Organisation for Economic Co-operation and Development
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ENVIRONMENTAL PERFORMANCE OF AGRICULTURE IN OECD COUNTRIES SINCE 1990:

Netherlands 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The review of environmental performance draws on the country responses to the OECD agri-environmental questionnaires (unpublished) provided by countries and the OECD agri-environmental database supporting Chapter 1 (see website above).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.

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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:

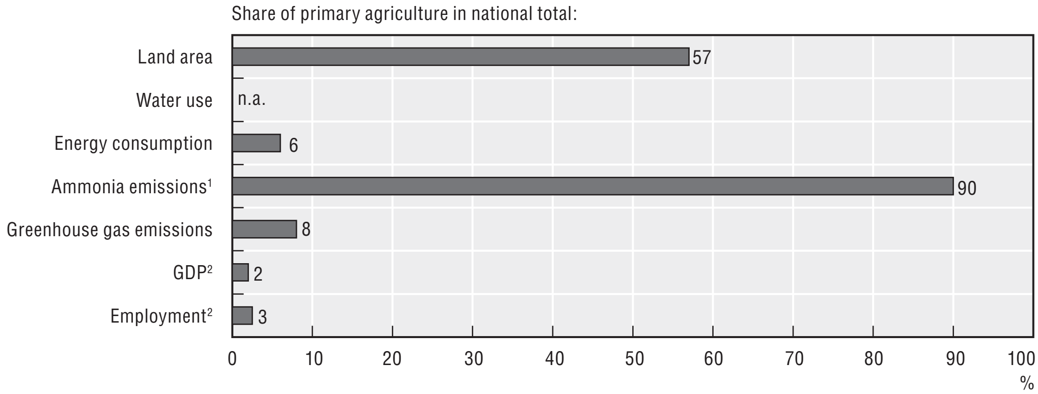
Coverage: The analysis is confined to examination of agri-environmental trends. The influence on these trends of policy and market developments, as well as structural changes in the industry, are outside the scope of these sections. Moreover, the country sections do not examine the impacts of changes 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).

3.19. NETHERLANDS

Figure 3.19.1. **National agri-environmental and economic profile, 2002-04: Netherlands**



StatLink http://dx.doi.org/10.1787/300711413753

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

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

3.19.1. Agricultural sector trends and policy context

Overall the agricultural sector has been contracting, with a reduction in the volume of production of nearly –10% and in the area farmed by –3% over the period 1990-92 to 2002-04. As a consequence the share of primary agriculture was around 2% of GDP and 2.5% of employment in 2003 [1] (Figure 3.19.1). However, within this overall decrease there has been an expansion in the horticultural sector, which now contributes around 40% of agricultural gross value added [1].

Agriculture makes intensive use of inputs resulting in high crop and livestock yields in comparison to most other OECD countries [1]. Livestock densities per hectare are among the highest in the OECD [2]. Purchased farm input use has in general declined more rapidly than agricultural production, suggesting that production intensity is diminishing and economic efficiency increasing over the period 1990-92 to 2002-04 (Figure 3.19.2). For example, the volume of inorganic fertiliser use fell by –36% for phosphorus, and –27% for nitrogen, and pesticides fell by over –50%. In contrast, direct on-farm energy consumption rose by 5%, largely reflecting the growth in the horticultural sector.

Farming is mainly supported under the Common Agricultural Policy, together with additional national expenditure within the CAP framework. Support to EU agriculture has declined from 39% of farm receipts in the mid-1980s to 34% in 2002-04 (as measured by the OECD Producer Support Estimate). This compares to the OECD average of 30% [3]. Nearly 70% of EU farm support is output and input linked, falling from over 98% in the mid-1980s. The total national agricultural budget (including CAP support) was EUR 1.9 (USD 2.4) billion in 2004, with environmental expenditure around EUR 500 (USD 625) million annually, or about 5-6% of agricultural gross value added [1, 3]. It is estimated by the Ministry of Agriculture that in 2003 the agricultural sector incurred costs totalling EUR 850 (USD 960) million in order to meet environmental regulations. EUR 650 (USD 730) million of this sum was spent to meet nutrient measures; EUR 90 (USD 100) million for acidification and air quality control; EUR 50 (USD 55) million to reduce pesticide use; and EUR 20 (USD 22) million to meet waste measures.

Agri-environmental policies mainly focus on reducing pollution. There have been three phases in nutrient policy: first, 1984-90, stopping the increase in livestock production; second, 1990-98, a step wise decrease of pressures resulting from surplus quantities of animal manure by using application limits and a manure quota system; and third, 1998-05, balancing farm level nutrient inputs and outputs through a compulsory *Minerals Accounting System* (MINAS), farmers being subject to levies when nitrogen and phosphorus surpluses exceed certain limits [2, 3, 4, 5, 6]. The annual cost of the nutrient policy rose from near zero in 1984 to EUR 400 (USD 380) million by 2002 [4]. There were also nutrient reduction costs through livestock farm closure schemes during 1998-2003, of EUR 710 (USD 700) million [2]. The *Nature for People, People for Nature* and *Subsidy Scheme for Nature Management* programmes include farmer environmental management agreements covering meadow birds, floral species and cultural landscapes.

Agriculture is affected by national environmental and taxation policies. Farming is assisted through environmentally important tax reductions. The following figures give estimates of annual budget revenue forgone in early 2000 [7] through these tax reductions: energy used for heating greenhouses [EUR 113 (USD 124) million]; on-farm diesel use [EUR 18 (USD 20) million]; and exemption from the groundwater abstraction tax up to a certain limit [EUR 17 (USD 19) million] [5, 8]. Agriculture also contributed 3% of total environmental tax revenues in 2002, mainly from nutrient levies [9]. Support and higher feed-in tariffs are provided for farm biomass used as a bioenergy feedstock [10]. Successive four-year *National Environmental Policy Plans* (NEPP) include environmental targets which affect farmers for pesticides, acid deposition, and eutrophication [5, 11].

To comply with international environmental agreements, agriculture has been set targets, for reducing nitrogen and phosphorus emissions into the North Sea (*OSPAR Convention*) and ammonia emissions into the atmosphere (*Gothenburg Protocol*). Agriculture is also implicated by national commitments under the *Kyoto Protocol* to reduce greenhouse gases and biodiversity conservation under the *Convention of Biological Diversity*.

3.19.2. Environmental performance of agriculture

With among the highest population density in the OECD area, pressure on land resources is high. Farming accounts for almost 60% of land use (2002-04), with most of the reduction in the area farmed since 1990 converted to urban use and, to a lesser extent, nature areas. About 25% of the country lies below sea level, protected from the sea by barriers of dunes and dykes [5, 12]. The main environmental challenge is the control of nutrient use, but also important is the reduction of groundwater use, drainage, and greenhouse gas emissions, as well as the improvement of energy efficiency, and the protection of biodiversity.

Soil quality is generally high [13]. Less than 1% of farmland suffers from high water erosion (above 14 tonnes/hectare/year), and wind erosion affects only about 2% of farmland [14, 15]. There is some evidence that intensive potato production in the northeast has contributed to wind erosion and soil organic carbon losses as a consequence of bulbs/ pasture production systems [13] and ploughing grasslands [14, 16].

Water pollution originating from agriculture is an important environmental concern. While recent trends indicate that the pressure from farming on water quality is diminishing, absolute levels of pollution remain amongst the highest across the OECD. Agriculture is the major source of nutrients, pesticides and the only known source of heavy metals in water. Pollution from endocrine disrupters and veterinary medicines in terms of potential impacts on human and wildlife reproductive systems is also a concern. The total external costs of agricultural water pollution are unknown, but in the late 1990s the annual external costs of eutrophication associated with nitrate emissions was estimated at EUR 600 (USD 540) million [17], and for treating drinking water polluted with nitrates at EUR 23 (USD 21) million [18].

Nutrient surpluses per hectare of agricultural land, among the highest in OECD countries, were greatly reduced between 1990-92 and 2002-04: by about 34% for nitrogen and nearly 50% for phosphorus, with much of the decrease occurring after 1995 (Figure 3.19.2) [4, 17, 19]. The decline in surpluses is attributed to lower fertiliser use and smaller livestock numbers [20]. Despite the decline in fertiliser use, the intensity of use remains high in relation to the OECD average (Figure 3.19.2) [1, 5]. More farmers are improving their nutrient management practices, with the share of farmland under nutrient plans rising from 40% in 1995-99 to over 80% by 2000-03, largely because nutrient management under MINAS became compulsory as from 2001. Storage capacity for manure also grew over the 1990s, with over 80% of dairy and pig farms having storage capacity for at least 5 months of manure production [21]. Infringements of nutrient regulations were found in over a quarter of farms inspected in 2002 [21].

Agriculture is the major source of nutrients in water [21]. Farming contributes more than 50% of the nitrogen and phosphorus loading to surface waters. The share of agriculture is increasing in relation to other sources of nutrient pollution, mainly sewage and the industrial sector, which have declined more rapidly. Farming is also the main source of groundwater and marine water nutrient pollution. Some two thirds of nutrients entering Dutch rivers are from other countries [17, 21]. The share of monitoring sites in farming areas where pollution levels exceed drinking water standards for ***surface water***, are 70% for nitrates and 60% for phosphorus. Agricultural nitrate pollution of surface water has declined since the late 1990s, but phosphorus pollution has been decreasing since the early 1990s, although annual mean concentrations of nitrogen and phosphorus in surface water by 2003-05 remained above *Maximum Tolerable Risk Levels* (Figure 3.19.3) [2, 21, 22].

Around 12% of shallow groundwater monitoring sites in farming areas have pollution levels that exceed nitrate drinking water standards, but the share has been declining since the mid-1990s and varies with soil type [2, 4, 21]. For deep groundwater (> 30 m depth) nitrate pollution is still rising because of the long time lags associated with nitrate leaching [21]. ***Coastal nutrient pollution*** has also declined over the past 10 years, but a 2002 OSPAR Convention assessment concluded that the entire Dutch coastal zone was eutrophic [21]. Levels of cadmium (derived from fertilisers) in fish and shellfish has also risen [5].

The over 50% reduction in the volume of pesticide use (active ingredients) was amongst the highest in the OECD during 1990-92 to 2002-04 (Figure 3.19.2). However, the trend in use stabilised over the period 2000 to 2004 [23], but the intensity of use per hectare remains high [1, 5]. Pesticide use has been decoupled from crop production, although the reduction in pesticide use was offset, to some extent, by higher use in the horticultural sector [5, 24]. The cut in pesticide use met the NEPP1 target which sought a reduction of 50% by 2000 from 1984-88 levels [5]. Pesticide risk indicators for the period 1998-2001 show a lowering of toxic effects on ecosystems and leaching into groundwater. In some regions pesticide concentrations exceeded drinking water standards [5]. The 4% of the agricultural area located in drinking water abstraction areas seems to be more vulnerable to pesticide leaching than the rest of the area farmed [25]. Therefore, special measures have been introduced for pesticide registration to prevent groundwater pollution in drinking water abstraction areas.

There are also pressures on water quality from agricultural heavy metals and pathogens. Loadings of heavy metals (copper and cadmium) on farm soils, mainly derived from manure and fertilisers, fell between 1990 and 1995 but then stabilised up to 2001 [26, 27]. Loadings of zinc rose, linked to corrosion from galvanised steel in greenhouses, although since 2001 agreements have been made with the horticultural industry to reduce this form of pollution [28]. In some regions heavy metal pollution exceeds drinking water standards [5], and there are concerns that their accumulation in soils may lead to leaching over hundreds of years [27]. An estimated 10% of drinking water supplies exceeded the standards for faecal bacteria and some wells where *E. coli* was detected were closed in 2001 [14].

Agriculture accounts for only about 1% of total water use, with 80% of the water used for irrigation. Around 30% of farmland is irrigated [29], and the area of land under irrigation rose by 1% between 1990-92 to 2001-03. About 50% of water used by agriculture is from groundwater, 25% from surface water, and much of the rest piped tap water [29]. Agriculture has contributed to the overexploitation of groundwater [5], which is important as farmers account for about 10% of total groundwater use [29]. Groundwater depletion coupled with agricultural drainage has harmed natural ecosystems on around 15% of the total land area, and possibly up to 5% of land is affected by saltwater intrusion [5, 17]. Since 2002, as part of the plan to address the pressure on groundwater resources, a national and provincial tax has aimed at providing incentives to use surface water [5]. Farmers are exempt from the national groundwater tax if their use is under 40 000m3/year, which has encouraged them to use multiple smaller pumps to avoid the tax [30]. Moreover, around 90% of the irrigated area is under low efficiency high-pressure rain gun application technology.

Ammonia emissions from agriculture have declined continuously by 48% between 1990 and 2003, the largest reduction across the OECD (Figure 3.19.2) [5]. Farming accounts for over 90% of total ammonia emissions, mainly from livestock, and contributes about 30% to problems of acidification [31]. About two thirds of ammonia emissions are of domestic origin, while the Netherlands contributes to deposition in Germany and the North Sea [5]. Much of the reduction in emissions is due to: obligatory regulations to cover livestock manure facilities and use low emission spreading practices; lower livestock numbers (manure accounts for over 90% of emissions); and to some extent use of low emission livestock housing. A 2001 survey showed that only 15% of pigs were housed under low emission conditions [5, 32]. Ammonia emissions are expected to meet the EU and *Gothenburg Protocol* emission targets by 2010, but not the stricter NEPP4 target [11, 31]. Nitrogen deposition levels across the country are too high for the recovery of natural habitats, such as heathland and peat bogs, although there are regional differences [11]. Currently about 10% of natural habitats are protected from acidification, compared to the NEPP4 target of protecting 20-30% by 2010 [5].

Agricultural greenhouse gas (GHG) emissions declined by 18% between 1990-92 and 2002-04, and accounted for 8% of total national emissions in 2002-04 (Figure 3.19.2).

This compares to no change in total national GHG emissions over the same period and a *Kyoto Protocol* reduction target of –6% by 2008-12 under the EU *Burden Sharing Agreement*. The fall in GHGs was largely due to lower emissions of methane and, to a lesser extent, nitrous oxide, due to reduced livestock numbers and nitrogen fertiliser use, and improved manure management [33]. There was also a decrease in carbon dioxide (CO_2) emissions from agriculture. The potential loss of soil organic carbon in farmed soils and possible underestimation of GHG emissions from grassland ploughing [16], might be offset, to some extent, by the conversion of farmland to forestry over the 1990s and the growth in agricultural biomass for bioenergy production. The share of bioenergy in national heat, power and transport fuel production is under 1% [10].

Direct on-farm energy consumption rose by 5% over the period 1990 to 2004 (Figure 3.19.2). Most of this occurred in the first half of the 1990s, since when consumption has decreased [34]. Nearly 85% of on-farm direct energy consumption in 2001 was used for heating greenhouses[34], with farming accounting for 6% of total national energy consumption in 2002-04. A target has been set to reduce energy use per unit of production by 65% by 2010 compared to 1980 levels [31]. But while agriculture achieved a nearly 2% per annum improvement in energy efficiency over the 1990s [10], it has been estimated this rate needs to rise to 4.5% per annum between 2000 and 2010 to realise the government energy efficiency target [35]. The agricultural energy use per unit of production, however, almost halved between 1980 and 2003 [36].

The high intensity of agriculture has exerted substantial pressure on biodiversity. The main causes of this pressure derive from: acidification of natural habitats; drainage of farmland (lowering groundwater tables); pollution of aquatic ecosystems from eutrophication, pesticides and pathogens; and land use changes, including loss of semi-natural biotopes, ploughing of grasslands and conversion of farmland to urban use [5, 37]. Trends in ***agricultural genetic resources*** show that for *crops* extensive *ex situ* collections exist and are being increased, while *in situ* conservation is limited to fruit trees and some grasslands, as most traditional varieties were replaced many decades ago [14, 38]. For livestock all endangered breeds are included under conservation programmes with growing interest for *in situ* conservation of rare breeds and an expansion of genetic material in gene banks [39].

Over 50% of terrestrial flora and fauna species depend on farmland as habitat. Farmland bird populations declined by over 1% annually during 1990 to 2003, but the rate of decline accelerated over 2000 to 2004 to more than 4% annually, although the reasons for this are not yet known (Figure 3.19.4) [40]. Some bird species are in a critical situation, such as the Black Tailed Godwit (*Limosa limosa*) and the Skylark (*Alauda arvensis*) (Figure 3.19.4) [40, 41, 42]. The Netherlands has an international responsibility for some of these species, including, for example, the Black Tailed Godwit, with about 50% of the European population found in the country [43]. Numbers of reptiles (*e.g.* adders and lizards) on heath land have also declined by about a third between 1994 to 2003, mainly because of agricultural habitat fragmentation, and groundwater withdrawal and drainage leading to desiccation [44].

Acidification from ammonia emissions has caused the displacement of local flora by species that flourish in acid and nitrogen rich conditions. In addition, groundwater depletion and farmland drainage have led to the displacement of flora that thrive in moist habitats. About 40% of native plant species require wet environments [5]. The reduction in pesticides, however, appears to be easing threats to birds, worms and aquatic species, but pollution from heavy metals and pathogens remains a concern for aquatic ecosystems [5].

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Changes to agricultural habitats have also adversely impacted on wild species, especially the conversion of farmland to urban use, and of pasture to arable and permanent crops. Around 7% of farmland is semi-natural habitat, mainly extensive grasslands, heaths and marshes [14], while there has been an increase in fallow land rising to over 1% of total farmland. Uncultivated habitats account for a 3% share of agricultural land, mainly woodland (> 5 ha) and small water bodies. Uncultivated habitats also provide a linear network of wet and dry ditches and hedgerows [14, 45].

As the major land user farming determines, to a great extent, the appearance of cultural landscapes. The government retains responsibility for 20 "national landscapes" covering about a quarter of the total national land area [1]. In most cases pasture is the main form of land use in these areas. The commitment to protect landscapes has been reconfirmed in several government plans. While some landscapes are still intact, many are in danger of losing their unique character, particularly open cultivated grassland on peat soils [5, 14].

3.19.3. Overall agri-environmental performance

Overall agriculture is slowly moving toward a more environmentally sustainable path, but at a considerable environmental and financial cost [5]. Environmental pressure has largely become decoupled from the rise in farm production, but the intensity of farming across the country, however, remains high by OECD standards. Agriculture is the major contributor to eutrophication, acidification, and groundwater depletion. It is a source of continuing pressure on the pollution of surface and groundwater from nutrients, pathogens and heavy metals; and on biodiversity.

An extensive environmental monitoring system has been established, which also covers agricultural pressures on the environment. Monitoring and evaluation efforts are important in tracking national progress toward the targets established under the NEPPs; and also the numerous international environmental agreements ratified by the Netherlands. The *Dutch Soil Quality Monitoring Network* started in 1993 to collect data on soil biodiversity. Initial results show some declines for nematodes in intensive pastures [13, 46]. However, information on biodiversity in relation to farming, especially on trends and the quality of semi-natural and uncultivated habitats [45] and landscapes is poor. Also there are few estimates of the costs and environmental benefits of nutrient policies [47].

Strengthening of agri-environmental policy measures should further ease environmental pressures. The European Court of Justice ruled in 2003 that the methodology of the MINAS system did not comply with the EU *Nitrates Directive*, and in response the government implemented a new nutrient policy from January 2006. Under the new policy nutrient application standards, determined by crop and soil types, comply with the EU *Nitrates Directive* [3, 4]. Decreasing application standards should lower nutrient losses to the environment, with the standards set for 2009 seeking to achieve a maximum of 50 mg nitrate per litre in upper groundwater and the standards for 2015 aiming to have an equilibrium level of phosphate fertilisation [48]. A target to reduce pesticides by 95% by 2010 compared with 1998 (pesticide use stabilised between 2000 and 2004 [23]) will be addressed by greater adoption of integrated pest management; stricter regulations on pesticide sales and use; improved farmer education; and farm certification [3, 5].

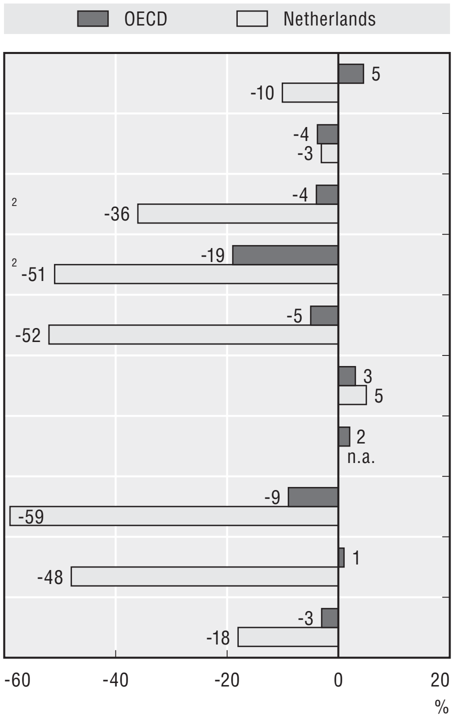
In 2005 the government introduced a habitat approach into biodiversity policy with a specific focus on an integrated area, rather than the earlier approach of conservation plans for each species [49]. The *Policy Document on Organic Agriculture* 2005-07 aims for 10% of farmland to be under organic production by 2010. The growth in conversion of land to organic farming slowed between 1999 to 2004, and accounted for around 2.5% of farmland in 2002-04 [50]. Payments provided for 5 years for organic conversion and maintenance were phased out from 2005, with instead a system whereby certification costs for the period 2006-10 are be paid under the EU *Rural Development Programme* [1, 50, 51].

Moving agriculture onto a sustainable path will remain a major challenge. Currently more than half of Dutch dairy farms apply more than 250 kg nitrogen per hectare (kg N/ha) through the application of livestock manure to grassland [47]. The EU *Nitrate Directive*, however, stipulates a maximum of 170 kg N/ha from livestock manure, but the EU agreed to grant the Netherlands a derogation of 250 kg N/ha, which the new nutrient policy aims to meet over the next 5-10 years [52]. In addition, a further reduction of nutrient loadings into the North Sea will be necessary to achieve the *OSPAR Convention* target of 2010. While EU and international targets have been met for ammonia emission reduction, and are likely to be met up to 2010, these emissions need to be further reduced in order to prevent harm to natural habitats [1]. The accumulation of phosphorus in farmed soils and the build up of agricultural pathogens and heavy metals may affect water quality for many decades to come [5]. For groundwater the farm tax exemption reduces the incentive for farmers to use surface water, with only around 2% of them paying the national tax and many avoiding payment of the provincial tax [8, 18, 30].

Meeting government targets by 2010 for pesticide use and the area organically farmed will require a substantial effort over the second half of this decade in view of the limited progress to date. Improving energy efficiency in the horticultural sector may require containing the increase in area of greenhouse cultivation under artificial lighting [32]. But subsidising energy use by greenhouse operators, and on-farm diesel use, acts as a disincentive to improving energy use efficiency and reducing GHG emissions. To date, efforts to slow or reverse agriculture's pressure on biodiversity have had little success, possibly due to the fact that the intensity of farming has counteracted the effects of agri-environmental measures, as revealed by, for example, the poor state of meadow birds and the decline in the area of land under on-farm conservation schemes by private landowners [41, 42]. The government is committed to halting biodiversity loss by 2010 [49], with payments to farmers being increased to meet the 2010 target of around 5% (110 000 ha) of agricultural land being managed as semi-natural habitat [5].

Figure 3.19.2. **National agri-environmental performance compared to the OECD average**

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



Absolute and economy-wide change/level

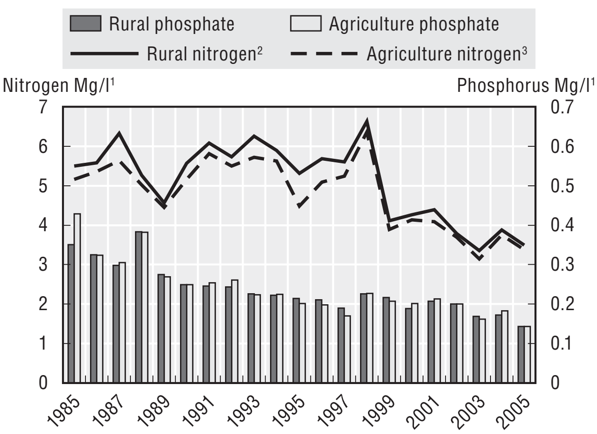
Variable	Unit		Netherlands	**OECD**
Agricultural production volume	Index (1999-01 = 100)	1990-92 to 2002-04	90	105
Agricultural land area	000 hectares	1990-92 to 2002-04	–61	–48 901
Agricultural nitrogen (N) balance	Kg N/hectare	2002-04	229	74
Agricultural phosphorus (P) balance	Kg P/hectare	2002-04	19	10
Agricultural pesticide use	Tonnes	1990-92 to 2001-03	–9 283	–46 762
Direct on-farm energy consumption	000 tonnes of oil equivalent	1990-92 to 2002-04	+175	+1 997
Agricultural water use	Million m^3	1990-92 to 2001-03	n.a.	+8 102
Irrigation water application rates	Megalitres/ha of irrigated land	2001-03	0.1	8.4
Agricultural ammonia emissions	000 tonnes	1990-92 to 2001-03	–113	+115
Agricultural greenhouse gas emissions	000 tonnes CO_2 equivalent	1990-92 to 2002-04	–4 100	–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*.

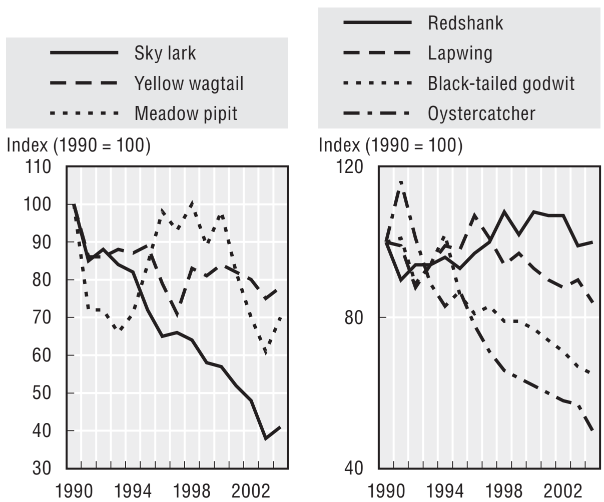
Figure 3.19.3. **Annual mean concentrations of nitrogen and phosphorus in surface water of rural and agricultural water catchments**



1. Maximum tolerable risk for nitrogen 2.2 mg N/l and 0.15 mg P/l for phoshorus in surface water.
2. 75% of rural upstream catchments including agricultural and other effluents.
3. 75% of agricultural upstream catchments.

Source: RIZA Institute for Inland Water Management and Waste Water Treatment, 2007.

Figure 3.19.4. **Farmland bird populations**



Source: NEM (SOVON, CBS, provinces).

StatLink http://dx.doi.org/10.1787/300751751071

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