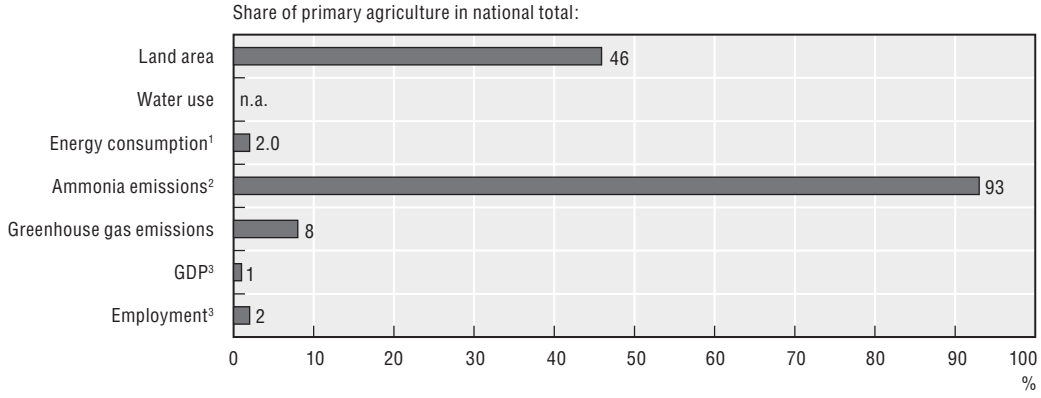
3.3. BELGIUM

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 (*KyotoProtocol*) [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 reafforestation of farmland, to some extent offset by land use changes, especially the increase in arable and permanent cropland [17, 18]. The potential of agricultural 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].

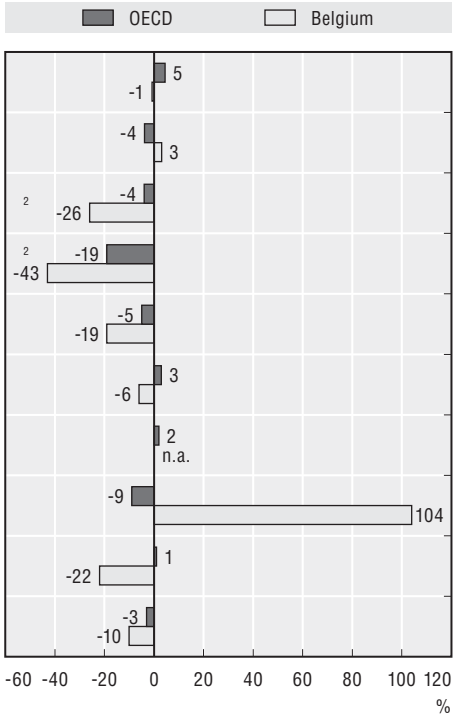
To meet the national ammonia emission ceiling target by 2010 agreed under the Gothenburg Protocol, emissions will need to decline by a further 8% from their 2001-03 average level. This compares to a reduction of 22% from 1990-92 to 2001-03. Some researchers consider it unlikely, however, that acidification 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 2002-04[1]



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

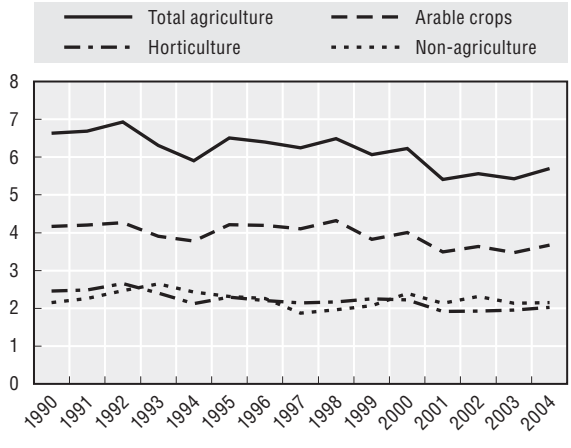
n.a.: Data not available. Zero equals value between –0.5% to < +0.5%.

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*.

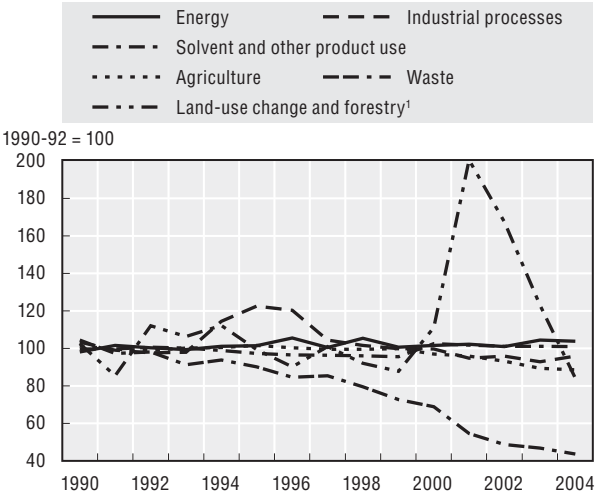
Figure 3.3.3. **Total pesticide use**

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.

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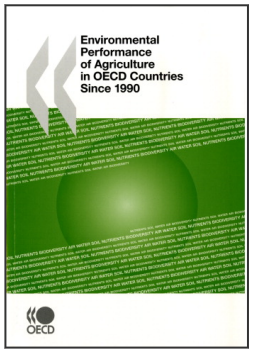

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