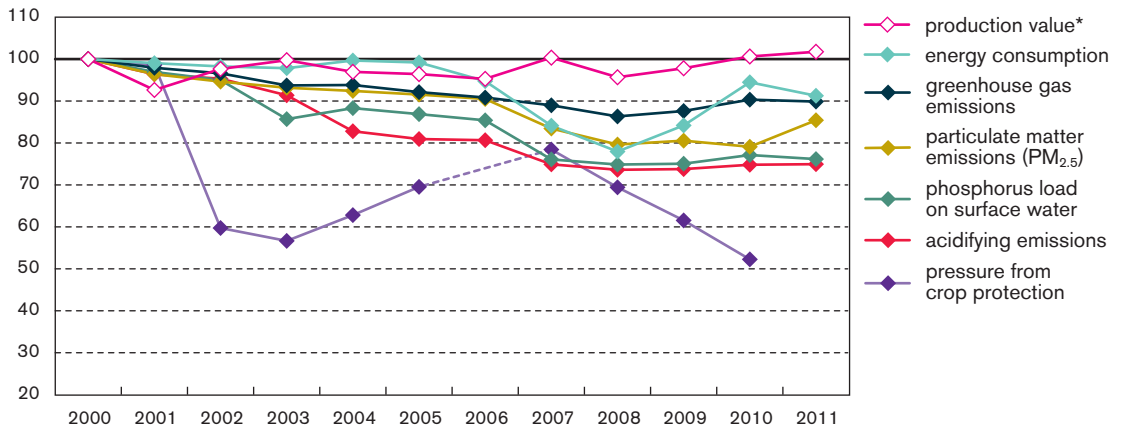


Eco-efficiency of agriculture



DPSIR

index (2000=100)



* production value in constant prices of 2005

Source: MIRA based on AMS (LV), VMM, UGent, LNE, VITO

Livestock is the driving factor for environmental pressure

Between 2000 and 2008, environmental pressure from agriculture decreased more than the volume of the activities, expressed as production value. The increase in scale, environmental measures and the decreasing numbers of livestock since 2000 set the falling trend for the emissions. After 2008, the environmental pressure increased again for energy consumption, greenhouse gases and particulate matter, with an increasing production value. Acidifying emissions and the phosphorous load on surface water both stagnated. As a result, the eutrophication pressure from agriculture in absolute values remains at a high level.

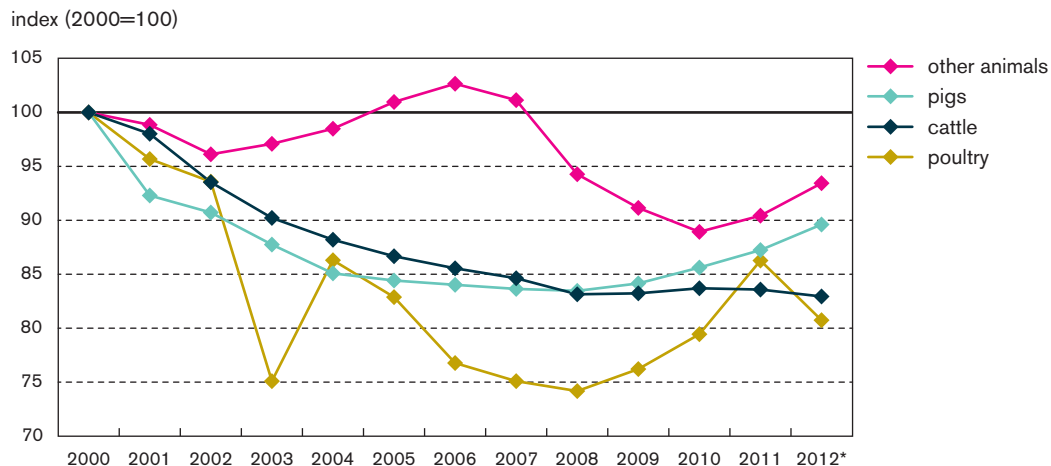
In the period 2000-2008, acidifying emissions decreased by 26 % and the phosphorous load on surface water by 25 %. The driving forces behind these decreases are the manure policy and the economic situation. This was reflected in shrinking numbers of livestock. The manure policy led to decreased use of chemical fertilisers, the application of low-emission techniques, a lower level of nutrient content in animal feeds and an increase in manure processing. The shrinking numbers of livestock also explain the reduction in the greenhouse gas (-14 % in 2008) and particulate matter (-20 % in 2008) emissions.

The increase in the numbers of livestock from 2008 and the expansion of combined heat and power (CHP) in greenhouse horticulture led to increasing emissions. CHPs in principle lead to efficiency gains as compared to the separate generation of electricity and heat. The efficiency can only be determined on a cross-sector basis, because the agricultural sector feeds electricity into the grid. Since 2010, agriculture has been a net producer of electricity. In 2001 the pressure on aquatic life from crop protection amounted to 52 % of the level in 2000. This fluctuating decrease is the result of the banning of the most toxic substances and changes in the product use.

| | 2000 | 2005 | 2007 | 2008 | 2009 | 2010 | 2011 |
|--|-------|-------|-------|-------|-------|-------|-------|
| production value* (million euros) | 4 660 | 4 493 | 4 676 | 4 458 | 4 558 | 4 689 | 4 741 |
| energy consumption (PJ) | 30.4 | 30.1 | 25.5 | 23.7 | 25.6 | 28.7 | 27.7 |
| greenhouse gas emissions (ktonnes CO ₂ -eq) | 9 971 | 9 186 | 8 873 | 8 608 | 8 736 | 9 007 | 8 961 |
| particulate matter emissions (PM _{2.5}) (tonnes) | 2 522 | 2 313 | 2 286 | 1 957 | 1 958 | 1 870 | 1 911 |
| phosphorous load on surface water (tonnes) | 1 515 | 1 316 | 1 152 | 1 134 | 1 137 | 1 168 | 1 154 |
| acidifying emissions (million Aeq) | 3 715 | 3 007 | 2 783 | 2 735 | 2 741 | 2 779 | 2 785 |
| pressure from crop protection (billion Seq) | 33.9 | 23.6 | 26.6 | 23.6 | 20.9 | 17.7 | - |

Livestock

DPSIR



* provisional figures

Numbers are a snapshot taken around the month of May and, therefore, do not represent the average livestock density for that year. Other animals include equine animals, goats and sheep.

Source: FOD Economy

40

Fewer animals ...

The size of the Flemish cattle stock has been decreasing since 1996 due to improved efficiency (dairy stock) and the worsened economic situation (meat stock). In comparison with 2000, the number of cattle in 2012 had dropped by 17 %. The reduction in the pig stock started after 1999 as a result of the drop in prices (since 1998), the dioxin crisis (1999), the purchase agreement (2000-2004) and the stricter manure policy. The poultry stock underwent a major expansion up to 1998, which was followed by three stable years, but went down from 2000 onwards as a result of the manure policy, the dioxin crisis and fowl plague. The latter, in combination with low prices, is also the cause of a large temporary fall in 2003.

... more animals

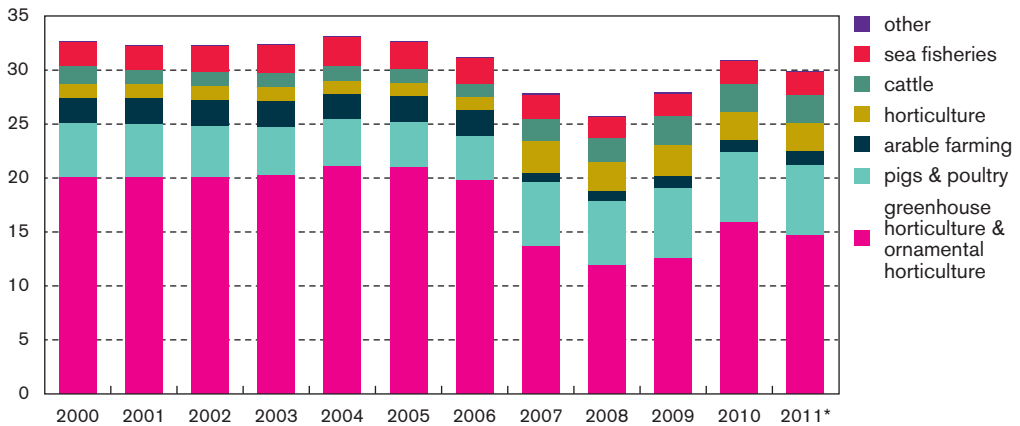
Since 2008, pig and poultry numbers have been increasing again due to the possibilities for expansion created under the manure policy since 2007. Provided there is more manure processing, a farm can increase its livestock numbers. This has led mainly to an increase in the number of poultry. Poultry manure is the simplest to process. This growth is accompanied by an increase in scale, so that the number of animals per farm continues to increase. Poor prices for pig meat, reflecting a growing volatility in the pricing, are accompanied by an increase in scale and expansion of the pig stock. The scale of the livestock numbers has been a driving force behind the increase in particulate matter and greenhouse gas emissions since 2008.

| livestock (millions) | 2000 | 2005 | 2008 | 2009 | 2010 | 2011 | 2012* |
|----------------------|-------|-------|-------|-------|-------|-------|-------|
| pigs | 7.05 | 5.95 | 5.88 | 5.93 | 6.04 | 6.15 | 6.32 |
| cattle | 1.56 | 1.35 | 1.30 | 1.30 | 1.30 | 1.30 | 1.29 |
| poultry | 36.66 | 30.39 | 27.19 | 27.94 | 29.13 | 31.63 | 29.60 |
| other animals | 0.132 | 0.134 | 0.125 | 0.121 | 0.118 | 0.120 | 0.124 |



Energy consumption by agriculture

energy consumption (PJ)



* all figures for 2011 are provisional; figures for cattle, sea fisheries and other have been kept constant with 2010. The 'other' column includes off-road emissions in forestry and public green spaces.

Source: MIRA based on Flanders Energy Balance VITO

Increasing energy consumption in agriculture

The decrease in energy consumption since 2004 was completely reversed in 2009. Compared with 2008, the consumption in 2011 increased by 16 % due to increasing consumption in greenhouse horticulture, arable farming and cattle breeding. Two-thirds of this increase is attributable to greenhouse horticulture, the expansion of CHP plants that generate both heat and electricity for local use, but also for injection into the power grid. Since 2010, the agricultural sector has been a net electricity producer. For Flanders, this yields an efficiency gain, because the electricity is generated simultaneously with heat, which can both be usefully applied. In 2011, electricity consumption by agriculture amounted to 4.2 PJ, an 8 % increase with respect to 2000. With the Pact 2020, the Flemish Government aims to improve energy efficiency, also in agriculture.

Renewable energy and natural gas share increasing

The use of natural gas has increased by a factor of 10 since 1990, at the expense of the use of coal and heavy fuel oil. In 2011, the proportion of biomass in the total energy consumption was 9 %.

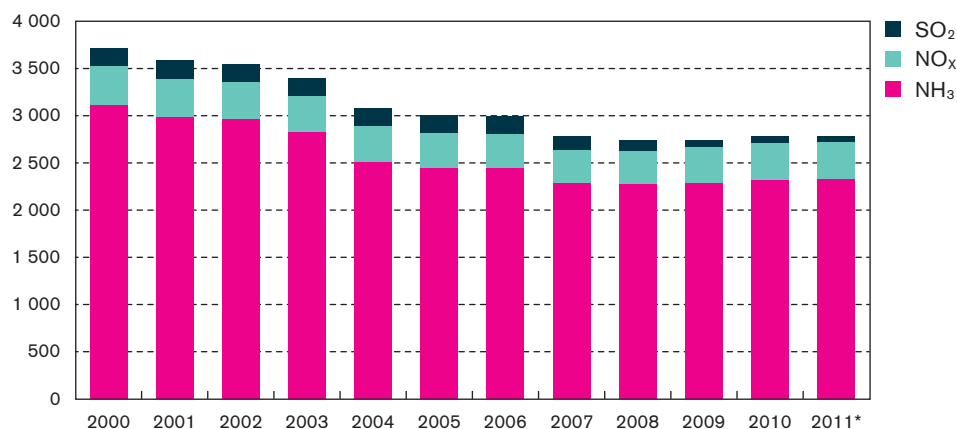
In the Flemish Climate Policy Plan 2006-2012, the target proposed for greenhouse horticulture is to obtain 75 % of the energy from natural gas or renewable sources of energy by 2013. In 2011, this proportion for greenhouse horticulture (excl. CHP in collaboration with the energy sector) was 75 %, compared with only 26 % in 2000. This percentage includes the primary energy for electricity production to be sold to the grid. When the primary energy is limited to production for local use, the proportion amounts to 67 %.

| energy consumption (PJ) | 2000 | 2005 | 2007 | 2008 | 2009 | 2010 | 2011* |
|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| greenhouse horticulture & ornamental horticulture | 20.1 | 21.0 | 13.7 | 11.9 | 12.6 | 15.9 | 14.7 |
| pigs & poultry | 2.3 | 2.4 | 0.9 | 0.9 | 1.2 | 1.1 | 1.3 |
| arable farming | 5.0 | 4.2 | 5.9 | 6.0 | 6.4 | 6.5 | 6.5 |
| horticulture | 1.3 | 1.2 | 2.9 | 2.6 | 2.8 | 2.6 | 2.6 |
| cattle | 1.7 | 1.3 | 2.1 | 2.3 | 2.7 | 2.6 | 2.6 |
| sea fisheries | 2.2 | 2.5 | 2.2 | 1.9 | 2.1 | 2.1 | 2.1 |
| other | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| total | 32.7 | 32.8 | 27.9 | 25.7 | 27.7 | 30.9 | 29.9 |

Emission of acidifying substances by agriculture

DPSIR

emissions (million Aeq)



* provisional figures

Source: VMM

Share of agriculture in acidification increases

Emissions of potentially acidifying substances from agriculture decreased in 2011 by 57 % with respect to 1990 and by 25 % with respect to 2000. Ammonia emissions accounted for 83 % of the potentially acidifying emissions from agriculture in 2011.

Agriculture is the main source of acidifying emissions in Flanders with a share of 42 % in 2011. This share is increasing as a result of the greater decrease in emissions from other sectors.

Decrease in emissions stagnates after 2008

Until 2008, acidifying emissions decreased due to the declining livestock numbers, the lower nitrogen content of cattle feed, the low-emission application of animal manure on arable land and pastures, the construction of low-emission stalls and the switch to natural gas in greenhouse horticulture. After 2008, the emissions stagnated, because the slightly increasing livestock numbers, the manure processing and the expansion of low-emission stables kept each other in balance.

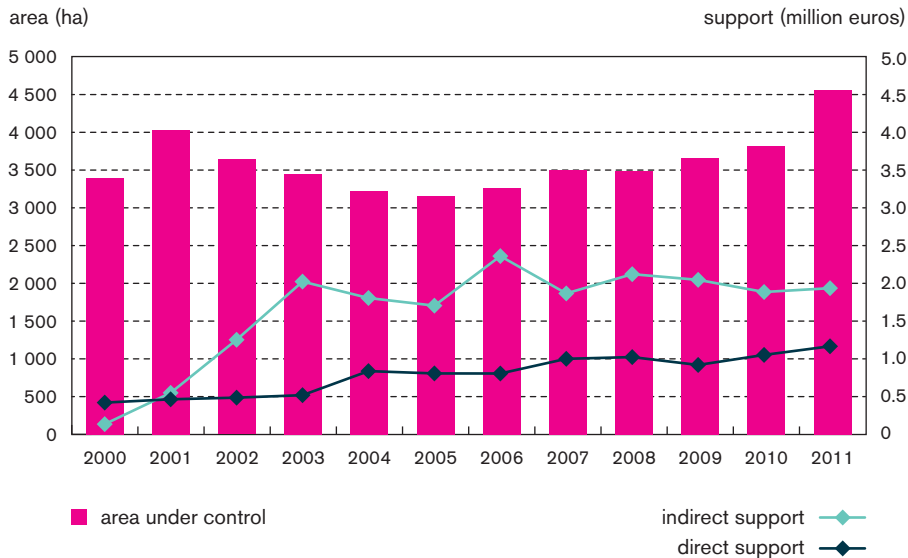
In 2011, ammonia emissions from agriculture amounted to 39 million kg. Thus, 93 % of the Flemish ammonia emissions come from agriculture. Partly as a result of this, the Flemish ammonia emissions remained below the emissions ceiling of 45 million kg ammonia for all sectors in 2010 (MINA plan 3+, 2008-2010). The emissions ceiling of 45 million kg has been retained for 2015 (MINA plan 4, 2011-2015).

A further decrease in emissions is, however, necessary to protect the vulnerable natural environment from excess nitrogen deposition. It is also necessary to achieve the conservation objectives of the Flemish Nature policy. With additional financial efforts, there is still room for limiting emissions through the expansion of low-emission stalls and reduction in the nitrogen content of cattle feed. Low-emission stalls not only result in a decrease in ammonia emissions, but also limit odour and particulate matter emissions. Finally, a regional permit policy around nature areas is instrumental in the implementation of the nature policy.

| emissions (million Aeq) | 1990 | 2000 | 2005 | 2008 | 2009 | 2010 | 2011* |
|-------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| NH ₃ | 5 070 | 3 107 | 2 442 | 2 268 | 2 286 | 2 313 | 2 321 |
| NO _x | 491 | 416 | 375 | 358 | 378 | 395 | 393 |
| SO ₂ | 897 | 192 | 189 | 109 | 77 | 71 | 70 |
| <i>total</i> | <i>6 459</i> | <i>3 715</i> | <i>3 007</i> | <i>2 735</i> | <i>2 741</i> | <i>2 779</i> | <i>2 785</i> |

Organic agriculture

DPSIR



Source: AMS (LV) based on Integra and Certisys

Increasing area ...

The organic agricultural area in Flanders was 4 563 ha in 2011, which is an increase of 19 % with respect to 2010 and 45 % with respect to 2005. The area thus reached its highest level since 1994, which represents 0.7 % of the total agricultural area. The increase in 2011 is mainly attributable to grassland and vegetable cultivation.

The organic area also includes the agricultural area being converted to organic cultivation. This amounts to 30 % of the total Flemish organic area. The share of organic agriculture in the Flemish agricultural land area in 2010 is, at 0.6 %, below the European average of 5.3 % (EU-27).

... through strong support and large demand

The increased area is a response to increasing government support and increasing market demand. In 2001, the Flemish Government spent 3.1 million euros on support for the organic agriculture sector, a 6 % increase with respect to 2010. Direct support to organic farmers was 0.9 million euros in 2011. Indirect support is focused on promotion, strengthening of sales, research, education and organisation of the sector. All support activities are carried out within the framework of the Flemish Government's Strategic Plan for Organic Agriculture 2008-2012.

The organic sector has suffered comparatively little from the financial-economic crisis. Stable prices and loyal, price-conscious customers contribute to this. 18 % of Belgians were frequent buyers in 2011. This indicates a stabilisation with respect to 2010. Consumer spending on organic products has been growing since 2006 and in 2011 reached its highest level since 2002. This growth was less pronounced in 2011. The organic market share amounted to 1.8 % and includes both food and non-food products. Belgian consumption is larger than the domestic production and 37 % of organic products were not purchased in supermarkets in 2011 (markets, speciality shops and farm shops).

| | 1994 | 2000 | 2005 | 2009 | 2010 | 2011 |
|--|------|-------|-------|-------|-------|-------|
| area under control (ha) | 640 | 3 393 | 3 153 | 3 659 | 3 822 | 4 563 |
| direct support (10 ³ euros) | 118 | 420 | 809 | 922 | 1 056 | 1 171 |
| indirect support (10 ³ euros) | - | 133 | 1 713 | 2 057 | 1 895 | 1 946 |
| consumer spending in Belgium (10 ⁶ euros) | - | - | 259 | 349 | 421 | 435 |

Agro-environmental measures

DPSIR



* The area under management agreements for small landscape features (SLFs) concerns only the area of the SLFs themselves. Before 2008, this meant the whole plot of land.

Source: AMS (LV)

8 % of the agricultural area under agro-environmental control

Agro-environmental measures are voluntary agreements that the farmer enters into with the authorities. In exchange for the extra efforts for the environment and nature, the farmer receives compensation. In 2011, there were 11 possible groups of measures. The area of agricultural land to which one or more agro-environmental measures apply (unique area) was 50 066 ha or 8 % of the Flemish agricultural area in 2011. Thus, 8 % was farmed in a more environmentally friendly manner than legally required.

The expenditures in the table indicate the payments under the contracts of the previous year. In 2011, the government spent 22.5 million euros on agro-environmental measures. 51 % of this budget went to water management agreements with reduced fertilisation, 8 % to leguminous crops and 9 % to field border management.

Climbers and fallers

Since 2006, the unique area has been decreasing due to the discontinuation of broadly applicable agro-environmental measures, such as cover crops. Such measures are actually part of normal agricultural practice, so that extra subsidies are no longer provided. The measure cover crops was again subsidised in 2012, as a supporting policy for the implementation of the tightened Manure Action Plan (MAP4). All measures experienced a shrinking or stagnating area in 2011 in comparison with 2010, with the exception of organic agriculture, confusion technique and orchards.

The measures for water with reduced fertilisation, confusion technique, leguminous crop and mechanical weed control were the most successful with 46 %, 16 %, 10 % and 8 % respectively of the unique agro-environmental measures area in 2011.

| | 2000 | 2005 | 2007 | 2008* | 2009* | 2010* | 2011* |
|-------------------------------------|--------|---------|---------|---------|--------|--------|--------|
| unique agro-environmental area (ha) | 29 554 | 118 945 | 121 513 | 119 555 | 64 898 | 60 085 | 50 066 |
| share in agricultural area (%) | 4.6 | 18.9 | 19.5 | 19.2 | 10.5 | 9.7 | 8.1 |
| number of contracts | 4 119 | 18 326 | 17 767 | 18 279 | 12 499 | 11 391 | 9 125 |
| spending (million euros) | 1.2 | 14.6 | 19.9 | 22.8 | 24.7 | 21.1 | 22.5 |