Organisation for Economic Co-operation and Development
Organisation de Coopération et de Développement Économiques

ENVIRONMENTAL PERFORMANCE OF AGRICULTURE IN OECD COUNTRIES SINCE 1990:

Austria Country Section

This country section is an extract from chapter 3 of the OECD publication (2008) ***Environmental Performance of Agriculture in OECD countries since 1990***, which is available at the OECD website indicated below.

This text should be cited as follows: OECD (2008), *Environmental Performance of Agriculture in OECD countries since 1990*, Paris, France

A summary version of this report is published as ***Environmental Performance of Agriculture: At a Glance***, see the OECD website which also contains the agri-environmental indicator time series database at: http://www.oecd.org/tad/env/indicators

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BACKGROUND TO THE COUNTRY SECTIONS

Structure

This chapter provides an analysis of the trends of environmental conditions related to agriculture for each of the 30 OECD member countries since 1990, including an overview of the European Union, and the supporting agri-environmental database can be accessed at *www.oecd.org/tad/env/indicators*. Valuable input for each country section was provided by member countries, in addition to other sources noted below. The country sections are introduced by a figure showing the national agri-environmental and economic profile over the period 2002-04, followed by the text, structured as follows:

- ***Agricultural sector trends and policy context:*** The policy description in this section draws on various OECD policy databases, including the *Inventory of Policy Measures Addressing Environmental Issues in Agriculture* (*www.oecd.org/tad/env*) and the Producer and Consumer Support Estimates (*www.oecd.org/tad.support/pse*).
- ***Environmental performance of agriculture:*** The review of environmental performance draws on the country responses to the OECD agri-environmental questionnaires (unpublished) provided by countries and the OECD agri-environmental database supporting Chapter 1 (see website above).
- ***Overall agri-environmental performance:*** This section gives a summary overview and concluding comments.
- ***Bibliography:*** The OECD Secretariat, with the help of member countries, has made an extensive search of the literature for each country section. While this largely draws on literature available in English and French, in many cases member countries provided translation of relevant literature in other languages.

At the end of each country section a standardised page is provided consisting of three figures. The first figure, which is the same for every country, compares respective national performance against the OECD overall average for the period since 1990. The other two figures focus on specific agri-environmental themes important to each respective country.

Additional information is also provided for each country on the OECD agri-environmental indicator website (see address above) concerning:

- Details of national agri-environmental indicator programmes.
- National databases relevant to agri-environmental indicators.
- Websites relevant to the national agri-environmental indicators (*e.g.* Ministries of Agriculture)
- A translation of the country section into the respective national language, while all 30 countries are available in English and French.

Coverage, caveats and limitations

A number of issues concerning the coverage, caveats and limitations need to be borne in mind when reading the country sections, especially in relation to making comparisons with other countries:

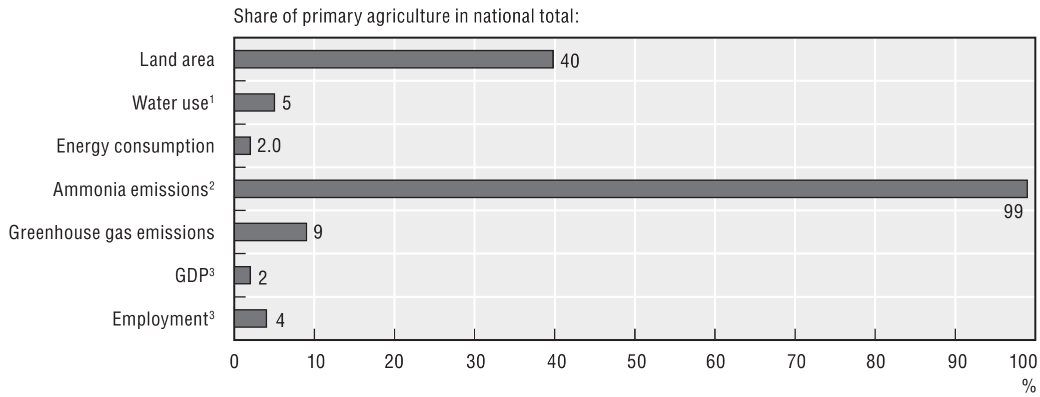
Coverage: The analysis is confined to examination of agri-environmental trends. The influence on these trends of policy and market developments, as well as structural changes in the industry, are outside the scope of these sections. Moreover, the country sections do not examine the impacts of changes in environmental conditions on agriculture (*e.g.* native and non-native wild species, droughts and floods, climate change); the impact of genetically modified organisms on the environment; or human health and welfare consequences of the interaction between agriculture and the environment.

Definitions and methodologies for calculating indicators are standardised in most cases but not all, in particular those for biodiversity and farm management. For some indicators, such as greenhouse gas emissions (GHGs), the OECD and the UNFCCC are working toward further improvement, such as by incorporating agricultural carbon sequestration into a net GHG balance.

- ***Data availability, quality and comparability*** are as far as possible complete, consistent and harmonised across the various indicators and countries. But deficiencies remain such as the absence of data series (*e.g.* biodiversity), variability in coverage (*e.g.* pesticide use), and differences related to data collection methods (*e.g.* the use of surveys, census and models).
- ***Spatial aggregation*** of indicators is given at the national level, but for some indicators (*e.g.* water quality) this can mask significant variations at the regional level, although where available the text provides information on regionally disaggregated data.
- ***Trends and ranges in indicators***, rather than absolute levels, enable comparisons to be made across countries in many cases, especially as local site specific conditions can vary considerably. But absolute levels are of significance where: limits are defined by governments (*e.g.* nitrates in water); targets agreed under national and international agreements (*e.g.* ammonia emissions); or where the contribution to global pollution is important (*e.g.* greenhouse gases).
- ***Agriculture's contribution to specific environmental impacts*** is sometimes difficult to isolate, especially for areas such as soil and water quality, where the impact of other economic activities is important (*e.g.* forestry) or the "natural" state of the environment itself contributes to pollutant loadings (*e.g.* water may contain high levels of naturally occurring salts), or invasive species that may have upset the "natural" state of biodiversity.
- ***Environmental improvement or deterioration*** is in most individual indicator cases clearly revealed by the direction of change in the indicators but is more difficult when considering a set of indicators. For example, the greater uptake of conservation tillage can lower soil erosion rates and energy consumption (from less ploughing), but at the same time may result in an increase in the use of herbicides to combat weeds.
- ***Baselines, threshold levels or targets for indicators*** are generally not appropriate to assess indicator trends as these may vary between countries and regions due to difference in environmental and climatic conditions, as well as national regulations. But for some indicators threshold levels are used to assess indicator change (*e.g.* drinking water standards) or internationally agreed targets compared against indicators trends (*e.g.* ammonia emissions and methyl bromide use).

3.2. AUSTRIA

Figure 3.2.1. **National agri-environmental and economic profile, 2002-04: Austria**



StatLink http://dx.doi.org/10.1787/288706230083

1. Data refer to the year 2003.
2. Data refer to the period 2001-03.
3. Data refer to the year 2004.

Source: OECD Secretariat. For full details of these indicators, see Chapter 1 of the *Main Report*.

3.2.1. Agricultural sector trends and policy context

Agriculture's role in the economy is small and declining, currently accounting for under 2% of GDP and about 4% of employment [1, 2] (Figure 3.2.1). Agricultural productivity has been increasing with a 10% rise in the volume of production from 1990-92 to 2002-04 while the area farmed fell by 3% (Figure 3.2.2). Although there has been some expansion in arable output, much of the increase in production has occurred through growth in livestock output, especially output from milk production. The livestock sector accounts for over 55% of the total value of agricultural output [1, 2].

The intensity of production diminished significantly over the period 1990-92 to 2002-04 [3], as revealed by the expansion in agricultural production relative to the reduction in purchased farm input use. This fell by around –40% and –20% for phosphate and nitrogen inorganic fertilisers respectively, –24% for pesticides, and –13% for direct on-form energy consumption (Figure 3.2.2). The reduction in farm chemical use reflects, in part, the near doubling of organic farming as a share of the total agricultural area over the past decade, reaching over 10% by 2005, among the highest in the OECD. There was a tenfold rise in the number of organic farms since the early 1990s to about 20 000 by 2003 [4]. Over 60% of farmland is pasture, much of which is in mountainous areas where most farms are classified as disadvantaged [2].

Farming is mainly supported under the Common Agricultural Policy, but also through national expenditure within the CAP framework. Support to EU15 agriculture declined from 39% of farm receipts in the mid-1980s to 34% in 2002-04 (as measured by the OECD Producer Support Estimate) compared to the OECD average of 30% [5]. Nearly 70% of EU15

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farm support is output and input linked, but this share was over 98% in the mid-1980s. In addition to EU support, the total Austrian agricultural budget was EUR 954 (USD 1200) million in 2004 or 18% of agricultural gross value added [5]. About 20% of public farm research funding is directed towards agri-environmental concerns.

Agri-environmental measures seek to promote extensive farming practices, biodiversity and landscape conservation. These measures are included under the Austrian Agri-environmental Programme (ÖPUL) established in 1995 [4, 6]. ÖPUL accounts for nearly a third of the agricultural budget [7], providing about EUR 4000 (USD 4520) per farm in 2003. Farmers are compensated for imputed loss of farm income due to constraints on production (*e.g.* lower livestock numbers), rather than as a function of direct environmental benefits [3]. ÖPUL is a voluntary programme, which includes 32 measures covering six payment categories. These measures often feature advisory services for farmers and inspections to monitor compliance with, for example: organic farming, non-application of pesticides and fertilisers, crop rotation, extensive cereal production and extensive grassland [1, 4, 6]. Farmers already participating in ÖPUL are eligible for additional payments if they undertake such actions as converting arable land to pasture, keeping green cover over winter and maintaining nutrient accounts [3]. About 14% (EUR 86-USD 110 million in 2004) of ÖPUL funding is provided for organic farming [3, 5]. However, as organic farms can participate in other ÖPUL measures (for example, by preserving cultivated areas through mowing of steep areas), the share of premiums paid to agricultural holdings engaged in organic farming accounts for 24% of the ÖPUL budget. Support is also given for *in situ* conservation of endangered plant varieties and livestock breeds [8].

Agriculture also plays a key role in the national strategy for sustainable development, and is affected by national taxation policies and international environmental agreements. While the *Water Act* already included various measures to reduce agricultural nutrient loads, it was reformed following entry into the EU in 1995 (including abolition of a fertiliser tax [9, 10],) and replaced by the EU *Nitrate Directive*. The *Nitrate Action* programme of 1999 includes specific policies aimed at reducing nitrate emission from agriculture, including bans on manure application during the winter and use of good agricultural practices such as buffer zones along rivers and maximum limits on fertiliser application [4]. From 2005 support for on-farm diesel fuel, through tax refunding, are equivalent to between EUR 40 and 50 (USD 50-60) million of budget revenue forgone annually [5, 11].

Agriculture is affected by international environmental agreements with respect to limiting emissions of: ammonia (*Gothenburg Protocol*); methyl bromide (*Montreal Protocol*); and greenhouse gases (*Kyoto Protocol*). As part of its *Kyoto Protocol* commitments about EUR 20 (USD 25) million annually is provided as support for biomass and farm forestry, under the *Federal Environment Fund* and the *Agricultural Biomass Fund*, to promote renewable energy production and improvements in energy efficiency [3]. Support to electricity generation from renewable resources, including biomass, is provided through: feed-in tariffs which provide above market prices to renewable power; and a requirement that electricity suppliers must meet a certain minimum share of supplies from renewables [12].

3.2.2. Environmental performance of agriculture

Agriculture uses over 40% of the total land area so it has a significant impact on the environment. Two key environmental issues concern agricultural water pollution, especially from nutrients and pesticides, and the interaction of farming with biodiversity and cultural landscapes. Other environmental issues of importance to agriculture include soil erosion, mainly on arable and permanent cropland, and ammonia and greenhouse gas emissions.

Soil erosion remains a concern in arable cropping areas [4, 13]. About 7% of total agricultural land (35% of arable land) was classified in the late 1990s as having a moderate to severe risk of erosion (10.1-33.3 tonnes of soil/hectare/year), with a further 4% (22% of arable land) in the low erosion risk category (5-10 tonnes/hectare/year) [13]. Most soil erosion takes place on agricultural land, especially on land under maize. While water erosion is monitored, there is no national monitoring of wind erosion [13, 14, 15]. There are also no time series trends of soil erosion risk, but changes in farming practices suggest that the risk of erosion could be declining. Between 1999 and 2003 the numbers of farms using soil conservation practices (*e.g.* greening arable areas over winter, low tillage) doubled to about 75% of all farms, while over the same period the area of arable and permanent crop land with a vegetative cover throughout the year rose by 15% to a share of nearly 90% of arable and permanent cropland in 2003 (Figure 3.2.3) [16].

Extensively used grassland plays an important role for soil organic carbon (SOC) storage in farmed soils, accounting for over 40% of the total stock in 1990 [17]. It is unclear what changes in SOC stocks have occurred in agricultural soils over the 1990s, although the conversion of cropland to forest seems to have had little impact on overall storage of SOC [17].

Farming is a major source of water pollution [3, 4, 13, 18]. The main water quality problems related to agriculture are mainly situated in the crop growing areas in the east and south-east. In these regions surface water is particularly affected by enhanced phosphorus loads from agriculture, and groundwater quality is influenced by nitrate concentrations [4, 18]. Pesticide pollution is a continuing, although declining, problem [4, 18]. Despite the use of sewage sludge on agricultural land (farming recycles about 10% of total sewage sludge supplies [4]), water pollution from heavy metals by using sewage sludge in farming is generally not a problem [19].

Agricultural nutrient surpluses have shown a marked reduction between 1990-92 and 2002-04. The decrease in nitrogen (N) and phosphorus (P) surpluses (tonnes) over this period was nearly 30% and over 60% respectively, well below the average reductions for the OECD and EU15. Moreover, the intensity of nutrient surpluses per hectare of total farmland, at 48 kgN/ha and 3kgP/ha 2002-04, is also much lower than the averages for the OECD and EU15 (83 kgN/ha and 10kgP/ha respectively) (Figure 3.2.2). While there was a slight reduction in crop and pasture production leading to a lower nutrient uptake, much of the decrease in nutrient surpluses has been due to lower livestock numbers, especially dairy cattle, and a reduction in fertiliser use, partly explained by the rapid growth of organic farming.

Agricultural nutrient pollution of water has been declining, but remains a problem in some regions. In the late 1990s agriculture contributed over 30% of nitrogen and phosphorus in surface water and around 50% of nitrate in groundwater [20]. The efficiency of nutrient use (ratio of nutrient output to input) is above the OECD average and has shown a rising trend over the past 15 years. At the same time, only around 12% of farms regularly test their soil for nutrients, which is low compared with many other European OECD countries. Pollution of groundwater is a problem as it provides nearly all of Austria's drinking water [4, 18]. The drinking water threshold level for nitrate in groundwater (45 mg/l) was exceeded in 13% of all monitoring sites (including farming areas) in 2003, compared to around 20% in the early 1990s [21, 22]. Trends for nitrates found in surface waters have declined [4, 23]. Despite this improvement, some regions, especially the north-east, have seen rising nitrate and phosphorus levels in both surface and ground waters during the past decade [4, 24].

Pesticide use has declined significantly. Farming accounts for about 90-95% of total pesticide use [4]. The volume in terms of active ingredients fell by 23% from 1990-92 to 2001-02, a reduction markedly higher than the average for the OECD (–5%) and the EU15 (–4%), despite the small increase in crop production. The rapid expansion in organic farming and growth in the area under fallow, partly explain the decrease of pesticide use over this period. The area of farmland under ***organic management*** rose from just under 6% in 1993-95 to almost 10% by 2002-04, among the highest share across the OECD area (Figure 3.2.3). However, the share of the integrated pest management area in total arable and permanent crop area declined slightly from 3.8% to 3.2% between 1995 and 2003 [16]. Overall, in the late 1990s, only 0.2% of groundwater monitoring sites showed pesticide levels above the drinking water threshold (0.1 µg/l) [19]. Atrazine concentrations remained above these levels in around 3% of monitoring sites in 2005, down from about 30% in the early 1990s, although Atrazine was banned from use in 1995, and some pesticides in river water are thought to derive from transboundary sources [3, 13, 18]. About 12% of the 800 authorised pesticides have been subject to a national environmental risk assessment [13]. In recent years ***methyl bromide*** use (an ozone depleting substance) was over two tonnes annually, being largely used for nematode control in soils [4]. By 2005 under the *Montreal Protocol* Austria is committed to a total phase out of methyl bromide use. While many OECD countries have applied for exemptions with respect to methyl bromide use, Austria has not done so.

As agriculture is largely rain-fed, use of irrigation is limited. Farming accounted for around 5% of national water use in 2003, which was mainly drawn from groundwater for use by livestock producers [25, 26]. Irrigation is limited to a few areas mainly for horticultural crops and it accounts for a small share of agricultural water use (5%), while some support is provided for water deliveries to irrigators. Livestock producers pay the full cost for water deliveries [16].

Ammonia emissions from agriculture declined by 15% over the period 1990-92 to 2001-03. As other sources of acidifying emissions have decreased more rapidly (except nitrous oxide) over the past decade, however, the share of ammonia in total acidifying air pollutants rose to 37% (in acidification equivalents) by 2001 [4, 27]. Agriculture accounted for about 99% of total ammonia emissions in 2001-03, mostly from livestock manure, and by 2001-03 had reduced emissions to about 65 000 tonnes, which is equal to the 2010 target of 65 000 required under the *Gothenburg Protocol*. Critical loads for deposition of acidifying substances continue to be exceeded in 10% of ecosystems and in 50% of the most sensitive ecosystems, but this is an improvement from the early 1990s when respective shares were nearly 50% and over 90% [3].

Agricultural greenhouse gas (GHG) emissions decreased by 12% from 1990-92 to 2002-04. This reduction compares to an overall rise across the economy of nearly 15%, and a commitment under the EU *Burden Sharing Agreement* to meet the *Kyoto Protocol* to reduce total emissions by –13% in 2008-12 [28]. As a result of these diverging trends, agriculture's share of total GHGs declined to 9% by 2002-04 [28]. Much of the decrease in agricultural GHGs is due to lower livestock numbers (reducing methane emissions) but also reduced fertiliser use (lowering nitrous oxide emissions) (Figure 3.2.4). The national climate change target aims to reduce agricultural GHG emissions to 6.7 million tonnes of carbon dioxide equivalent ($mtCO_2e$) by 2010, and this compares to the level of 8.0 $mtCO_2e$ in 2002-04 [29, 30].

The agricultural sector has also contributed to lowering GHG emissions by reducing its on-farm energy consumption and by expanding biomass production, as a feedstock for renewable energy (heat, power and fuel). Direct on-farm energy consumption decreased by 13%

between 1990-92 and 2002-04 and farming only contributed 2% of total energy consumption (2002-04). Renewable energy production from agricultural and other biomass feedstocks, including farm forestry, is being rapidly expanded, with the objective of avoiding 1 million tonnes of CO_2 emissions by 2008 [31]. By 2003 biomass and biofuels contributed almost 10% of total primary energy demand [7, 21]. Biomass, including biogas, contributes about 4% of electricity produced from renewable energy sources, and around 15% to heat generation, while biodiesel production has increased more than threefold during the 1990s, to 25 000 tonnes by 2002 [4, 32].

Agriculture's pressure on biodiversity is starting to ease. But disentangling the impacts of farming activities on biodiversity is difficult due to a lack of time series data, and to a range of factors including: the continued process of intensification in fertile areas; the conversion of land in marginal farming areas, particularly high nature value Alpine pastures, to forestry; and the overall reduction of pollutants into the environment reducing pressure on biodiversity [8, 13]. In terms of ***agricultural genetic resources*** there are *in situ* programmes and extensive *ex situ* collections of plant and animal genetic material [8, 33]. Crop varieties used in production have increased in diversity. The number of national crop varieties endangered has halved over the period 1990 to 2002, linked partly to the expansion of rare crop cultivation. Most endangered livestock breeds are now under conservation programmes compared with very few in the early 1990s.

A key driving force affecting the impact of agriculture on ecosystems has been the decrease in the total agricultural land area, which declined by over 3% from 1990-92 to 2002-04. About 120 000 hectares of farmland is annually converted to other land uses, roughly a half of which is converted to urban uses, transport infrastructure and quarries, while the other half is forested [19]. A major share of the reduction in farmland has been the decline in the area of pasture, the main form of agricultural land use. Although the ÖPUL conservation programmes have slowed the rate of reduction, the tendency continues for the conversion of "high nature" value alpine pastures to fallow and forestry [4]. Nevertheless, it is apparent that an increase in some high nature value agricultural habitats has occurred under the ÖPUL programmes, while the expansion in the area under organic management is generally considered by Austrian research as beneficial to wild flora and fauna [8]. Research suggests that almost 20% of the total land area which is farmed can be regarded as national "hot-spots" of biodiversity [33].

Nationally, the decline in species is continuing, with over 60% of vascular plants endangered or threatened, 25% of mammal and bird species, with amphibians and reptiles under particular threat [3, 8]. At the same time, data on overall trends of wild flora and fauna impacted by farming activities are poor. The limited evidence concerning agriculture suggests that between 1998 and 2002 farmland bird populations declined slightly and that farming poses a threat to nearly 70% of important bird habitats through intensification and land use changes. Government research indicates that pastures and meadows are rich in diversity of different grass, herb and legume species [6].

Farmed Alpine pastures play a key role in cultural landscape amenity. Alpine pastures account for about 70% of total farmland and nearly 40% of farms, with transhumance involving half a million cows, sheep and goats annually [4]. The Alpine pastures are considered to provide benefits for biodiversity, scenic landscapes, and tourism, as well as a source of income for farmers [1]. While there has been extensive research in establishing a typology for Austrian landscapes (with 42 different landscape types identified), there is a lack of national time series data tracking physical changes in agricultural landscapes [34, 35].

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3.2.3. Overall agri-environmental performance

Overall agricultural pressure on the environment has eased over the past 15 years, but there are two key developments that threaten this positive development. First, further increases in production and intensification in the more fertile eastern area of the country and, second, the conversion of land in marginal farming areas, particularly high nature value Alpine pastures, to forestry. In general agricultural pollution from nutrients, pesticides, ammonia and greenhouse gases all declined over the past decade. Even so, agriculture remains a major source of water pollution, soil erosion is a concern, ammonia emissions continue to harm ecosystems, and the conversion of Alpine pastures to forestry is a threat to biodiversity and cultural landscapes reliant on farming activities.

Agri-environmental monitoring and evaluation efforts are mixed. The monitoring of water pollution from agricultural nutrients and pesticides is well established, although not for pollution from livestock pathogens. Monitoring of ammonia and greenhouse gas emissions from agriculture has recently been improved [27, 28]. Monitoring of soil quality (*e.g.* erosion), biodiversity (except for agricultural genetic resources) and landscape change on agricultural land are inadequate, although in 2003 the Ministry of Agriculture commissioned research to improve biodiversity monitoring [4].

Agri-environmental programmes have become more widespread, with particular emphasis on promoting organic farming, and the protection of biodiversity and cultural landscapes. Almost 80% of farmers and 90% of farmland are included under the ÖPUL agri-environmental programme and Austria has one of the highest rates of uptake for agri-environmental schemes across the EU15 [36]. However, the uptake of ÖPUL is slightly lower in intensively farmed areas where ground water pollution from agriculture tends to remain a problem [19].

The rapid expansion of organic farming is closely linked to funding under ÖPUL, with 95% of organic farms receiving ÖPUL funding, with plans to further increase support to organic production [1, 4, 13]. The growth in organic production has partly explained the decrease in fertiliser and pesticide use, but some Austrian research suggests that organic farms are not always able to prevent nitrate leaching into groundwater [37]. Moreover, the further expansion of the organic sector is not likely to be constrained by the supply of organic produce, but by constraints on the demand side (*e.g.* lack of distribution channels, standardised labelling, and organised marketing and processing) [38]. Research suggests that the future impacts of the EU 2003 Common Agricultural Policy reforms for the environment in Austria are likely to lead to an expansion of grassland and the reduction of arable land (resulting in an increase of soil organic matter), and an overall reduction of livestock numbers (leading to lower nutrient surplus, ammonia and greenhouse gas emissions). Organic farming could further expand but there is likely to be no increase in forestation, leading to the maintenance of open agricultural landscapes [39, 40].

While pressure from farming on the environment has been reduced problems persist. Water pollution, in particular groundwater (the main drinking water source), from nutrients and pesticides remains a concern in some regions. Soil erosion exists in some arable cropping areas but changes in farming practices (increased plant cover over winter) suggest erosion rates might be falling, although there are no time series data of erosion trends. The 2010 target under the *Gothenburg Protocol* to reduce ammonia emissions has already been met (in 2001-03), but continued reduction in emissions is necessary to reduce the harmful impacts of acidification on sensitive ecosystems, especially through improving manure and fertiliser management [4]. While agricultural GHG emissions and on-farm energy consumption have decreased over the past 15 years, further reductions might be achieved if the farm support on diesel fuel were lowered, which acts as a disincentive to lower energy use, improves energy efficiency and further reduce GHG emissions. In terms of the conservation of biodiversity in agriculture, there are concerns that only a small share (3-10%) of ÖPUL funding is directly targeted at biodiversity conservation [34]. However, other ÖPUL measures are important for biodiversity conservation, measures such as those covering preservation of cultivated areas, support for alpine grazing and herding, and organic farming too.

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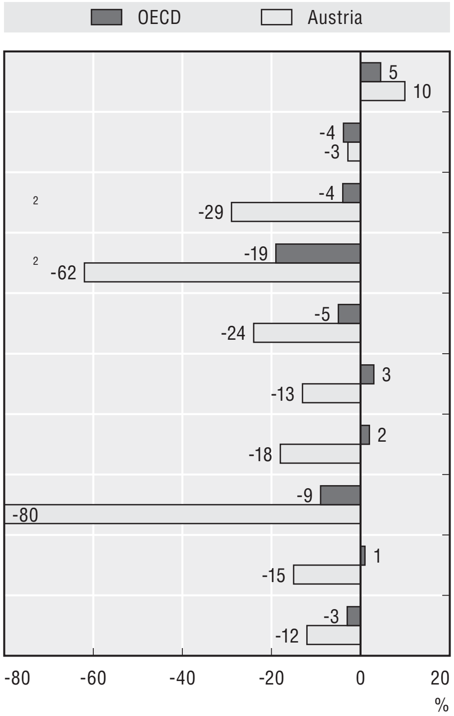
Figure 3.2.2. **National agri-environmental performance compared to the OECD average**

Percentage change 1990-92 to 2002-04[1]



Absolute and economy-wide change/level

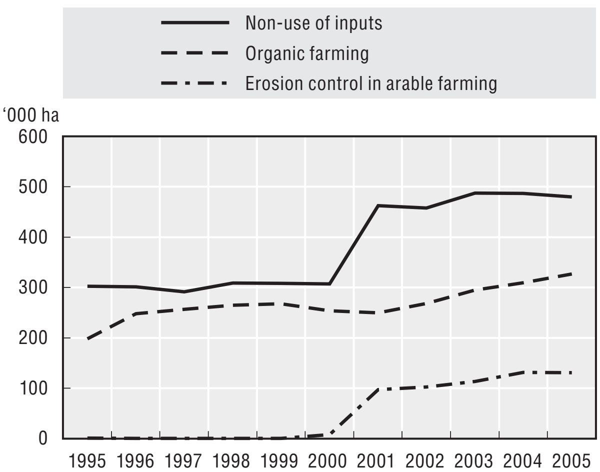
Variable	Unit		Austria	OECD
Agricultural production volume	Index (1999-01 = 100)	1990-92 to 2002-04	110	105
Agricultural land area	000 hectares	1990-92 to 2002-04	–95	–48 901
Agricultural nitrogen (N) balance	Kg N/hectare	2002-04	48	74
Agricultural phosphorus (P) balance	Kg P/hectare	2002-04	3	10
Agricultural pesticide use	Tonnes	1990-92 to 2001-03	–1 008	–46 762
Direct on-farm energy consumption	000 tonnes of oil equivalent	1990-92 to 2002-04	–96	+1 997
Agricultural water use	Million m^3	1990-92 to 2001-03	–18	+8 102
Irrigation water application rates	Megalitres/ha of irrigated land	2001-03	2.5	8.4
Agricultural ammonia emissions	000 tonnes	1990-92 to 2001-03	–11	+115
Agricultural greenhouse gas emissions	000 tonnes CO_2 equivalent	1990-92 to 2002-04	–1 074	–30 462

n.a.: Data not available. Zero equals value between –0.5% to < +0.5%.

1. For agricultural water use, pesticide use, irrigation water application rates, and agricultural ammonia emissions the % change is over the period 1990-92 to 2001-03.
2. Percentage change in nitrogen and phosphorus balances in tonnes.

Source: OECD Secretariat. For full details of these indicators, see Chapter 1 of the *Main Report*.

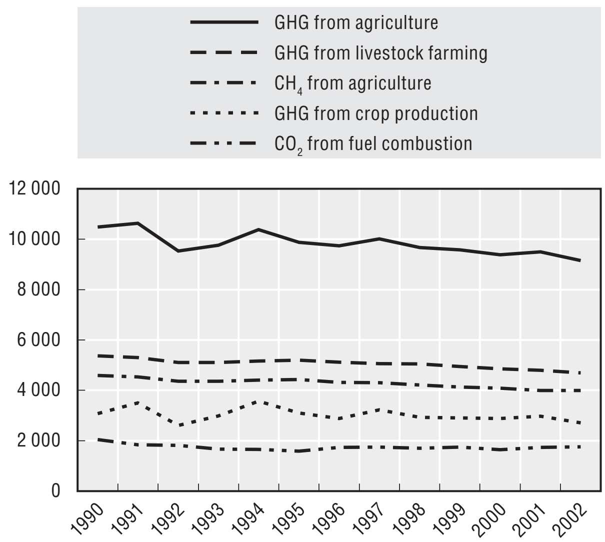
Figure 3.2.3. **Area under non-use of inputs, organic farming and erosion control measures of the ÖPUL agri-environmental programme**



Source: Federal Ministry for Agriculture, Forestry, Environment and Water Management.

Figure 3.2.4. **Greenhouse gas emissions from agriculture**

CO_2 equivalent Gg



Source: Federal Ministry for Agriculture, Forestry, Environment and Water Management.

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