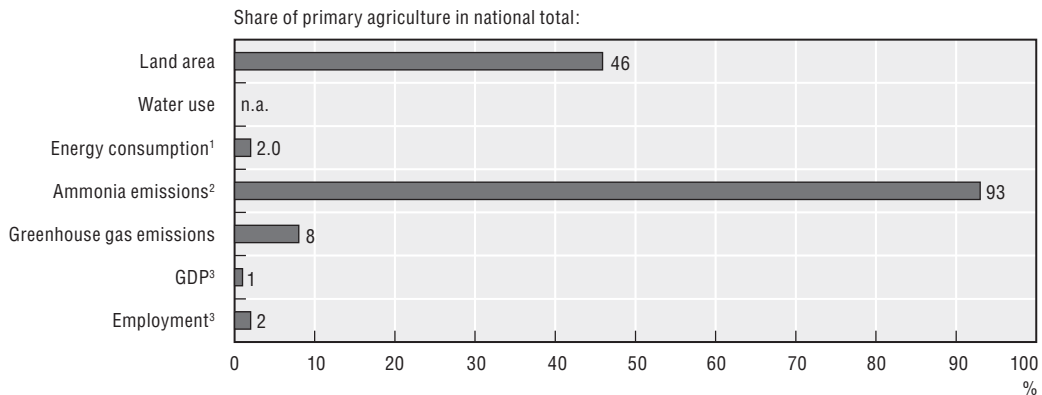



3.3. BELGIUM

Figure 3.3.1. **National agri-environmental and economic profile, 2002-04: Belgium**



StatLink  <http://dx.doi.org/10.1787/288840560263>

1. Data refer to the period 1999-01.
2. Data for the period 2002-04 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*.

3.3.1. Agricultural sector trends and policy context

Agriculture's contribution to the economy declined over the 1990s, and by 2004 accounted for less than 1% of GDP and represented about 2% of employment [1] (Figure 3.3.1). The overall volume of farm production decreased by around 1% over the period 1990-92 to 2002-04 (Figure 3.3.2), and since 2000 production has decreased most rapidly for livestock but less so for crops. While Walloon accounts for 55% of farmland it generates only half the agricultural value added of Flanders where two-thirds of the intensive farming holdings are situated [1].

The area farmed increased by about 3% from 1990-92 to 2002-04 (Figure 3.3.2), and accounted for 45% of the total land area in 2002-04, although the area of farmland declined by nearly 1% from 2000 to 2005 [1]. The growth in farmland over the 1990s was largely because of improved measurement (*i.e.* registration and reporting by farmers), rather than an actual increase in land farmed, linked to manure policy and the CAP reforms of the early 1990s [2, 3]. Agriculture remains highly intensive by comparison with most OECD countries, although purchased farm input use per unit volume of output diminished over the period 1990-92 to 2002-04. During this period the volume of inorganic fertilisers declining by about -15% for nitrogen and over -30% for phosphorus, pesticides by 19% and direct on-farm energy consumption by -6% (Figure 3.3.2).

Farming is mainly supported under the Common Agricultural Policy, with additional 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% [4]. Nearly 70% of EU15 farm support is output and input linked, falling from over 98% in the mid-1980s. Annual Belgian agricultural budgetary expenditure (less CAP payments) was EUR 222 (USD 277) million in 2004, of which around 30% EUR 65 (USD 80) million) was for agri-environmental measures, which was about 1% of farm gross value added. Since 2001 farm policy is devolved to Flanders, Walloon and Brussels, although only 3% of the Brussels region is farmed [4, 5, 6].

Agri-environmental policies are mainly focused on reducing the intensity of farming and protecting biodiversity and cultural landscapes. Flanders and Walloon have established their own agri-environmental plans [6, 7, 8]. While there are many common elements in these plans, they accounted for 23% of the agricultural budget in Flanders and 45% in Walloon in 2004 [4]. Nutrient policy under the EU Nitrates Directive was implemented in Flanders in 1991, with obligatory requirements for manure application and storage and voluntary codes of good environmental farm practice. Since 2004 there have been obligatory requirements for nutrient application and storage, and soil cover during winter [2, 7] in Walloon. Payments have been provided for biodiversity and landscape conservation since 2000, such as maintaining hedges, ponds and meadow birds, and also to reduce nutrient application rates [2, 6, 9].

Agriculture is impacted by national environmental and taxation policies and international environmental agreements, with national environmental policies devolved to the regions in the early 1990s [6]. Revenue from environmental taxes was about 2% of GDP in 2003, including taxes on manure surpluses, groundwater use [10] and, since 1997, on five of the most common pesticides found in water at EUR 2.5 (USD 3.1)/kg [2]. Under measures to manage and recycle packaging waste, farmers are required to recover at least 80% of their pesticide packaging or they are subject to a tax of EUR 0.124 (USD 0.155)/litre of pesticide [2]. Farmers are exempt from fuel tax [11], while tax reductions were granted on biofuels from 2005 [12], and tax benefits are available to farmers if they invest in energy saving (13.5% tax deduction on the energy saving investment) [1]. Some international environmental agreements require Belgian agriculture to reduce nutrient pollution into the North Sea (OSPAR Convention), ammonia emissions (Gothenburg Protocol), methyl bromide (Montreal Protocol) and greenhouse gases (Kyoto Protocol) [13].

3.3.2. Environmental performance of agriculture

The high population density and intensive farming system exert great pressure on the environment. The key environmental challenges are to reduce water pollution from farm nutrients, pesticides and heavy metals, as well as to maintain soil quality, reduce ammonia and greenhouse gas emissions, and enhance biodiversity and cultural landscapes [8, 14].

Soil erosion is a concern in some regions, although less than 1% of farmland area is experiencing water erosion greater than 11 tonnes per hectare per year. Problems related to wind erosion are minor. Some improvement in soil management practices (e.g. low tillage, green cover during winter) is helping to raise soil quality, especially in those regions (central areas) at greatest risk of erosion both on and off-farm [2, 15, 16]. Improvements in soil management practices together with land use changes may also have increased soil organic carbon levels over the 1990s, thus, improving soil fertility and carbon sequestration in soils, although current evidence suggests such improvements are likely to have been small [2, 8, 17, 18].

The pressure from farming activities on water quality is easing, but absolute levels of agricultural nutrient and pesticide pollution of water remain amongst the highest in the OECD. Agriculture is the major source of nutrient pollution of water, with water pollution from pesticides and heavy metals also important [8, 14].

Agricultural nutrient surpluses decreased between 1990-92 and 2002-04, but surpluses per hectare of farmland remain amongst the highest in the OECD (Figure 3.3.2). Over this period surpluses (tonnes) of nitrogen fell by -26% and phosphorus by -43%, mainly because of a reduction in fertiliser use and higher uptake of nutrients due to an expansion in crop production, although this was partly offset by an increase in livestock numbers (largely pigs and poultry) [14, 19]. As a result livestock now accounts for the major share of nutrient surpluses (notably dairy cattle). The drop in fertiliser use has become decoupled from the growth in crop production over the past decade, although the intensity of fertiliser use remains high in relation to the OECD average [13]. The efficiency of nutrient use (volume ratio of inputs to outputs) is below the OECD average, but overall has improved over the period 1990-92 to 2002-04 [20, 21]. The improvement in nutrient use efficiency is partly because of the obligation of all farms to implement a nutrient management plan since the early 1990s, with an increasing number of farms now undertaking soil nutrient testing.

Agriculture accounts for the major and growing source of nutrients and heavy metals in water, as pollution from other sources (industry, urban) is declining [14, 22]. The shares of **nitrogen and phosphorus** from agriculture in surface waters in the Flanders region were about 60% and 35% respectively, compared to respective shares of 50% and 25% in 1992 [14, 22]. Similar levels are apparent for coastal waters, which rose from 39% and 14% for nitrogen and phosphorus respectively in 1985, to respective shares of 56% and 39% by 2000 [2]. The share of surface water monitoring sites in agricultural areas of Flanders exceeding drinking water standards in 2001-02 for surface water was about 40% for nitrates and phosphorus and 30% for nitrates in groundwater. Nitrate concentrations are also rising in certain aquifers in Walloon [8]. Despite the decrease in agricultural nitrogen surpluses, pollution of groundwater is not expected to improve for many years because of the time lags involved in the transfer of nitrates through water tables [2, 7], with even longer time lags for phosphorus.

Agricultural pollution of surface water from heavy metals, especially fertilisers, is making a growing contribution to total emissions, as heavy metal pollution from non-agricultural sources is rapidly declining [8, 14]. In Flanders, however, targets for heavy metal emissions in surface water are being met in most cases [14]. This is mainly because of lower inorganic fertiliser use and the ban on applying sewage sludge as a fertiliser (although sewage sludge use is restricted in Walloon) [18].

Environmental risks have diminished with the 19% reduction in the volume of pesticide use (active ingredients) over the period 1990-92 to 2001-03 (Figures 3.3.2 and 3.3.3). Agriculture accounts for around 70% of pesticide use, with horticultural producers being the major users [23]. Pesticide use has become decoupled from the growth in crop production, mainly because of the increasing use of new generation pesticides, which in general are applied at a much lower dose per hectare, and improvements in pest management practices [23]. But despite the increase in the area under integrated pest management (IPM) over the past decade this only accounted for under 2% of the total arable and permanent crop area, with organic farming accounting for 3% of the total agricultural land area in 2003. For some crops the share under IPM is higher, such as for apples (23%) and pears (33%) [24]. In Flanders 11% of surface water monitoring sites in agricultural areas recorded that atrazine (a pesticide)

was found in excess of drinking water standards in 2002, with a share of 25% for groundwater monitoring sites, but this varies regionally from 13% to 32% [2]. An environmental pesticide risk indicator for aquatic species declined by in excess of 100% during the period 1990 to 2004, well in excess of the target set by the Flemish government to achieve a 50% reduction between 1990 and 2005 [14].

Farming accounts for a minor share of water use despite significant growth in the area irrigated. The area irrigated grew by 67% between 1990-92 and 2001-03, but accounts for less than 2% of total farmland (3% of arable and permanent cropland), and 22% of total agricultural water use. Most of the irrigated area is in the Flanders region, and is mainly used for irrigating horticultural crops [2]. Over 80% of the water used on irrigated areas is applied using efficient water application technologies, such as drip emitters and low pressure sprinklers [2].

Agricultural ammonia and methyl bromide emissions have declined over the past decade. Having increased slightly over the period 1990 to 1997, agricultural **ammonia** decreased sharply from 1998 to 2002, largely because of the obligatory requirement for low emission spreading of manure (Figure 3.3.2). Agriculture accounted for over 93% (2001-03) of ammonia emissions, and the lowering of emissions has contributed to the overall reduction in emissions of acidifying substances by nearly 30% between 1990 and 2002, although the level of acidification continues to damage ecosystems [8, 14]. While there has been a substantial reduction in the use of **methyl bromide** (an ozone depleting substance) it continues to be used by the horticultural sector [14, 25]. Belgium, as a signatory to the *Montreal Protocol* agreed to phase out methyl bromide use by 2005, but also agreed under the Protocol to “Critical Use Exemption” of 36 tonnes (ozone depleting potential) or about 10% of its consumption level in 1991, which under the Protocol allows farmers additional time to find substitutes [25].

Agricultural greenhouse gas emissions (GHGs) declined by 10% between 1990-92 and 2002-04, but rose by 1% for other sectors of the economy (Figures 3.3.2 and 3.3.4). This compares to a commitment as part of the *Kyoto Protocol* to reduce total GHGs by 7.5% in 2008-12 under the *EU GHG Burden Sharing Agreement*, relative to the 1990 base period [1]. Much of the decrease in agricultural GHGs was due to lower fertiliser and livestock numbers, with farming contributing 8% of total GHG emissions in 2002-04 and 2% of total energy consumption. **Carbon sequestration** related to agriculture showed a small increase over the period 1990 to 2004, mainly due to improvements in soil management practices (low tillage practices) and reforestation of farmland, to some extent offset by land use changes, especially the increase in arable and permanent cropland [17, 18]. The potential of agriculture to provide biomass feedstock for renewable energy production is limited at present as there is no biofuel production capacity [26].

Agriculture has adversely impacted on biodiversity since 1990, but there are recent signs since around 2000 that this pressure could be easing. The key pressures derive from eutrophication and acidification of ecosystems due to surplus nutrients, desiccation from farmland drainage and groundwater extraction, and the fragmentation and conversion of farmland to non-agricultural uses [27]. For **agricultural genetic resource diversity** an increasing number of crop varieties and livestock breeds (except cattle) have been used in production in Flanders since 1990. Some endangered cattle breeds, however, are maintained under *ex situ* conservation programmes, and a regional network of *ex situ* fruit orchards to conserve local fruit varieties was established in 2005. There are also some improvements for *in situ* collections of crops and livestock genetic material [28].

Trends in species diversity showed that farming accounts for over 70% of the harmful impacts affecting the quality of important bird areas. Compared to other EU countries there has been a high rate of decline in farmland birds. Within Flanders ten species showed a negative trend, especially the Skylark (*Alauda arvensis*) and Meadow Pipit (*Anthus pratensis*), and two a positive trend from 1985 to 2002 [2, 29]. The acidification and eutrophication of terrestrial and aquatic ecosystems from excess agricultural nitrogen emissions in Flanders currently threaten 40% of the floral species that are not tolerant to acid conditions. Over 70% of species rich grasslands exceeded the critical load for nitrogen in 2003, although pressure on habitats from nitrogen pollution declined over the 1990s [14, 29]. Butterfly populations have been negatively affected by excess nitrogen in the environment as well as the conversion of extensive pasture to other uses [27, 30]. Concerning **agricultural habitat diversity**, conversion of small farmland habitats, such as ditches and hedgerows, has also been a major cause of the loss of certain flora, for example the Primrose (*Primula vulgaris*) [27, 31]. Moreover, wild species have been adversely impacted since 1990 by the conversion of pasture to cropland, and to a lesser extent permanent crops (horticultural crops), and the conversion and fragmentation of farmland to other uses, especially urban use and forestry [29].

Agriculture plays a key role in changing cultural landscapes [5]. There are landscape inventories, but no regular monitoring of changes in agricultural cultural landscapes. But concerns remain, however, that cultural landscapes are being adversely impacted by fragmentation, as a result of the enlargement of field size and the expansion of urban areas and transport networks [5].

3.3.3. Overall agri-environmental performance

Overall the high intensity of farm input use exerts considerable pressure on the environment, although since the late 1990s there have been signs the pressure could be easing. Pressure on the environment has largely become decoupled from farm production with the reduction in output over the period 1990-92 to 2002-04 less than the much larger decline in purchased input use. But absolute levels of many agricultural pollutants in Belgium remain high relative to average OECD standards, and as a result the sector is a major source of water and air pollution, while farming practices continue to cause pressure on soil erosion, biodiversity and cultural landscapes.

Each Federal region is developing its own agri-environmental monitoring and evaluation system. As a consequence of the shift to a regional decision making system, obtaining a uniform assessment and data for Belgium as a whole is difficult and, hence, there is little co-ordinated information available at a national level [5, 27]. Both Flanders and Walloon publish annually environmental indicators, including many of relevance to agriculture [8, 14, 29], and in 2004 Flanders made a detailed study of agri-environmental performance [32].

Agri-environmental measures have been considerably strengthened and expanded since 2000, compared to those measures first introduced in the early 1990s [6, 9]. In 2003 around 10% of the agricultural land area was under agri-environmental schemes [6, 9], with the major part of expenditure under these schemes being aimed at reducing nutrient pollution (water and air) [6, 9]. Recent policy initiatives, including budgetary payments, have led to a substantial expansion in agricultural areas under biodiversity conservation (i.e. field margins, ponds, hedges, extensive grassland), even so they only covered just

over 1% of farmland in Flanders in 2004 [29]. Payments to convert and maintain organic farming were increased in 2003, for a minimum period of 5 years [4]. The target area organically farmed is set to rise from 3 % of farmland in 2003 to 10% by 2010 [2, 9, 28].

Despite recent improvements in agri-environmental performance major challenges remain.

Flanders has identified a 2010 target for **nutrient surpluses** (70 kg N/ha and 4 kg P/ha) to protect drinking water quality, but this will require a major effort to achieve, as the surpluses in 2002-04 were 184 kg N/ha and 23 kg P/ha [14]. Similar concerns also arise in overcoming farm nitrogen pollution in Walloon [7]. Improving nitrogen use efficiency levels, which are relatively low by average OECD standards, has been recognised as one way of reducing nitrogen surpluses [20, 21, 33]. From 2003 some 40 active **pesticide** ingredients were prohibited out of a total 375 authorised ingredients in Flanders. This has help the region meet the 50% reduction target for its environmental pesticide risk indicator between 1990-2005 (for farm and non-farm pesticides) [14, 23].

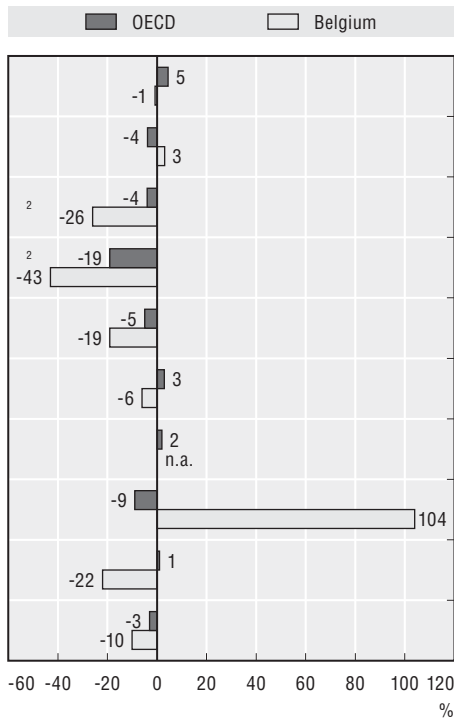
To meet the national ammonia emission ceiling target by 2010 agreed under the Gothenburg Protocol, emissions will need to decline by a further 8% from their 2001-03 average level. This compares to a reduction of 22% from 1990-92 to 2001-03. Some researchers consider it unlikely, however, that acidification will decrease sufficiently by 2010 to avoid damage to vulnerable ecosystems [27].

The farming sector has reduced its GHG emission levels, and this trend is projected to continue up to 2010 [34, 35], but the contribution from soil carbon sequestration could be modest [18]. While agricultural GHG emissions and on-farm energy consumption have decreased over the past 15 years, further reductions might be achieved if the fuel tax exemption for farmers were removed, which acts as a disincentive to lower energy use, improve energy efficiency and further reduce GHG emissions.

Concerning biodiversity risks of future adverse impacts from farming remain [27]. Implementation of meadow bird and floral protection schemes are progressing only slowly in Flanders [27], and were behind the targets set for 2006 [29].

Figure 3.3.2. **National agri-environmental performance compared to the OECD average**

Percentage change 1990-92 to 2002-04¹



Absolute and economy-wide change/level

Variable	Unit	Belgium	OECD
Agricultural production volume	Index (1999-01 = 100) 1990-92 to 2002-04	99	105
Agricultural land area	000 hectares 1990-92 to 2002-04	42	-48 901
Agricultural nitrogen (N) balance	Kg N/hectare 2002-04	184	74
Agricultural phosphorus (P) balance	Kg P/hectare 2002-04	23	10
Agricultural pesticide use	tonnes 1990-92 to 2001-03	-1 283	-46 762
Direct on-farm energy consumption	000 tonnes of oil equivalent 1990-92 to 2002-04	-55	+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	0.2	8.4
Agricultural ammonia emissions	000 tonnes 1990-92 to 2001-03	-21	+115
Agricultural greenhouse gas emissions	000 tonnes CO ₂ equivalent 1990-92 to 2002-04	-1 233	-30 462

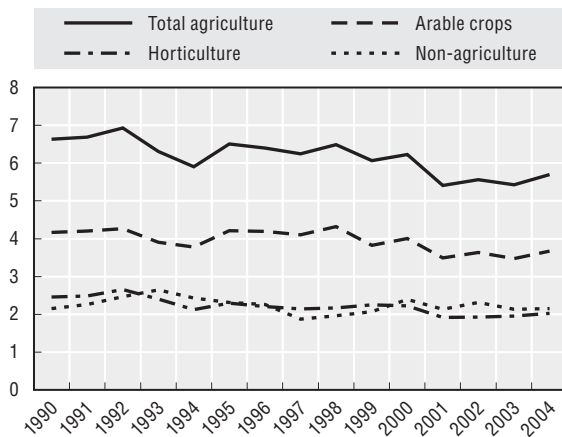
n.a.: Data not available. Zero equals value between -0.5% to < +0.5%.

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*.

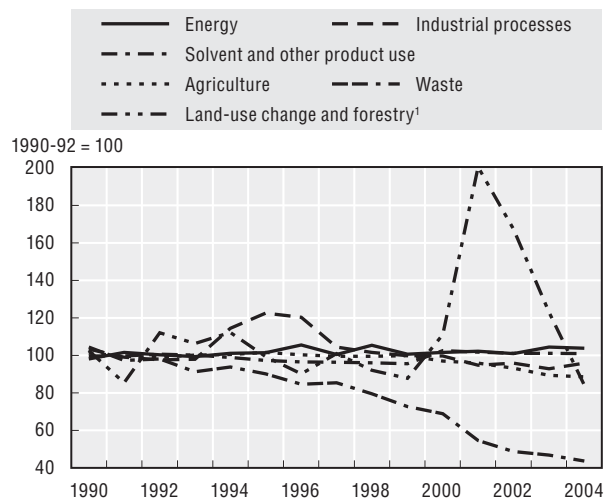
Figure 3.3.3. **Total pesticide use**

Thousand tonnes, active ingredients



Source: Crop Protection Department, Ghent University, Belgium.

Figure 3.3.4. **Greenhouse gas emissions and sinks**



1. Index shows the increase and decrease in GHG sinks.

Source: National inventory report under the UNFCCC, 2007.

StatLink <http://dx.doi.org/10.1787/288850702786>

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Table of Contents

I. Highlights	15
Overall agri-environmental performance.	15
Agri-environmental performance in specific areas	16
Caveats and limitations	19
Matching indicator criteria.	20
II. Background and Scope of the Report.	23
1. Objectives and scope.	23
2. Data and information sources.	24
3. Progress made since the OECD 2001 Agri-environmental Indicator Report	25
4. Structure of the Report	26
Bibliography	28
Annex II.A1. List of indicators in Chapter 1	29
Annex II.A2. Indicators in Chapter 1 assessed according to the OECD indicator criteria	31
Chapter 1. OECD Trends of Environmental Conditions related to Agriculture since 1990	37
1.1. Agricultural production and land	38
1.1.1. Introduction	39
1.1.2. Agricultural production	39
1.1.3. Agricultural land use.	40
1.1.4. Linkages between agricultural production and land use.	46
Bibliography	47
1.2. Nutrients	48
1.2.1. Nitrogen balance	52
1.2.2. Phosphorus balance	56
1.2.3. Regional (sub-national) nutrient balances.	60
Bibliography	62
1.3. Pesticides	63
1.3.1. Pesticide use	63
1.3.2. Pesticide risk indicators	67
Bibliography	74
1.4. Energy	76
Bibliography	83
1.5. Soil	84
Bibliography	90

1.6. Water.....	92
1.6.1. Water use	93
1.6.2. Water quality	100
Bibliography	108
1.7. Air	109
Background	110
1.7.1. Ammonia emissions, acidification and eutrophication.....	110
1.7.2. Methyl bromide use and ozone depletion	117
1.7.3. Greenhouse gas emissions and climate change	122
Bibliography	130
1.8. Biodiversity	133
Background	134
1.8.1. Genetic diversity	136
1.8.2. Wild species diversity	146
1.8.3. Ecosystem diversity.....	148
Bibliography	159
1.9. Farm management	160
1.9.1. Overview of environmental farm management	163
1.9.2. Nutrient management	163
1.9.3. Pest management	168
1.9.4. Soil management.....	169
1.9.5. Water management.....	172
1.9.6. Biodiversity management	173
1.9.7. Organic management	174
Bibliography	176
Chapter 2. OECD Progress in Developing Agri-environmental Indicators	179
2.1. Introduction.....	180
2.2. Progress in developing OECD Agri-environmental Indicators	180
2.2.1. Soil: Erosion, biodiversity and soil organic carbon	180
2.2.2. Water: Use and water quality	184
2.2.3. Biodiversity: Genetic, wild species and ecosystem diversity	188
2.2.4. Land: Landscapes and ecosystem functions	192
2.2.5. Farm management	195
2.3. Overall assessment.....	196
Annex 2.A1. Agri-environmental Indicators of Regional Importance and/or under Development.....	200
Annex 2.A2. A Qualitative Assessment of the Agri-environmental Indicators included in Annex 2.A1 according to the OECD Indicator Criteria	202
Bibliography	207
Chapter 3. OECD Country Trends of Environmental Conditions related to Agriculture since 1990	209
Background to the country sections	210
3.1. Australia	212
3.2. Austria	224
3.3. Belgium.....	234
3.4. Canada	243

3.5. Czech Republic	256
3.6. Denmark	269
3.7. Finland	284
3.8. France	296
3.9. Germany	305
3.10. Greece	313
3.11. Hungary	324
3.12. Iceland	336
3.13. Ireland	344
3.14. Italy	357
3.15. Japan	366
3.16. Korea	377
3.17. Luxembourg	386
3.18. Mexico	393
3.19. Netherlands	402
3.20. New Zealand	413
3.21. Norway	423
3.22. Poland	433
3.23. Portugal	448
3.24. Slovak Republic	459
3.25. Spain	472
3.26. Sweden	486
3.27. Switzerland	498
3.28. Turkey	507
3.29. United Kingdom	522
3.30. United States	532
3.31. European Union	545
Chapter 4. Using Agri-environmental Indicators for Policy Analysis	551
4.1. Policy context to OECD agri-environmental performance	552
4.2. Tracking agri-environmental performance	554
4.2.1. Evolution of Agri-environmental Indicators to track sustainable development	554
4.2.2. Tracking national agri-environmental performance	556
4.2.3. International reporting on environmental conditions in agriculture	559
4.2.4. Non-governmental organisations (NGOs)	561
4.3. Using Agri-environmental Indicators for policy analysis	562
4.3.1. OECD member countries	563
4.3.2. International governmental organisations	565
4.3.3. Research community	567
4.4. Knowledge gaps in using Agri-environmental Indicators	568
Bibliography	571
List of boxes	
II.1. OECD Expert Meetings on Agri-environmental Indicators: 2001-04	25
1.7.1. Towards a net agricultural greenhouse gas balance indicator?	123

1.8.1. Defining agricultural biodiversity	134
2.1. Soil biodiversity in agricultural land	182
2.2. Agricultural livestock pathogens and water pollution	187
2.3. The impact of agriculture on aquatic ecosystems	188
4.1. Main agri-environmental measures in OECD countries	553
4.2. Selected international and regional environmental agreements relevant to agriculture	555

List of tables

1.1.1. OECD and world agricultural production	39
1.1.2. OECD and world agricultural exports	40
1.3.1. Germany: Percentage risk indices	70
1.7.1. Total OECD emissions of acidifying pollutants	114
1.7.2. Ammonia emission targets to 2010 under the Convention on Long-range Transboundary Air Pollution	116
1.7.3. Methyl bromide use and progress in meeting the phase-out schedule under the <i>Montreal Protocol</i>	120
1.7.4. Critical Use Exemptions (CUEs) for methyl bromide agreed under the <i>Montreal Protocol</i> for 2005	121
1.7.5. Total OECD gross greenhouse gas emissions	124
1.7.6. Main sources and types of gross greenhouse gas emissions	127
1.8.1. Area of transgenic crops for major producing countries	139
1.8.2. Plant genetic resource conservation activities for OECD countries	139
1.8.3. Livestock genetic resource conservation activities for OECD countries	144
1.8.4. Share of farm woodland in agricultural land area	157
1.8.5. Share of farm fallow in agricultural land area	157
1.9.1. Countries recording adoption of environmental farm management practices	164
1.9.2. Overview of farmer incentives to adopt environmental farm management practices	166
2.1. Net water balance in a Japanese rice field irrigation system: 2003	185

List of figures

II.1. The Driving Force-State-Response framework: Coverage of indicators	24
1.1.1. Production, yields and area harvested and future projections for selected commodities and OECD countries	41
1.1.2. Volume of total agricultural production	43
1.1.3. Share of agricultural land use in the national land area	44
1.1.4. Agricultural land area	45
1.1.5. Agricultural production volume index and agricultural land area	46
1.2.1. Main elements in the OECD gross nutrient (nitrogen and phosphorus) balance calculation	50
1.2.2. Gross nitrogen balance estimates	51
1.2.3. Gross nitrogen balances for selected OECD countries	53
1.2.4. Inorganic nitrogen fertilisers and livestock manure nitrogen input in nitrogen balances	54

1.2.5. Agricultural use of inorganic nitrogen and phosphate fertilisers	54
1.2.6. Contribution of the main sources of nitrogen inputs and outputs in nitrogen balances	56
1.2.7. Nitrogen efficiency based on gross nitrogen balances	57
1.2.8. Gross phosphorus balance estimates	58
1.2.9. Gross phosphorus balance for selected OECD countries	59
1.2.10. Contribution of the main sources of phosphorus inputs and outputs in phosphorus balances	60
1.2.11. Phosphorus efficiency based on phosphorus balances	61
1.2.12. Spatial distribution of nitrogen balances in Canada and Poland	62
1.3.1. Pesticide use in agriculture	65
1.3.2. Pesticide use for selected OECD countries	66
1.3.3. Belgium: Risk for aquatic species due to use of pesticides in arable land, horticulture and outside of agriculture	69
1.3.4. Denmark: The annual trend in frequency of pesticide application	70
1.3.5. The Netherlands: Potential chronic effects scores for aquatic and terrestrial organisms and leaching into groundwater	71
1.3.6. Norway: Trends of health risk, environmental risk and sales of pesticides	72
1.3.7. Sweden: National level pesticide risk indicators and the number of hectare doses	73
1.3.8. United Kingdom (England and Wales): Total area of pesticide applications	74
1.4.1. Simplified energy “model” of an agricultural system	78
1.4.2. Direct on-farm energy consumption	79
1.4.3. Direct on-farm energy consumption for selected OECD countries	80
1.4.4. Agricultural employment and farm machinery use	81
1.4.5. Composition of on-farm energy consumption in the EU15 and the United States	82
1.5.1. Agricultural land area classified as having moderate to severe water erosion risk	87
1.5.2. Trends in agricultural land area classified as having moderate to severe water erosion risk	88
1.5.3. Agricultural land area classified as having moderate to severe wind erosion risk	89
1.6.1. Agricultural water use	95
1.6.2. Share of national water use in annual freshwater resources and share of agricultural water use in national use	96
1.6.3. Irrigated area, irrigation water use and irrigation water application rates	97
1.6.4. Share of agricultural groundwater use in total groundwater use, and total groundwater use in total water use	99
1.6.5. Share of agriculture in total emissions of nitrates and phosphorus in surface water	102
1.6.6. Share of agriculture in total emissions of nitrates and phosphorus in coastal water	103
1.6.7. Share of monitoring sites in agricultural areas exceeding national drinking water limits for nitrates and phosphorus in surface water	104
1.6.8. Share of monitoring sites in agricultural areas exceeding national drinking water limits for nitrates in groundwater	105

1.6.9. Share of monitoring sites in agricultural areas where one or more pesticides are present in surface and groundwater	106
1.6.10. Share of monitoring sites in agricultural areas exceeding national drinking water limits for pesticides in surface water and groundwater	107
1.7.1. Impacts of agriculture on air quality: Multi-pollutants, multi-effects	110
1.7.2. Ammonia emissions from agriculture	112
1.7.3. Emissions of acidifying airborne pollutants for the EU15, US and OECD.	113
1.7.4. Agricultural ammonia emission trends for selected OECD countries	114
1.7.5. Share of the main sources of agricultural ammonia emissions in OECD countries	117
1.7.6. Methyl bromide use	119
1.7.7. Global methyl bromide use by major sectors.	121
1.7.8. Agricultural gross greenhouse gas emissions	125
1.7.9. Gross agricultural greenhouse gas emissions in carbon dioxide equivalent for selected OECD countries	126
1.7.10. Agricultural production and agricultural greenhouse gas emissions.	128
1.7.11. Main sources of methane and nitrous oxide emissions in OECD agriculture	129
1.7.12. Contribution of main sources in agricultural greenhouse gas emissions	130
1.8.1. OECD agri-biodiversity indicators framework	135
1.8.2. Change in the number of plant varieties registered and certified for marketing	137
1.8.3. Change in the share of the one-to-five dominant crop varieties in total marketed crop production	138
1.8.4. Change in the number of livestock breeds registered and certified for marketing	141
1.8.5. Change in the share of the three major livestock breeds in total livestock numbers.	142
1.8.6. Total number of cattle, pigs, poultry and sheep in endangered and critical risk status and under conservation programmes	143
1.8.7. Share of selected wild species that use agricultural land as primary habitat.	148
1.8.8. Population trends of farmland birds	149
1.8.9. Change in agricultural land use and other uses of land.	152
1.8.10. Permanent pasture and arable and permanent cropland	155
1.8.11. Share of arable and permanent cropland, permanent pasture and other agricultural land in total agricultural land area.	156
1.8.12. Share of national Important Bird Areas where intensive agricultural practices pose a serious threat or a high impact on the areas' ecological functions	158
1.9.1. OECD farm management indicator framework	162
1.9.2. Share of agricultural land area under nutrient management plans.	168
1.9.3. Share of total number of farms under nutrient management plans	169
1.9.4. Share of total number of farms using soil nutrient testing	170
1.9.5. Share of total arable and permanent crop area under integrated pest management.	171
1.9.6. Share of arable crop area under soil conservation practices	172
1.9.7. Share of total arable and permanent crop area under all-year vegetative cover	173
1.9.8. Share of irrigated land area using different irrigation technology systems	174

1.9.9. Share of agricultural land area under biodiversity management plans	175
1.9.10. Share of agricultural land area under certified organic farm management	176
2.1. Canadian soil organic carbon stocks in agricultural soils by different classes	183
2.2. United States soil organic carbon stocks in agricultural soils by different classes	184
2.3. Agricultural, industrial, and household water charges	186
2.4. National crop varieties that are endangered	189
2.5. National crop varieties that are not at risk.	190
2.6. Edge density of agricultural fields in Finland.	190
2.7. Share of Canadian farmland in various classes of the habitat capacity index.	191
2.8. Cultural landscape features on agricultural land	193
2.9. Water retaining capacity of agriculture	194
2.10. Water retaining capacity for agricultural facilities	195
2.11. Share of farmers participating in agri-environmental education programmes	197
3.1.1. National agri-environmental and economic profile, 2002-04: Australia	212
3.1.2. National agri-environmental performance compared to the OECD average.	220
3.1.3. National Landcare membership.	220
3.1.4. Annual quantities of insecticide and acaricide applied to the cotton crop	220
3.2.1. National agri-environmental and economic profile, 2002-04: Austria	224
3.2.2. National agri-environmental performance compared to the OECD average.	231
3.2.3. Area under non-use of inputs, organic farming and erosion control measures of the ÖPUL agri-environmental programme.	231
3.2.4. Greenhouse gas emissions from agriculture	231
3.3.1. National agri-environmental and economic profile, 2002-04: Belgium	234
3.3.2. National agri-environmental performance compared to the OECD average.	240
3.3.3. Total pesticide use	240
3.3.4. Greenhouse gas emissions and sinks	240
3.4.1. National agri-environmental and economic profile, 2002-04: Canada	243
3.4.2. National agri-environmental performance compared to the OECD average.	252
3.4.3. Share of cropland in different soil organic carbon change classes.	252
3.4.4. Share of farmland in different wildlife habitat capacity change classes.	252
3.5.1. National agri-environmental and economic profile, 2002-04: Czech Republic	256
3.5.2. National agri-environmental performance compared to the OECD average.	265
3.5.3. Share of samples above Czech drinking water standards for nitrates in surface water	265
3.5.4. Monitored numbers of partridge population	265
3.6.1. National agri-environmental and economic profile, 2002-04: Denmark	269
3.6.2. National agri-environmental performance compared to the OECD average.	280
3.6.3. Share of monitoring sites with occurrences of pesticides in groundwater used for drinking	280
3.6.4. Share of meadows and dry grasslands, heath, and bogs and marshes in the total land area	280
3.7.1. National agri-environmental and economic profile, 2002-04: Finland	284
3.7.2. National agri-environmental performance compared to the OECD average.	292
3.7.3. Nitrogen fluxes in the Paimionjoki river and agricultural nitrogen balances	292

3.7.4. Population trends of Finnish farmland butterflies in three ecological species groups.	292
3.8.1. National agri-environmental and economic profile, 2002-04: France.	296
3.8.2. National agri-environmental performance compared to the OECD average.	302
3.8.3. Trends in key agri-environmental indicators.	302
3.8.4. Trends in key agri-environmental indicators.	302
3.9.1. National agri-environmental and economic profile, 2002-04: Germany	305
3.9.2. National agri-environmental performance compared to the OECD average.	310
3.9.3. Share of the number of farms and Utilised Agricultural Area (UAA) under organic farming.	310
3.9.4. Share of renewable biomass and energy crop area in the total agricultural land area	310
3.10.1. National agri-environmental and economic profile, 2002-04: Greece	313
3.10.2. National agri-environmental performance compared to the OECD average.	321
3.10.3. Irrigated area and irrigation water application rates	321
3.10.4. <i>Ex situ</i> accessions of plant landraces, wild and weedy relatives.	321
3.11.1. National agri-environmental and economic profile, 2002-04: Hungary	324
3.11.2. National agri-environmental performance compared to the OECD average.	333
3.11.3. Agricultural land affected by various classes of water erosion	333
3.11.4. Support payments for agri-environmental schemes and the number of paid applications.	333
3.12.1. National agri-environmental and economic profile, 2002-04: Iceland	336
3.12.2. National agri-environmental performance compared to the OECD average.	342
3.12.3. Annual afforestation	342
3.12.4. Annual area of wetland restoration.	342
3.13.1. National agri-environmental and economic profile, 2002-04: Ireland	344
3.13.2. National agri-environmental performance compared to the OECD average.	353
3.13.3. River water quality	353
3.13.4. Population changes for key farmland bird populations	353
3.14.1. National agri-environmental and economic profile, 2002-04: Italy.	357
3.14.2. National agri-environmental performance compared to the OECD average.	363
3.14.3. Actual soil water erosion risk.	363
3.14.4. Regional change in agricultural land area: 1990 to 2000.	363
3.15.1. National agri-environmental and economic profile, 2002-04: Japan	366
3.15.2. National agri-environmental performance compared to the OECD average.	373
3.15.3. National water retaining capacity of agriculture.	373
3.15.4. Share of eco-farmers in the total number of farmers.	373
3.16.1. National agri-environmental and economic profile, 2002-04: Korea	377
3.16.2. National agri-environmental performance compared to the OECD average.	383
3.16.3. Composition of soils	383
3.16.4. National water retaining capacity of agriculture.	383
3.17.1. National agri-environmental and economic profile, 2002-04: Luxembourg	386
3.17.2. National agri-environmental performance compared to the OECD average.	391
3.17.3. Nitrate and phosphorus concentration in river sampling stations.	391
3.17.4. Agricultural land under agri-environmental schemes	391
3.18.1. National agri-environmental and economic profile, 2002-04: Mexico	393
3.18.2. National agri-environmental performance compared to the OECD average.	399

3.18.3. Trends in key agri-environmental indicators	399
3.18.4. Trends in key agri-environmental indicators	399
3.19.1. National agri-environmental and economic profile, 2002-04: Netherlands	402
3.19.2. National agri-environmental performance compared to the OECD average	409
3.19.3. Annual mean concentrations of nitrogen and phosphorus in surface water of rural and agricultural water catchments	409
3.19.4. Farmland bird populations	409
3.20.1. National agri-environmental and economic profile, 2002-04: New Zealand	413
3.20.2. National agri-environmental performance compared to the OECD average	420
3.20.3. Sectoral use of pesticides: 2004	420
3.20.4. Dairy cattle enteric methane emissions per litre of milk	420
3.21.1. National agri-environmental and economic profile, 2002-04: Norway	423
3.21.2. National agri-environmental performance compared to the OECD average	430
3.21.3. National sales of pesticides	430
3.21.4. Net change in agricultural land for five counties	430
3.22.1. National agri-environmental and economic profile, 2002-04: Poland	433
3.22.2. National agri-environmental performance compared to the OECD average	444
3.22.3. Agriculture and forest land at risk to erosion	444
3.22.4. Index of population trends of farmland birds	444
3.23.1. National agri-environmental and economic profile, 2002-04: Portugal	448
3.23.2. National agri-environmental performance compared to the OECD average	456
3.23.3. Numbers of local breeds under <i>in situ</i> conservation programmes: 2006	456
3.23.4. Relation between land use and Designated Nature Conservation Areas (DNCA): 2004	456
3.24.1. National agri-environmental and economic profile, 2002-04: Slovak Republic . .	459
3.24.2. National agri-environmental performance compared to the OECD average	468
3.24.3. Agricultural methane (CH ₄) and nitrous oxide (N ₂ O) emissions	468
3.24.4. Share of agricultural land under different types of protected areas: 2003	468
3.25.1. National agri-environmental and economic profile, 2002-04: Spain	472
3.25.2. National agri-environmental performance compared to the OECD average	482
3.25.3. Area of organic farming	482
3.25.4. Share of Dehesa area in total land area for five regions	482
3.26.1. National agri-environmental and economic profile, 2002-04: Sweden	486
3.26.2. National agri-environmental performance compared to the OECD average	494
3.26.3. Losses of nutrients from arable areas and the root zone	494
3.26.4. Cultural features on arable land	494
3.27.1. National agri-environmental and economic profile, 2002-04: Switzerland	498
3.27.2. National agri-environmental performance compared to the OECD average	504
3.27.3. Support for agricultural semi-natural habitats	504
3.27.4. Input/output efficiency of nitrogen, phosphorous and energy in agriculture . . .	504
3.28.1. National agri-environmental and economic profile, 2002-04: Turkey	507
3.28.2. National agri-environmental performance compared to the OECD average	518
3.28.3. Trends in key agri-environmental indicators	518
3.28.4. Trends in key agri-environmental indicators	518
3.29.1. National agri-environmental and economic profile, 2002-04: United Kingdom	522
3.29.2. National agri-environmental performance compared to the OECD average	528

3.29.3. Agri-environmental trends	528
3.29.4. Greenhouse gas emission trends and projections.	528
3.30.1. National agri-environmental and economic profile, 2002-04: United States.	532
3.30.2. National agri-environmental performance compared to the OECD average.	540
3.30.3. Soil erosion on cropland	540
3.30.4. Change in palustrine and estuarine wetlands on non-federal land and water area	540
3.31.1. National agri-environmental and economic profile, 2002-04: European Union (15)	545
3.31.2. EU15 agri-environmental performance compared to the OECD average.	548
3.31.3. Agri-environmental trends, EU15	548
3.31.4. Agri-environmental trends, EU15	548

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