
- At the aggregate country level, the environmental effects of further multilateral agricultural trade liberalisation are likely to be small. Only under the full trade liberalisation scenario would chemical intensity in certain arable crop sectors in Australia and New Zealand increase by more than 10%.
- The production and trade effects of overall support, agri-environmental payments and regulations warrant further empirical analysis.

SUMMARY AND CONCLUSIONS

Trade and environment issues in agriculture have gained increasing prominence at international and national levels alike. The present report analyses the linkages between agriculture, trade and environment in OECD countries for the arable crop sector (grains, rice and oilseeds). The report first provides some background material on economic and environmental aspects associated with arable crop farming and discusses the policies – both agricultural support and environmental policies – affecting the arable crop sector. It then analyses some of the cause-effect linkages between policies, including trade policies and regulations, and the environment.

What are the main environmental impacts associated with arable crop farming?

Arable cultivation systems are among the most important factors influencing soil quality. While chemical inputs, such as fertilisers, herbicides and other pesticides, make a major contribution to arable crop productivity, they also create environmental problems in some regions across OECD countries.

The environmental impacts of arable crop production vary across OECD countries for at least three reasons. First, they depend on the quality and quantity of natural resources used in, or affected by, arable crop production. For example, growing wheat in a semi-arid region may cause wind-induced soil erosion and particles in the air. In a country that relies heavily on irrigation, however, the primary effects are likely to concern water use and quality. Second, the impacts vary according to the technologies employed to produce crops. Reduced tillage systems, for example, decrease erosion and greenhouse gas emissions, but may require an increased use of pesticides, which can cause degradation in certain situations. Third, the impacts will depend upon the country's relative demands for different types of environmental quality. If the demand and willingness to pay for a particular environmental outcome are high (*e.g.* mixed use landscape), then measures may be needed to ensure its provision.

What are the key economic and structural characteristics of arable crop farming?

The arable crop sector occupies approximately one-third of the OECD's agricultural area, and contributes to around one-half of the OECD's total agricultural output. OECD countries are responsible for approximately 80% of global trade in cereals.

The number of arable farms and the area used for arable crop farming have declined over the last two decades in OECD countries as a whole, but average farm size has increased, as the number of farms has fallen by more than farmland. In several OECD member countries, however, the number of larger, more capital-intensive and specialised arable crop farms has increased in absolute terms.

Notwithstanding the diversity between countries, arable crop production in OECD countries increased, on average, by 0.5% per annum over the 1985-2002 period. Overall, most of this growth was derived from an increasingly intensive use of land already under crops rather than expansion of the harvested area, although the latter was the main source in some countries.

How extensive is the agricultural support affecting arable crops?

Support to arable crop producers in OECD countries amounted to USD 62 billion in 2001-03, accounting for 39% of farm receipts from crops. Reflecting overall trends, the average support levels decreased over time for all arable crops, except rice, for which support levels have changed little since 1986-88. The rice sector is the most-supported arable crop and oilseeds the least-supported. In 2001-03, prices received by rice producers and paid by consumers were, on average, more than four times higher than world rice prices.

It is not only the level of support, but also the form in which it is provided, that is important in terms of the impacts on resource allocation and on the environment. Many governments utilise a complex array of measures –including tariff rate quotas and preferential trade agreements – that directly or indirectly affect production, consumption, trade, prices and the environment. For arable crops as a whole in the OECD area, market price support and output-related support – which are the forms of support with the greatest potential to stimulate production, exacerbate environmental pressures and distort trade – accounted for about half of the support to the sector in the 2001-03 period.

What are the effects on the environment of agricultural support policies for arable crops?

Price support and input subsidies both provide incentives for output expansion and intensification of input use, as they stimulate farmers to change their management practices and rates of input use. Commodity-linked support will also alter the mix of crops grown, which may not be neutral for the environment. If higher levels of support are given to high-performance crops that are more input-intensive, then the impacts on input use and crop mix will be even greater. Further, when high levels of support are maintained over time, this may impede structural change in the sector and may stimulate the development of new yield-enhancing and cost-reducing technologies, which could be biased in favour of those crops receiving the highest support, and which may result in

variable environmental outcomes. At the same time, capitalisation of support into land prices may enhance the underlying pressures for farm consolidation and production intensification. However, the link between production changes and environmental outcomes is site-specific.

How large are the impacts of further agricultural trade liberalisation on the environment?

The analysis provides an illustration of the potential implications for the environment of multilateral agricultural trade liberalisation. Two hypothetical multilateral agricultural trade liberalisation scenarios are considered. The first scenario assumes an extension of the WTO Uruguay Round Agreement on Agriculture. The second scenario involves the elimination of all agricultural policy measures in all countries. The latter scenario can be viewed as an upper bound of potential outcomes of multilateral agricultural trade liberalisation.

In most cases, the simulated liberalisation impacts for the aggregate arable crop sector do not suggest significant environmental implications: the percentage changes in land and chemical use, aggregate output, and the rate of chemical application are small. Overall, the estimated changes in arable crop production, even in the extreme scenario of full agricultural trade liberalisation, are within the bounds of average seasonal variations witnessed over the last twenty years in the OECD area. The simulations also suggest that trade liberalisation would cause global methane and nitrous oxide emissions to decline.

The cross-country quantitative analysis is supplemented with some country-specific disaggregated analysis.

What are the main policies addressing environmental issues in the arable crop sector?

Notable trends in payment measures include the growing use of land retirement payments to promote environmental objectives; payments to support the adoption of less-intensive farming practices, such as organic farming; and transitional payments based on farm fixed assets, such as assistance for water, soil and land conservation.

The scope of regulatory policy measures has generally expanded in OECD countries over the past two decades. These measures range from broad prohibitions to very prescriptive details for the adoption of environmentally benign farm management practices. Most regulations are implemented at the local level, and environmental legislative responsibilities usually rest with sub-national level governments. Regulations to protect groundwater quality and control soil erosion are often used, with the most severe restrictions applying to pesticide use.

What are the production and trade effects of agri-environmental payments and regulations on arable crops?

The recent growth in agri-environmental regulatory and payment programmes raises concerns about the possible negative effects on trade, including arable crop imports and exports. Correcting for missing markets for environmental externalities, or reducing

government policy distortions improves social welfare, despite having trade impacts. However, if agri-environmental programmes are not implemented in cost-effective ways, there is a risk that national and global welfare will be lower.

Effects of regulations on factor costs and trade depend on the particular regulatory, country and crop conditions. The regulations may cover erosion, fertiliser and pesticide use, as well as land maintenance requirements under compliance schemes. Research generally has not shown that environmental regulations have significant impacts on trade competitiveness and firm location.

Despite the rapid growth of agri-environmental payments, there have been few similar advances in modelling their production and trade impacts. However, simulation analysis suggests that agri-environmental payments could have modest effects on production, and larger impacts on trade flows, in certain country-crop situations.

Some policy conclusions

Further agricultural policy reform and trade liberalisation should reduce environmental pressure in countries with high support and environmental pressure. But reductions in price support alone are unlikely to redress the environmental harm caused by decades of such support, unless accompanied by targeted agri-environmental policies.

Production-linked agricultural support for crops has hindered the adoption of environmentally benign farming systems. Decoupling of agricultural support from production decisions, provision of information and investments in human capital would facilitate the adoption and diffusion of such systems.

Cross compliance attached to direct payments can achieve some objectives at low incremental cost, but the income support and environmental objectives are sometimes in conflict. A crucial limitation of cross compliance is that those farmers who receive payments with cross-compliance conditions are not necessarily those farming the most environmentally sensitive land or highly valued landscape. Improved environmental outcomes at lower cost could be achieved through targeted environmental measures such as taxes and regulations to deter the use of specific damaging inputs, and payments to foster certain environmental services.

A crucial consideration in assessing the cost effectiveness of an agri-environmental programme, taking into account its production and trade impacts, is whether, or to what extent, crop production and the environmental services are joint outputs and, therefore, whether the agri-environmental policies can or cannot be decoupled from production. Even if the environmental services and production are joint, measures to improve the cost effectiveness of the programme will lessen potential trade impacts.

There is a need for a coherent institutional framework in order to rationalise local and regional environmentally inspired initiatives. The level of government involvement that is appropriate, *i.e.* local, state/provincial, national or international, is the one that is the most cost-effective and which involves the lowest transaction costs for the particular environmental problem concerned.

Multilingual summaries are translated excerpts of OECD publications originally published in English and in French.

They are available free of charge on the OECD Online Bookshop
www.oecd.org/bookshop/

For more information, contact the OECD Rights and Translation unit,
Public Affairs and Communications Directorate.

rights@oecd.org

Fax: +33 (0)1 45 24 13 91

OECD Rights and Translation unit (PAC)
2 rue André-Pascal
75116 Paris
France

Visit our website www.oecd.org/rights/