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Nutrient Balance for Nitrogen

Execution report

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Chapter 1 Introduction

A nitrogen balance calculates the balance between nitrogen added to an agricultural system and nitrogen removed from the system. It is important to maintain an equilibrated nitrogen balance, because a persistent deficit of nitrogen in agricultural soil can cause decreasing soil fertility, whereas a high surplus of nitrogen implies a risk of pollution of surface water, groundwater and air. For this reason the nitrogen balance is an important agri-environmental indicator that can be used to analyse the interactions between agriculture and the environment and to evaluate the impact of agricultural policy on the environment.
In this project we calculated a gross nitrogen balance that takes into account organic and mineral fertilizer use, atmospheric nitrogen deposition, biological nitrogen fixation, the use of seeds and planting material, crop removal and ammonia emission to calculate the soil surplus. (see figure 1.1)

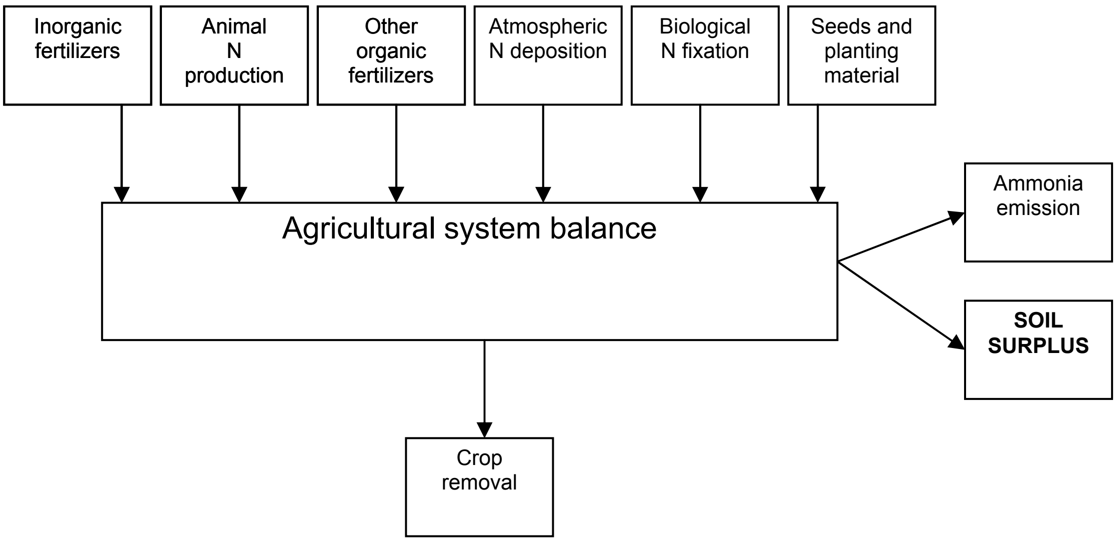

Fig 1.1 Nutrient balance of nitrogen in agricultural soil

However other approaches of N balance are possible. Regional administrations in Belgium use nitrogen balances for controlling the N added to agricultural soil by farmers or for policy-making. Depending on the objective, these approaches differ mainly in the nitrogen input and output factors that are taken into account.

The previous work done by the Institute for Agricultural and Fisheries Research (ILVO) on nutrient balance for Flanders (Lauwers *et al.*, 2004 and Vervaet *et al.*, 2006) was an excellent starting point for this project. The operational model of ILVO provides transparent calculation modules for nitrogen inputs and outputs to calculate a gross nitrogen balance for Flanders.

The main objectives of this project are:

- to adapt the Flemish model and coefficients to the Walloon Region
- bring up to date OECD tables: data and balance calculations (extend it up to 2005) at regional and national level

- to calculate a nitrogen balance at NUTS 3 (districts) for the most recent year for which all information is available and visualize results in a map

It was not possible to calculate directly a nutrient balance for Belgium as a whole, as the agricultural situation and the legislation are different in Flanders and the Walloon Region and data are gathered in a different way at different institutes. Therefore we calculated the nutrient balances of Flanders, the Walloon Region and Brussels Capital-Region separately and the nitrogen balance of Belgium was calculated as the sum of the regions.
The results for the Flemish Region and the used methods were provided by ILVO. As some calculation methods and coefficients were improved since the last report in 2006, for each component a short overview of the used methods and improvements as well as the results from 1990 until 2006 are presented in this report.
Furthermore, we tried to adapt these calculation methods to the Walloon Region and Brussels Capital-Region and to search for all necessary coefficients and data.

As nitrogen surpluses can be highly variable within different regions of a country, another aim of this project was to calculate nitrogen balances at NUTS 3 level or "districts" (Belgian "arrondissements" in French and "arrondissementen" in Dutch). In tables and maps we used reference codes for the districts. In annexe 1.1 the Flemish and Walloon districts are listed with their reference code and their location is shown. The territory of Brussels Capital-Region is at the same time considered as a region and as a district in Belgium. Therefore we did not make the distinction between NUTS 1 and NUTS 3 in Brussels Capital-Region.

Figure 1.2 gives a schematic overview of the objectives of this project.

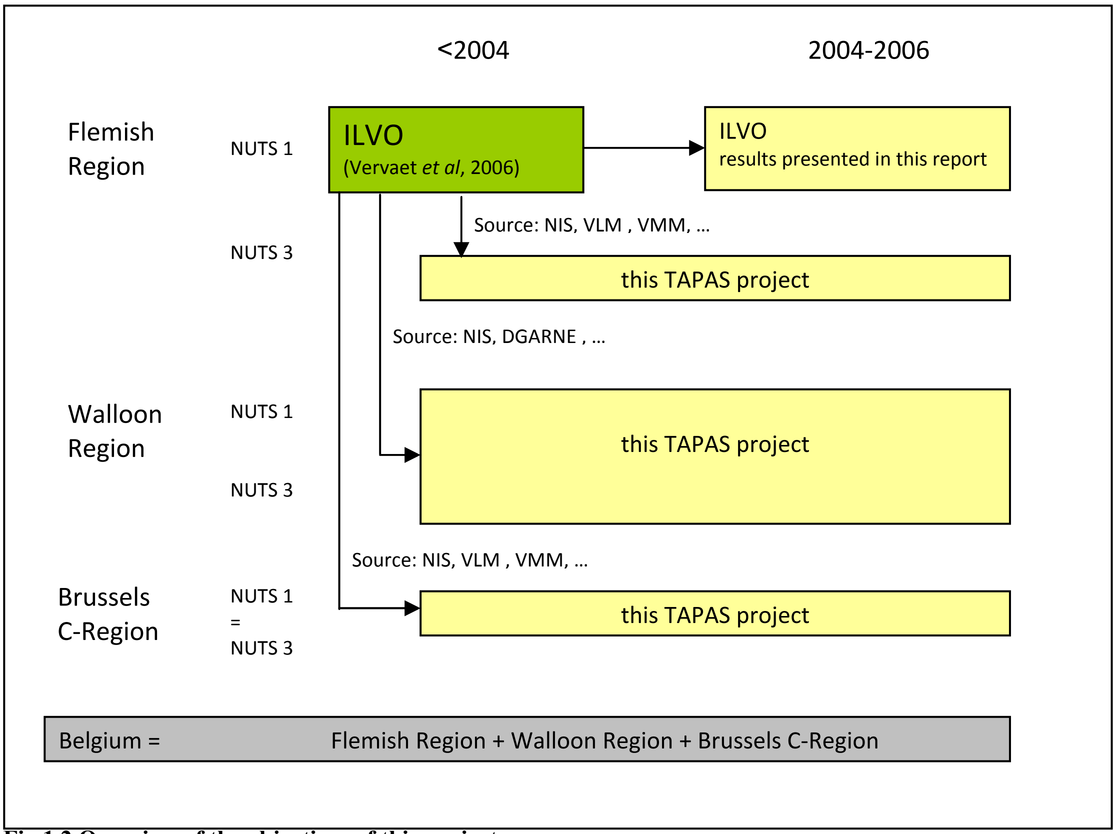

Fig 1.2 Overview of the objectives of this project.

In the following chapters we will discuss the calculation methods, used data sources and results of the N input and output factors for Flanders at NUTS 1 and NUTS 3, for the Walloon Region at NUTS 1 and NUTS 3 and for Brussels Capital-Region (NUTS 1 = NUTS 3). The first and the second chapter will discuss respectively livestock activities and land use activities that are main driving factors that will be used for calculation of the N input and output factors. The next chapters will treat the N input and output factors livestock nutrient production, inorganic fertilizer use, N exportation through crop removal, seed inputs, biological N fixation, atmospheric N deposition, the use of other fertilizers, manure import, export and processing and ammonia emission. Next we will discuss the resulting soil N surplus in Belgium at NUTS 1 and NUTS 3. In the last chapter we will present some general conclusions. The detailed results are presented in annexe.

Chapter 2 Livestock activities

As nutrient production is directly derived from livestock numbers, it is an important factor in the nitrogen balance of Belgium.

2.1 Flanders

2.1.1 NUTS1

Farm structure survey (FSS) data are used as input source. (NIS, 2006a) FSS refers to the annual agricultural census of May conduced by Statistics Belgium, further referred to as NIS, to get an overall picture of the situation at farm level on May 15th. Using these data for calculation of the nitrogen balance causes two problems.
Firstly, the NIS codification frequently changes. Animal categories can be split up or merged or new categories can be added. Therefore, ILVO decided to use ‘generic NIS-categories’ (gNIS categories). A detailed spreadsheet was developed, in which changes in codification are compiled. Based on this spreadsheet NIS-codes were assigned to gNIS codes as explained in table 2.1. When for a certain year there is no NIS code for the corresponding gNIS code, the livestock number for that gNIS code is zero. After the conversion to gNIS categories, livestock numbers are aggregated for each gNIS category at NUTS 1.

Table 2.1: Methodology for the transformation of NIS codes to gNIS codes (source: Vervaet *et al.*, 2006)

Situation	NIS livestock category	NIS codes Year t-1		Year t	gNIS code
Code stays the same	Description 1	Code a	=	Code a	NIS**01
Code changes, description stays the same	Description 1	Code a	→	Code b	NIS**01
Categories have been taken together	Description 1	Code a		-	NIS**01
	Description 2	Code c		-	NIS**02
	Description 3	-		Code d	NIS**03
Categories have been split up	Description 1	Code a		-	NIS**01
	Description 2	-		Code e	NIS**04
	Description 3	-		Code f	NIS**05
Code and description change	Description 1	Code a		-	NIS**01
	Description 2	Code c		-	NIS**02
	Description 3	-		Code g	NIS**06
	Description 4	-		Code h	NIS**07

A second problem is that the FSS data give a picture of the situation on May 15th and not an average of the whole year. To convert NIS data to average present animals (APA) Manure Bank (MB) data are used. (VLM, 2008) These data are only available for the Flemish farms. The APA coefficients are calculated per MB category:

APA coefficient $MBcat_i$ = MB livestock number in $MBcat_i$/ NIS livestock numbers in $MBcat_i$

Next, the APA coefficient of a certain MB category is assigned to all gNIS categories belonging to that MB category in order to obtain APA coefficients by gNIS category. The gNIS livestock numbers can now be multiplied by the APA coefficients to obtain

APA per gNIS category at NUTS 1. The results can be used to calculate the livestock nutrient production (see paragraph 4.1.1).
As shown in figure 2.1 the number of cattle decreased from 1996 on. This decrease could be explained by a deterioration of the economic situation for beef cattle, an increase of the productivity of dairy cows within fixed milk quota and a decrease of breeding bulls due to artificial insemination. The number of pigs increased until 1999, but decreased rapidly from then on, because of a fall in prices since 1998, the dioxin crisis in 1999, the buy up arrangement installed by the Flemish government in 2001-2004 for farms agreeing to stop livestock activities and the increasing internalization of the manure problem.
The number of poultry increased rapidly until 1998 and only started to decrease substantially from 2001 on. Possible reasons for this decrease are the dioxin crisis, avian influenza and a fall in prices in 2003.

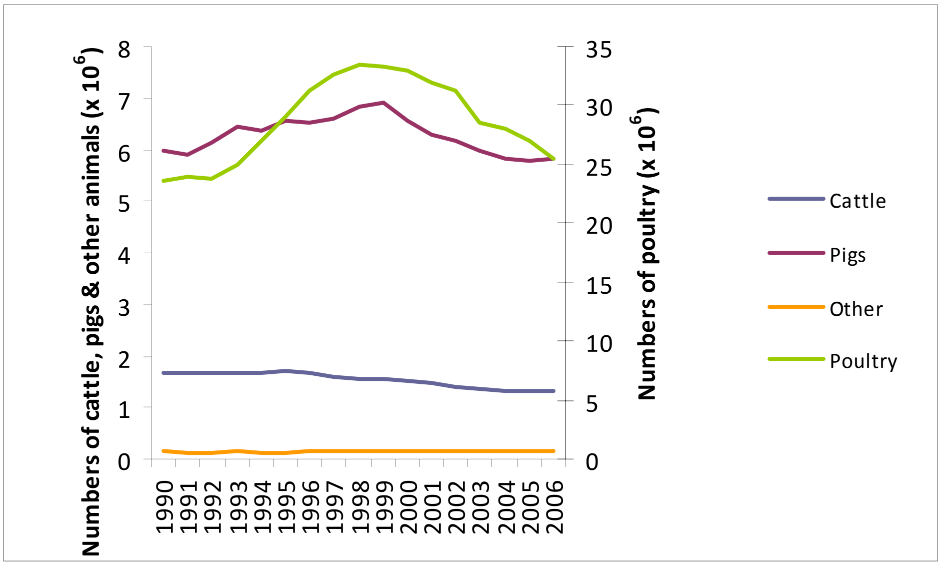

Fig 2.1 Average present animals in Flanders

A more detailed description of the calculations methods as well as some examples are given in the TAPAS reports of ILVO/CAE. (Vervaet *et al*., 2006 and Lauwers *et al*., 2004)

2.1.2 NUTS 3

The FSS livestock numbers could be aggregated at NUTS 3 after converting NIS to gNIS categories and then be multiplied by APA coefficients to obtain APA at NUTS 3 for each gNIS category. The results can be used to calculate livestock nutrient production (see paragraph 4.1.2).
In this first attempt APA coefficients of the Flemish Region were used. As the Manure Bank also provided data on average present animals at NUTS 3, a following step to refine the results could be to calculate APA coefficients at NUTS 3.

2.2 Walloon region

2.3.1 NUTS 1

As for the Flemish Region, FSS data were used as input source. (NIS, 2006a) However, livestock numbers were not converted to average present animals, because data on average present animals were not available. Data that could be used in the future for the conversion to APA, both for Wallonia and the Flemish Region, are gathered by the Sanitel system of the Federal Agency for the Safety on the Food Chain (FAVV-AFSCHA). FAVV-AFSCHA is working on a reform of Sanitel to a new system called Sanitrace, which combines the former systems Sanitel (in which livestock was registered) and Beltrace (in which abattoirs and slaughtered animals were registered). NIS will get access to the new system when operational.
Figure 2.2 shows the numbers of cattle, pigs, poultry and other animals in the Walloon Region from 1990 until 2006. There was a huge increase in poultry numbers between 1990 and 2005, whereas cattle numbers decreased slightly. These numbers are not calibrated as was done for the Flemish results. To compare the Walloon figures with the calibrated Flemish figures, the Flemish calibration coefficients have to be taken into account. We refer to Lauwers *et al*. (2004) and Vervaet *et al*. (2006) for the exact calibration coefficients per animal category per year.

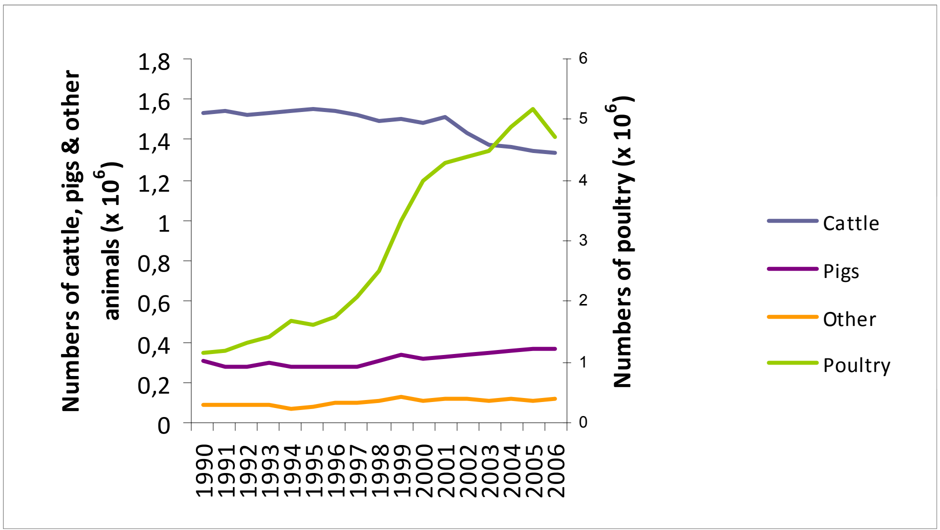

Fig 2.2 Livestock numbers in the Walloon Region in May

2.3.2 NUTS 3

The same input data and calculation methods as for NUTS1 were used, but livestock numbers were aggregated at NUTS3. The results will be used in paragraph 4.3.2 to calculate livestock nutrient production at NUTS3.
When the Sanitrace data of FAVV-AFSCHA become available, these numbers could be converted to average present animals to get more accurate results.

2.3 Brussels Capital-region

For Brussels Capital-Region the same method and input data were used. As explained before, a conversion to average present animals is desirable. Therefore FSS-data on livestock were converted to APA per gNIS category with the Flemish APA coefficients.

The results will be used in paragraph 4.3 to estimate livestock nutrient production in Brussels Capital-Region.

Chapter 3 Land use activities

3.1 Flanders

As livestock activities, land use activities have a big impact on the nutrient balance. Data on land use activities are used to calculate nutrient exportation through crop removal (chapter 6), seed inputs (chapter 7), nitrogen fixation (chapter 8) and atmospheric deposition (chapter 9).

3.3.1 NUTS 1

FSS-data that are collected by NIS in the annually organised agricultural surveys, census of 15th of May (NIS, 2006a) and sample survey of 15th of November (NIS, 2006b) are used as input source. Similar to data on livestock activities, these FSS-data on land use activities have some inconveniences.
Firstly NIS frequently changes the codification. This causes problems when combining these data with coefficients assigned to their corresponding land use activity categories. Therefore, generic NIS categories (gNIS categories) were created as for livestock numbers (see table 2.1). For more details we refer to the TAPAS reports of ILVO/CAE (Lauwers *et al*, 2004 and Vervaet *et al*., 2006). After the conversion to gNIS categories land use activities were aggregated at NUTS 1.
Secondly, there are some discrepancies between the FSS data and Manure Bank (MB) data. (see Lauwers *et al*., 2004 and Vervaet *et al*., 2006) There are several possible explanations for these discrepancies. For some crops the fact that FSS data give a picture of the situation on the 15th of May could be an explanation. Another possible cause is that farmers sometimes overestimate their crop area to enlarge their theoretical manuring space when declaring their land use activities at the MB. Furthermore, the MB data include non-professional farmers that are not included in the FSS data.
Therefore land use activities are calibrated with the MB data for calculation of the N balance. The Manure Bank publishes yearly crop areas for the four Manure Action Plan II bis (MAPII bis) categories (grass, maize, low nitrogen crops and other crops). To obtain calibration coefficients these crop areas were divided by the sum of their corresponding gNIS crop areas. As MB data are available from 1995 on, calibration coefficients for 1990 and 1991 were supposed to be 1 and from 1992 until 1994 calibration coefficients were supposed to increase linearly for grassland and maize. Next, the calibration coefficients per MB category were assigned to their corresponding gNIS categories and multiplied by the FSS crop areas to obtain calibrated crop areas per gNIS category. The overall calibration coefficient for 2006 is 1,07579. This means that the total Flemish crop area is 625 206 ha following NIS and 672 591 ha following MB. The results are shown in annexe 1.2. Figure 3.1 illustrates these results. The total calibrated crop area increased by 11% between 1990 and 2006 mainly due to an increase in the area of maize.

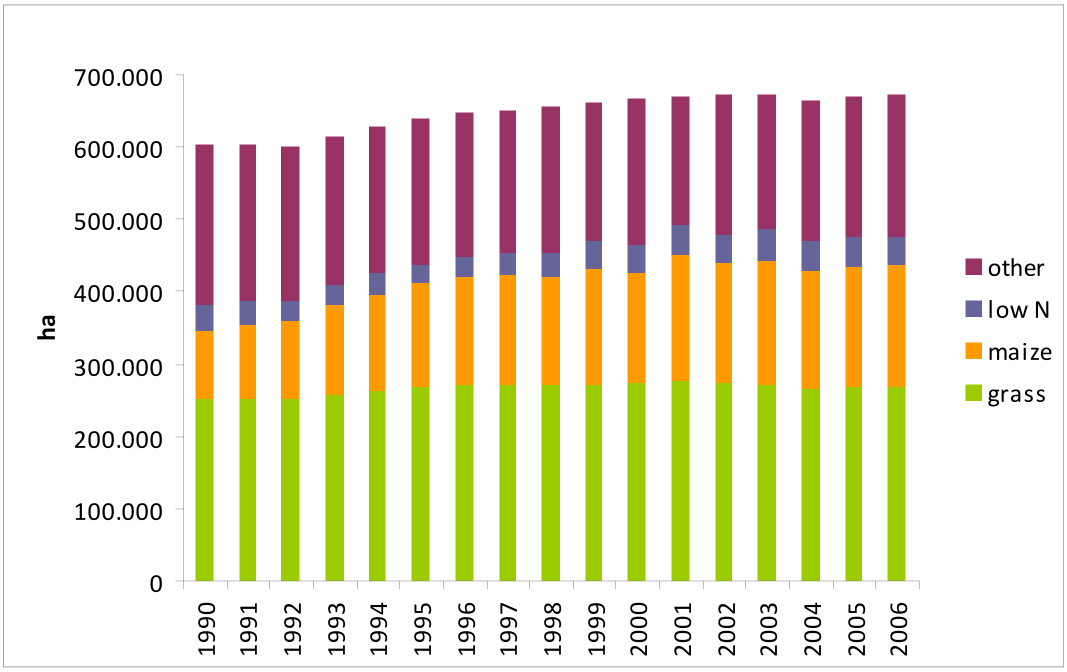

Fig 3.1 Calibrated crop areas in Flanders from 1990 until 2006

Manure Action Plan III (MAPIII) implies some changes to the calculation of calibration coefficients. (Belgisch staatsblad, 29.12.2006) The four MAPII bis categories are extended to seven categories (grass, maize, low nitrogen demanding crops, other Leguminosae than peas and beans, sugar beets, cereals and other crops). ILVO adapted their calculation programs to these changes so from 2007 on calibration coefficients will be calculated in accordance with MAPIII.

3.3.2 NUTS 3

Land use activities at NUTS 3 were calculated with the same input source and method as land use activities at NUTS 1. For all districts the same set of calibration coefficients (see paragraph 3.3.1) was used except for grasses. The Manure Bank provided data on grassland area from 2000 until 2006 for each municipality. These data were aggregated at NUTS 3 and divided by the FSS data that were also aggregated at NUTS 3 in MB categories. (see Vervaet *et al.*, 2006 for more details) The calibration coefficients were assigned to their corresponding gNIS categories. From 1990 until 1999 MB data were not available. Therefore calibration coefficients for grasses were supposed to be 1 in 1990 and 1991 similar to the global Flemish coefficients and to increase linearly from 1992 until 1999. These calibration coefficients were then multiplied by the crop areas per gNIS category. The total crop area per district is shown in annexe 1.2. The sum total crop areas of the Flemish districts can show small differences with the total crop area presented for the Flemish Region, because of the different calibration coefficients that were used per district for grassland.
The results for maize, low nitrogen demanding crops and other crops could probably be improved by calculating calibration coefficients per district as was done for grasses. However, less important differences between districts are expected for these categories than for grasses.

3.2 Walloon Region

3.3.1 NUTS 1

Similar to the Flemish method, FSS data were converted to gNIS categories and aggregated at NUTS 1. The total crop area in the Walloon Region from 1990 until 2006 is shown in annexe 1.1. Figure 3.2 illustrates these results. Compared to the Flemish Region, the Walloon Region has substantially more grassland and less maize.

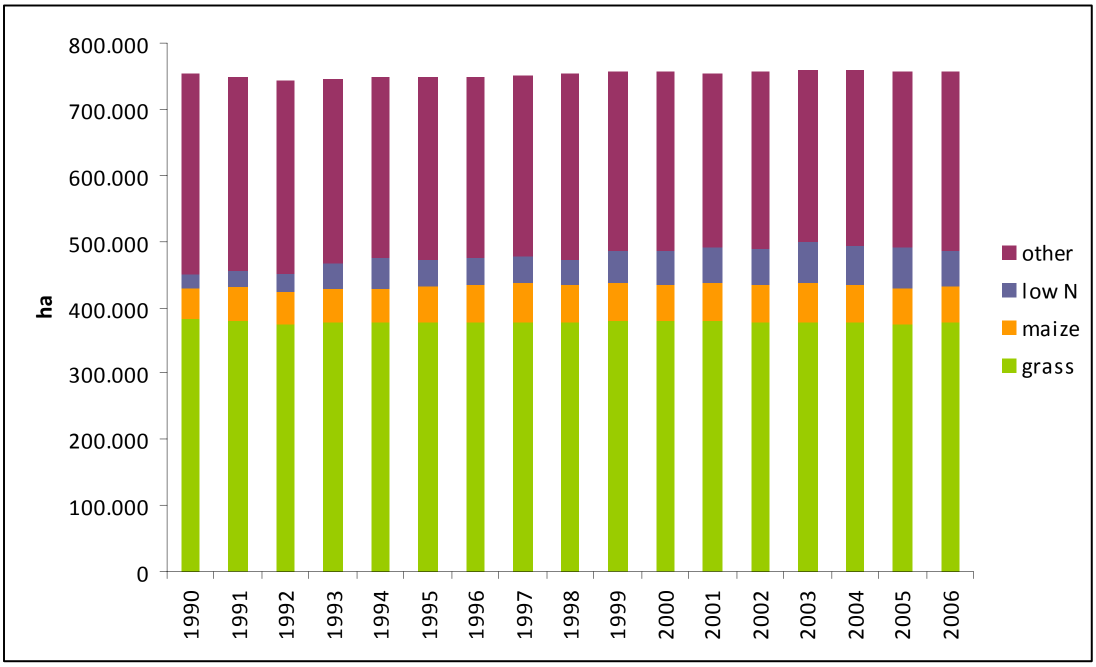

Fig 3.2 Total crop area in the Walloon Region from 1990 until 2006

The Walloon data were not calibrated, because the Manure bank only collects data of Flemish farmers and no other data source was available for this study. A data source that could be used for this purpose is the 'SIGEC' (Système Intégré de Gestion et de Contrôle) database of the Walloon authorities in which a set of land use activities are registered for administrative purposes (mainly management of agricultural subsidies). NIS hopes to get access to this database in the course of 2009. Note that SIGEC is limited to farmers demanding subsidies. With these data FSS data on land use activities could probably be improved and the results of nutrient exportation through crop removal, seed inputs, nitrogen fixation and atmospheric deposition could be refined.

3.3.2 NUTS 3

FSS data were converted to gNIS categories and aggregated at NUTS 3. Again these data were not calibrated because NIS had not yet access to the SIGEC database. The results are shown in annexe 1.2.

3.3 Brussels Capital-region

As for the Flemish and Walloon Region, FSS-data were used to calculate crop areas per gNIS category. Though MB-data cover only the Flemish region, the Flemish calibration coefficients for land use activities were used for calibration, as no other data source was available to calculate calibration coefficients for Brussels Capital-Region. The existing model for the Flemish Region was used to transform land use areas with NIS codes to land use areas with gNIS codes, to aggregate the land use areas at farm level to regional level and to calibrate these land use areas.
Results are shown in annexe 1.2.

Chapter 4 Livestock nutrient production

The livestock nutrient production is a very important factor of nutrient pressure from agriculture to the environment. According to our results livestock nutrient production covers from more or less 55% in 1990 until more then 70% in 2006 of total nitrogen inputs on agricultural soil in the Flemish Region. About 50% of the total nitrogen excretion originates from cattle, whereas about 40% is produced by pigs and about 10% by poultry.
In the Walloon Region livestock nutrient production covers more or less 45% of the total nitrogen input on agricultural soil. In 1990 about 95% of the total nitrogen excretion originated from cattle, whereas only 3% originated from pigs and not even 1% from poultry. In 2006 nitrogen excretion by cattle decreased to 90% of the total nitrogen excretion, whereas nitrogen excretion by pigs and poultry increased to respectively 4% and 3%.

4.1 Flanders

4.1.1 NUTS 1

Livestock nutrient production was derived from average livestock numbers per year (see paragraph 2.1.1). For each livestock category livestock numbers were multiplied by their corresponding nutrient excretion coefficient. These nutrient excretion coefficients are determined by the Flemish Manure Action Plan (MAP) and are expressed as kg N per average present animal. (Belgisch staatsblad, 11.05.1999 and 29.12.2006) In the previous TAPAS reports of ILVO (Lauwers *et al*., 2004 and Vervaet *et al*., 2006) the nutrient excretion coefficients of MAPII bis were used with an adaptation for bovines. For some livestock categories these coefficients were adapted for farmers who use improved feed efficiency measurements. Four different sets of excretion coefficients were possible (source: VLM, 2009):

- flat rate balance (no effort to reduce N and/or P production)
- convenant balance (using fodders with a low P content)
- regressive balance (with a fodder register to calculate protein and P intake)
- fodder technique balance (submitting a complete fodder balance)

The Manure bank has data on the number of animals that are fed with each balance type. Thus a weighed average of the excretion coefficients belonging to each of the balance types was calculated (see Vervaet *et al*., 2006 for more details).

In 2007 the MAPII bis was replaced by MAPIII. (Belgisch staatsblad, 29.12.2006) In MAPIII some of the nutrient excretion coefficients were adapted, based on recent scientific research by ILVO's Animal Sciences unit. (ILVO personal communication) This was the case for certain categories of bovines, pigs, poultry and rabbits.

Since MAPIII nutrient excretion of dairy cows depends on their milk production. From 2007 the Manure bank provides data on the average number of dairy cows and on their nutrient production based on milk production. For 2006 the total amount of milk (milk delivered to dairy industry and direct sale of milk) was divided by the number of dairy cows in the Flemish Region to obtain the average milk production per dairy cow. (source: VLM, 2009) From 1990 until 2005 a backwards assumption was done by ILVO. MAPIII considers also a correction depending on the ratio of the surface of fodder crops and purchased roughage and pasture. This correction was not included in the excretion coefficients that ILVO uses to calculate nutrient production.

For pigs and poultry excretion coefficients were calculated as in Vervaet *et al*. (2006). The nutrient production as provided by the Manure bank was divided by the MB livestock numbers. The result is a weighed average of the excretion coefficients belonging to the four fodder balance type, as the Manure bank takes into account improved feed efficiency measurements when calculating the nutrient production of pigs and poultry. The Manure bank applies MAPIII changes from 2007.

The excretion coefficients of rabbits for 1990 until 2006 were calculated based on the MB data of 2007. (VLM, 2008)

In table 4.1 the nutrient excretion coefficients of MAPII bis and MAPIII are listed as well as the excretion coefficients from 1999 until 2007 that are actually used for calculation of livestock nutrient production in the Flemish Region.

To obtain the livestock nutrient production per livestock category these coefficients were assigned to the appropriate gNIS categories. Subsequently they were multiplied by the livestock numbers to obtain the nutrient production per livestock category. The sum of nutrient production of all livestock categories is shown in annexe 1.3.

Table 4.1 Excretion coefficients (kg N/APA year) of MAPII bis, MAPII bis with adaptation for bovines, MAPIII and the coefficients used from 1999 until 2007.

	MAPII bis	MAPII bis with adaptation for bovines	MAPIII	1999	2000	2001	2002	2003	2004	2005	2006	2007
Calves for fattening	10,5	10,5	10,5	10,5	10,5	10,5	10,5	10,5	10,5	10,5	10,5	10,5
Cattle for breeding <1 year	33	36,96	33	33	33	33	33	33	33	33	33	33
Cattle for breeding 1-2 years	56	62,72	58	58	58	58	58	58	58	58	58	58
Catlle for fattening <1 year	23	25,76	22,3	22,3	22,3	22,3	22,3	22,3	22,3	22,3	22,3	22,3
Cattle for fattening 1-2 years	61	68,32	58	58	58	58	58	58	58	58	58	58
Other bovines	77	86,24	77	77	77	77	77	77	77	77	77	77
Dairy cows	97	108,64	*	97	97	97	99	101	101	105	107	111
Suckle cows	97	108,64	65	65	65	65	65	65	65	65	65	65
Piglets	2,46	2,46	2,18	2,46	2,51	2,48	2,47	2,46	2,45	2,44	2,46	2,34
Pigs 20-110 kg	13	13	11,6	13	12,17	11,92	11,64	11,5	11,46	11,4	11,48	11,2
Pigs >110 kg	24	24	21,8	24	22,73	22,39	22,23	21,89	21,91	21,87	21,89	19,76
Young breeding sows	24	24	21,8	24	22,73	22,39	22,23	21,89	21,91	21,87	21,89	19,76
Boars	24	24	21,8	24	23,36	23,08	22,64	22,38	20,16	22,21	22,08	20,79
Sows incl. piglets	24	24	21,8	24	23,18	22,82	22,51	22,14	22,09	22,09	22,05	20,91
Laying hens	0,69	0,69	0,7	0,69	0,69	0,69	0,69	0,68	0,68	0,67	0,68	0,66
Young laying hens	0,36	0,36	0,35	0,36	0,36	0,36	0,36	0,36	0,36	0,36	0,36	0,35
Laying broiler mothers	1,2	1,2	1,08	1,2	1,16	1,18	1,17	1,17	1,15	1,15	1,14	1,04
Young broiler mothers	0,47	0,47	0,47	0,47	0,46	0,46	0,46	0,46	0,46	0,45	0,46	0,46
Broilers	0,62	0,62	0,58	0,62	0,59	0,58	0,59	0,58	0,59	0,59	0,58	0,54
Other poultry	0,24	0,24	0,24	0,24	0,24	0,24	0,24	0,24	0,24	0,24	0,24	0,24
Turkeys	2,2	2,2	2	2,2	1,89	1,92	1,79	1,81	1,83	1,77	2,01	1,70
Ostriches for breeding	18	18	18	18	18	18	18	18	18	18	18	18
Ostriches for fattening	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6
Ostriches 0-3 months	3,5	3,5	3,5	3,5	3,5	3,5	3,5	3,5	3,5	3,5	3,5	3,5
Horses and ponies > 600 kg	65	65	65	65	65	65	65	65	65	65	65	65
Horses and ponies 200-600 kg	50	50	50	50	50	50	50	50	50	50	50	50
Horses and ponies <200 kg	35	35	35	35	35	35	35	35	35	35	35	35
Goats and sheep < 1 year	4,36	4,36	4,36	4,36	4,36	4,36	4,36	4,36	4,36	4,36	4,36	4,36
Goats and sheep > 1 year	10,5	10,5	10,5	10,5	10,5	10,5	10,5	10,5	10,5	10,5	10,5	10,5
Rabbits	8,64	8,64	7,42	7,2	7,2	7,2	7,2	7,2	7,2	7,2	7,2	7,20

***in function of milk production**

4.1.2 NUTS 3

The total nutrient production per year at NUTS 3 level could be directly derived from MB data. However, these data do not take into account MAPIII excretion coefficients. Therefore nutrient production at NUTS 3 was calculated based on livestock numbers and the Flemish set of excretion coefficients instead. The results are shown in annexe 1.3.

In this first attempt, the nutrient production in all Flemish districts was calculated with the Flemish set of excretion coefficients, so all districts got equal excretion coefficients. To get more accurate results, for certain gNIS categories excretion coefficients could be calculated at NUTS 3. The Manure bank provides data on nutrient production per MB category per municipality. These data could be aggregated at NUTS 3 and divided by the MB livestock numbers to obtain excretion coefficients at NUTS 3 for pigs and poultry. If data on the average milk production per district would be available to calculate the excretion coefficients for dairy cows, the results could be refined even more.

4.2 Walloon Region

4.3.1 NUTS 1

The agricultural situation in the Walloon Region is quite different from the one in the Flemish Region. As a consequence nutrient excretion coefficients are also different. Table 4.2 gives an overview of the nutrient excretion coefficients adopted in the Walloon Region. (source: Moniteur belge 07.03.2007)

Table 4.2 Nutrient production coefficients of the Walloon Region (Moniteur belge 07.03.2007)

Nutrient production coefficients (Walloon legislation)			
	kg N / place year		kg N/head year
Sows and bearing sows	15	Dairy cows	90
Boars	15	Suckle cows	66
Porkers	7,8	Reform cow	66
Porkers on bio-litter	4,5	Other bovines more than 2 years	66
Piglets 4-10 weeks	1,9	Calves < 6 months	10
Broilers (40 days)	0,27	Heifer 6-12 months	28
Laying hen (343 days)	0,6	Heifer 1-2 years	48
Pullets (127 days)	0,27	Bull 6-12 months	25
Breeding cocks	0,43	Bull 1-2 years	40
Ducks (75 days)	0,43	Sheeps and goats < 1 year	3,3
Goose (150 days)	0,43	Sheep and goats > 1 year	6,6
Turkeys (85 days)	0,81	Horses	56

Guinea fowls (79 days)	0,27
Mother rabbits	3,6
Rabbits for slaughter	0,32
Ostriches and emus	3
Quails	0,04

This table reveals some general differences with the Flemish coefficients. Firstly, for pigs, poultry and rabbits the coefficients are expressed as kg N per stable place and not per average present animal. To calculate the nitrogen production per category based on the livestock numbers calculated in paragraph 2.3.1, these coefficients have to be converted to kg N per average present animal per year. Secondly, these coefficients are net excretion coefficients (with exclusion of emissions of nitrogen from stables and during storage), instead of gross excretion coefficients. Nitrogen loss during grazing was not considered. As in the nitrogen balance full animal manure input is considered and data on total ammonia emission by agriculture is subtracted as a separate factor in the end (see chapter 12), it was necessary to recalculate these coefficients to obtain nutrient excretion coefficients including nitrogen loss.
Thirdly the categorisation used in Walloon legislation is not equal to the one in the Flemish Region. To be able to calculate livestock nutrient production, the categories had to be assigned to gNIS categories to obtain nutrient excretion coefficients for each gNIS category.

Bovines

To establish the values of nutrient production, a 15% loss of nitrous gasses was considered, so to obtain the nutrient excretion values without nitrogen loss this 15% was added to the values. (source: personal communication with Richard Lambert of the Catholic University of Louvain-La-Neuve)
For dairy cows, this resulted in an excretion of 106 kg N per cow. This value was supported by the average of 107 kg N/cow found by R. Lambert of the Catholic University of Louvain-la-Neuve on 416 farms of the Walloon Agency for Breeding (Lambert, 2007 and Lambert, 2008). These data revealed that there were important differences in nutrient excretion per cow between farms and that these differences could be linked to differences in milk production. This link could be expressed as follows (Lambert, 2007 and 2008):

Nutrient excretion (kg N/cow year) = 0,008 * milk production (L/year) + 57

With an average milk production of 5750L per cow the nutrient excretion would be 103 kg/cow. It would be interesting to gather data on the average milk production per year to calculate more accurate nutrient excretion coefficients for dairy cows per year for the Walloon Region.

Pigs

As indicated by Bontemps *et al.* (2007) relying on the accountancy data of the Walloon Pig Association (Filière Porcine Wallonne), a nitrogen loss of 30% was considered for all pig categories except for porkers on bio-litter where a loss of 70%

was considered. As the difference between porkers on bio-litter and other porkers was not made in the gNIS categorisation, the coefficient for porkers on bio-litter was not taken into account.
To obtain coefficients expressed as kg N per average present animal, an average of 6,5 rounds per year for piglets and 2,4 rounds per year for porkers (Bontemps *et al.*, 2007) and an average of 42 days per round for piglets and 132 days per round for porkers (Lambert *et al.*, 2004) was taken into account. This gives a stable occupation of 74,8% for piglets and 86,8% for porkers.
In table 4.3 the recalculated nutrient excretion coefficients are listed.

Poultry

To convert the nutrient production values per stable place to nutrient production values per average present animal, for broilers 6.5 rounds per year and 40 days per round were considered. This gives a stable occupation of 71,2%. For laying hens the value of 0.60 kg N per stable place in the Walloon Legislation was calculated without taking an empty period into account.
To obtain gross nutrient excretion coefficients, nitrogen losses of 37% for broilers and 19% for laying hens were considered as suggested by Devos (2006).
For other poultry such as breeding cocks, pullets, gooses, ducks, turkeys, guinea fowls, quails, ostriches and emus, there was no information available about nitrogen losses. Therefore, we used the Flemish MAP III excretion coefficients (see table 4.1). As these animal categories are of less importance in the Walloon Region, the influence of the use of these Flemish coefficients on the nutrient balance will be quite small.
In table 4.3 the resulting excretion coefficients are shown.

Horses, sheep, goats, rabbits and other animals

For sheep and goats nitrogen losses were estimated based on the nitrogen losses applied by the Manure Bank in the Flemish Region. As the MB applies different nitrogen losses for sheep and goats whereas the Walloon legislation provides nutrient production values for sheep and goats together, a weight average was calculated based on the numbers of sheep and goats in the Walloon Region. The resulting nitrogen loss was 25% for sheep and goats less than 1 year old and 18% for sheep and goats more than one year old.
For horses we calculated an average nitrogen loss of 14,7% with Flemish MB values.
For rabbits there was no information available about the stable place occupation and the nitrogen losses. Therefore we used the Flemish nutrient excretion coefficients.

Table 4.3 Walloon excretion coefficients used in this report

Excretion coefficients of the Walloon Region			
	kg N / APA year		kg N/APA year
Sows	21,43	**Dairy cows**	105,88
Boars	21,43	**Suckle cows**	77,65
Porkers	12,84	**Reform cow**	77,65
Piglets 4-10 weeks	3,63	**Other bovines more than 2 years**	77,65
Broilers	0,60	**Calves < 6 months**	11,76
Laying hen	0,74	**Heifer 6-12 months**	32,94
		Heifer 1-2 years	56,47
		Bull 6-12 months	29,41
		Bull 1-2 years	47,06
		Sheep and goats < 1 year	4,4
		Sheep and goats > 1 year	8,05
		Horses	65,65

4.3.2 NUTS 3

For all districts the same set of Walloon excretion coefficients was used. (see paragraph 4.3.1) These coefficients were multiplied by the livestock numbers as calculated in paragraph 2.3.2. The results are shown in annexe 1.3.
If data would be available on the average milk production per cow per district, it would be interesting to refine the results by calculating nutrient production of dairy cows based on their milk production as explained in the previous paragraph.

4.3 Brussels Capital-Region

The Flemish nutrient excretion coefficients (kg N per animal) were multiplied by the average present animals to obtain an estimation of the livestock nutrient production. Annexe 1.3 shows the results.

Chapter 5 Inorganic fertilizer use

Though a considerable decrease can be observed in the use of inorganic fertilizer in Belgium since 1990, it remains a driving factor in the nutrient balance. Our results indicate that in 2006 inorganic fertilizer use represented 26% of the total nitrogen input on agricultural soil in the Flemish Region, whereas in the Walloon Region inorganic fertilizer use covered 39% of the total nitrogen input.

5.1 Flanders

5.3.1 NUTS 1

Different sources of inorganic fertilizer use in Belgium are available. For the Flemish Region the two main sources are the data from the Manure Bank and accountancy data. (Lauwers *et al*., 2004 and Vervaet *et al*., 2006) The accountancy data seem to overestimate inorganic fertilizer use because of an over-representation of high inorganic fertilizer users such as dairy farms. On the other hand, the MB data probably underestimate inorganic fertilizer use, because farmers could sometimes declare lower quantities than actually used to be in conformity with manure legislation.

In the TAPAS action of 2004 (Vervaet *et al*., 2006) ILVO developed a new method to extrapolate the Flemish accountancy data more accurately to the whole population of farms. Unfortunately from 2004 until 2006 accountancy data on inorganic fertilizer use were not available. Therefore, the method as explained in Campens & Lauwers (2002) was again adopted. In this method accountancy data are extrapolated with a model based on MB data taking into account the manure pressure. For more details we refer to the report of the TAPAS action of 2002 (Lauwers *et al*., 2004). Based on this method MB data on inorganic fertilizer use were corrected with a factor 1,71262. The results are presented in annexe 1.4 and illustrated in figure 5.1. The inorganic fertilizer use decreased substantially in Flanders between 1990 and 2006.

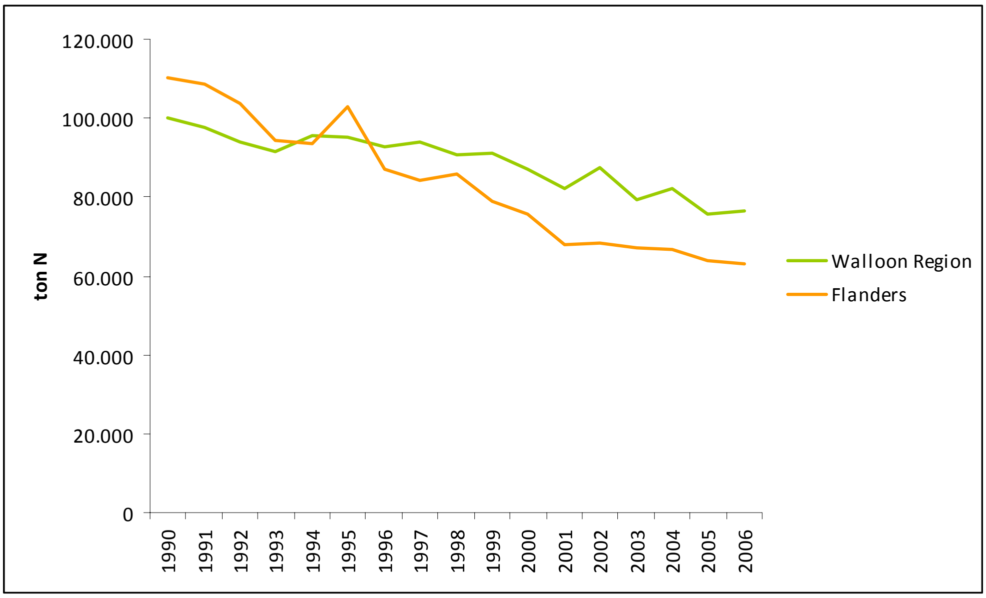

Fig 5.1 Inorganic fertilizer use in Flanders and the Walloon Region from 1990 until 2006

5.3.2 NUTS 3

Data on inorganic fertilizer use at NUTS 3 in the Flemish Region are available at the MB from 2000 on. (VLM personal communication) Similar to the Flemish MB data at NUTS 1, these data were corrected with a factor 1,71262. Annexe 1.4 presents the total inorganic fertilizer use per district from 2000 until 2006.
The sum of the inorganic fertilizer use in the Flemish districts can differ slightly to the total inorganic fertilizer use as calculated in paragraph 5.3.1. A possible reason for these small differences could be that data aggregated at NUTS 1 level were coming from the annual report of the MB, where the data aggregated at NUTS 3 level were recently extracted from the MB database to which small corrections could have been made after the publication of the annual report.

5.2 Walloon Region

5.3.1 NUTS 1

Data on inorganic fertilizer use are published in the report 'Tableau de bord" and in the analytical report of the cell 'State of the Walloon Environment' of the Directorate-General Agriculture, Natural Resources and Environment (DGARNE) of the Walloon Public Service. These data are estimated based on accountancy data.
The data used in this report are coming from the "Tableau de bord 2008" for 1995 until 2006 and from the analytical report 2006-2007 for 1990 until 1994. They are presented in annexe 1.4. Figure 5.1 (see paragraph 5.3.1) illustrates the results. As in Flanders, inorganic fertilizer use decreased in the Walloon Region.

5.3.2 NUTS 3

Data on inorganic fertilizer use at NUTS 3 were not available as such. The Cell of Agricultural Economical Analysis of DGARNE provided an estimation of inorganic fertilizer use per ha per crop type based on accountancy data. To obtain inorganic fertilizer use per district, we assigned this fertilizer use per ha per crop type to their corresponding gNIS categories and multiplied it with the calibrated crop areas as calculated in paragraph 3.2.2. Annexe 1.4 shows the results. We have to remark that these results are only a rough estimation, because data could only be provided for the most important crop types and some of the data were estimated based on less than 20 observations. As a consequence the sum of the Walloon districts can differ slightly from the total inorganic fertilizer use in the Walloon Region as described in paragraph 5.3.1.

5.3 Brussels Capital-Region

No data were available for Brussels Capital-Region. To be able to estimate inorganic fertilizer use in Belgium, we calculated inorganic fertilizer use in Brussels Capital-Region based on the Flemish data. The average inorganic fertilizer use per hectare in the Flemish Region was calculated by dividing inorganic fertilizer use by the total calibrated crop area in the Flemish Region. Next, we multiplied this average inorganic fertilizer use per hectare by the calibrated crop area in Brussels Capital-Region (see paragraph 3.3). If we compare the average inorganic fertilizer use per hectare in the Flemish Region with the average in the district Halle-Vilvoorde (district 23) that completely surrounds Brussels Capital-Region and has an agricultural situation that is probably more similar to Brussels Capital-Region, we observe higher average inorganic fertilizer use per hectare in Halle-Vilvoorde. Thus, the total inorganic fertilizer use may be slightly underestimated in Brussels Capital-Region in our results. Data for Halle-Vilvoorde were only available from 2000 on. For that reason they were not used to estimate inorganic fertilizer use in Brussels Capital-Region. Nevertheless, Belgian results should not be influenced too much as inorganic fertilizer use in Brussels Capital-Region represents less then 0,1% of the total inorganic fertilizer use in Belgium.

Chapter 6 Nutrient exportation through crop removal

Nutrient exportation through crop removal is the main output factor of the nitrogen balance. It is calculated based on land use activity data, crop yields and the nutrient content of harvested crops.

6.1 Flanders

6.3.1 NUTS 1

The calibrated crop areas as calculated in paragraph 3.1.1 was used as an input factor. From these calibrated crop areas crop yields per gNIS category could be derived by multiplying them with their corresponding crop yield per hectare. Crop yields per hectare were gathered from different data sources.
As a first source NIS data on crop yields were used. (NIS, 2006c) NIS organizes yearly a survey with 1500 farmers to estimate crop yields for the regions and provinces in Belgium. For cereals a distinction is made between yields of grains and straw so nutrient exportation through straw is included in the calculations.
Until 1996 the average grassland yields of the two mowing turns were estimated separately. From 1997 they were estimated together. This caused a drop in grassland yield that was not considered reliable. Therefore ILVO decided to reconstruct grassland yields from 1997 until 2006. For 1997 the average yield of 1995 and 1996 was used. From 1998 until 2002 an increase of grassland yields by 200 kg dry matter per ha was estimated. This increase was based on the regression coefficient of the production from 1990 until 1996. From 2003 a decrease of grassland yields by 100 kg dry matter per ha was estimated based on the regression coefficient of the production from 1997 until 2007. The resulting yield coefficients are shown in table 5.1.

Table 5.1 Grassland yield coefficients (ton dry matter per ha) used for Flanders

	Temporary mowed grassland (ton dry matter per ha)	Permanent mowed grassland (ton dry matter per ha)
1990	9,6	9,01
1991	9,9	8,66
1992	10,51	9,35
1993	10,78	9,49
1994	10,69	9,47
1995	11,44	10,97
1996	10,57	9,22
1997	11	10
1998	11,2	10,2
1999	11,4	10,4
2000	11,6	10,6
2001	11,8	10,8
2002	12	11
2003	11,9	10,9
2004	11,8	10,8
2005	11,7	10,7
2006	11,6	10,6
2007	11,5	10,5

For fruit, vegetable and ornamental crops NIS does not report crop yields. For these categories the crop yields per hectare calculated by the former Centre for Agricultural Economics (CAE) from 1990 until 2000 were used. When a crop yield per hectare of a certain crop in a specific year was not available an average yield per hectare of that crop was calculated. When a crop yield was only available for a bigger gNIS category, the same yield was assigned to all gNIS subcategories belonging to this gNIS category.
To obtain crop yields per gNIS category, the crop areas per gNIS category were multiplied by the crop yields per hectare.
Next, these crop yields were multiplied by the crop nutrient content (expressed in kg N per ton). Crop nutrient content data of DSM Agro BV, an inorganic fertilizer manufacturer from the Netherlands, were used as a main source. (see Lauwers *et al.*, 2004 and Vervaet *et al.*, 2006 for more details) The results are shown in annexe 1.5.

6.3.2 NUTS 3

Nutrient exportation through crop removal at NUTS 3 was calculated with the same method as at NUTS 1. Calibrated crop areas as calculated in paragraph 3.1.2 were multiplied by their corresponding crop yield per hectare to obtain crop yields at NUTS 3. The same set of crop yields per hectare and crop nutrient content data as for the Flemish Region was used. As the crop yield coefficients from the annual survey of NIS are also available at the level of the provinces, crop yield coefficients at NUTS 3 could be improved by assigning the crop yield coefficients of the provinces to their districts.
The results are shown in annexe 1.5.

6.2 Walloon Region

6.3.1 NUTS 1

Nutrient exportation through crop removal was calculated based on non calibrated land use activity data (see paragraph 3.2.2). As NIS reports specific crop yields per hectare for the Walloon Region, these yields per hectare were used to calculate crop yield per gNIS category. For grassland the same problem as for the Flemish Region occurs. Between 1990-1996 and 1997-2006 there is a decrease in grassland yield that is probably due to the fact that from 1997 on the two mowing turns were estimated together. Especially for permanent grassland the drop in yield per hectare does not seem reliable. For temporary grassland the decrease is less clear. In this report we used the grassland yields per ha as such, but the results could be improved by reconstructing grassland yields in the Walloon Region as was done for the Flemish Region.

For fruit, vegetable and ornamental crops the Flemish crop yields per hectare were used. When a crop yield per hectare of a certain crop in a specific year was not available an average yield of that crop was calculated. When a crop yield was only available for a bigger gNIS category, the same yield per hectare was assigned to all gNIS subcategories belonging to this gNIS category.

Next, these crop yields were multiplied by the crop nutrient content. The same crop nutrient content data as for the Flemish Region were used. Annexe 1.5 presents the results.

6.3.2 NUTS 3

The land use activity data of paragraph 3.3.2 were used as an input source. For all districts the same set of crop yields per hectare (see paragraph 6.3.1) was used. Results are show in annexe 1.5.

NIS also reports crop yield coefficients for the Walloon provinces, so the results could be improved by assigning the crop yields per hectare of the provinces to their districts.

6.3 Brussels Capital-Region

Crop yields per hectare for Brussels Capital-Region are available at NIS. The crop yield per hectare of the Flemish Region was used when a value was missing. Calibrated crop areas as calculated in paragraph 3.3 were multiplied by these crop yields per hectare and the crop nutrient content data. The results are presented in annexe 1.5.

Chapter 7 Seed inputs

Seed inputs are calculated based on land use activity data (see chapter 3), data on seed use per hectare and the nutrient content in seeds and planting materials.
For the Flemish Region, the Flemish districts and Brussels Capital-Region calibrated crop areas were used. For the Walloon Region and districts crop areas as reported by NIS were used because calibrated crop areas were not available.
Seed use data were derived from information of various seed dealers in Belgium and assigned to gNIS categories (see Lauwers *et al*., 2004 and Vervaet *et al*., 2006). The data on nutrient content in seeds and planting materials were coming from the Belgian Soil Service and DSM Agro BV (an inorganic fertilizer manufacturer from the Netherlands). Seed use per hectare and nutrient contents in seeds and planting material are assumed to be equal in the Walloon Region and Brussels Capital-Region, so the dataset for both variables as proposed in Lauwers *et al*., 2004 and Vervaet *et al*., 2006 was used for all regions and districts.
The (calibrated) crop areas per gNIS category were multiplied by these seed use data and the corresponding nutrient contents in seeds. The total nitrogen input by seed use is presented in annexe 1.6. The total nitrogen input by seed use in the Flemish Region can differ slightly to the sum of the nitrogen input by seed use in the Flemish districts because of the different grassland calibration coefficients that were used for the districts (see paragraph 3.1.2).

Chapter 8 Nitrogen fixation

Two types of nitrogen fixation are considered: fixation by free-living bacteria and fixation by symbiotic bacteria hosted by legumes. Both types are calculated based on crop area data (see chapter 3). For the Flemish Region, the Flemish districts and Brussels Capital-Region calibrated crop areas were used, whereas for the Walloon Region and districts crop areas as reported by NIS were used.
To obtain the nitrogen input on agricultural soil by nitrogen fixation, these crop areas were multiplied by nitrogen fixation coefficients. N-fixation by free-living organisms was estimated at 4 kg N/ha. For the additional symbiotic fixation, table 8.1 shows fixation coefficients as proposed in Lauwers *et al*. (2004) and Vervaet *et al*. (2006) and based on the report of Vanongeval *et al.* (1998). The nitrogen fixation coefficient for free-living organisms was multiplied by the total crop area of all gNIS crop categories. The coefficients for leguminous crops were multiplied by the areas of the corresponding gNIS categories.

Table 8.1 Nitrogen fixation coefficients (Vanongeval *et al.*, 1998, Vervaet *et al.*, 2006)

	Coefficient (kg N/ha)
Pulses	125
Clover	125
Alfalfa	250
Grass-clover mixtures	37,5
Free-living organisms	4

The same set of nitrogen fixation coefficients is used for all regions and NUTS levels. However, data on grass-clover mixture areas were only available for the Flemish Region. Thus, for the Walloon Region and districts the results could be improved by adding nitrogen fixation by grass-clover mixture areas when NIS gets access to the SIGEC database (see paragraph 3.2.1). At the level of the Flemish districts data about grass-clover mixture areas were available from the MB, but only from 2004 on, so they were not taken into account as data before 2004 were lacking.
Annexe 1.7 presents the total nitrogen input by biological nitrogen fixation on agricultural soil. Again, the total nitrogen input by nitrogen fixation in the Flemish Region can differ slightly to the sum of the nitrogen input by nitrogen fixation in the Flemish districts because of the different grassland calibration coefficients that were used for the districts (see paragraph 3.1.2) and because of the nitrogen fixation on grass-clover mixture areas that could not be taken into account at NUTS 3 level.

Chapter 9 Atmospheric deposition

Atmospheric deposition includes dry and wet deposition of nitrogen compounds. It is arising from agricultural emissions of nitrous gasses and combustion of fossil fuels in industry, energy production and transportation.

9.1 Flanders

9.1.1 NUTS 1

Atmospheric deposition rates are calculated with the OPS-model of the Flemish Institute for Technological Research (VITO) and published by VMM in the environmental report of Flanders (MIRA). The average atmospheric deposition rates are shown in figure 9.1.

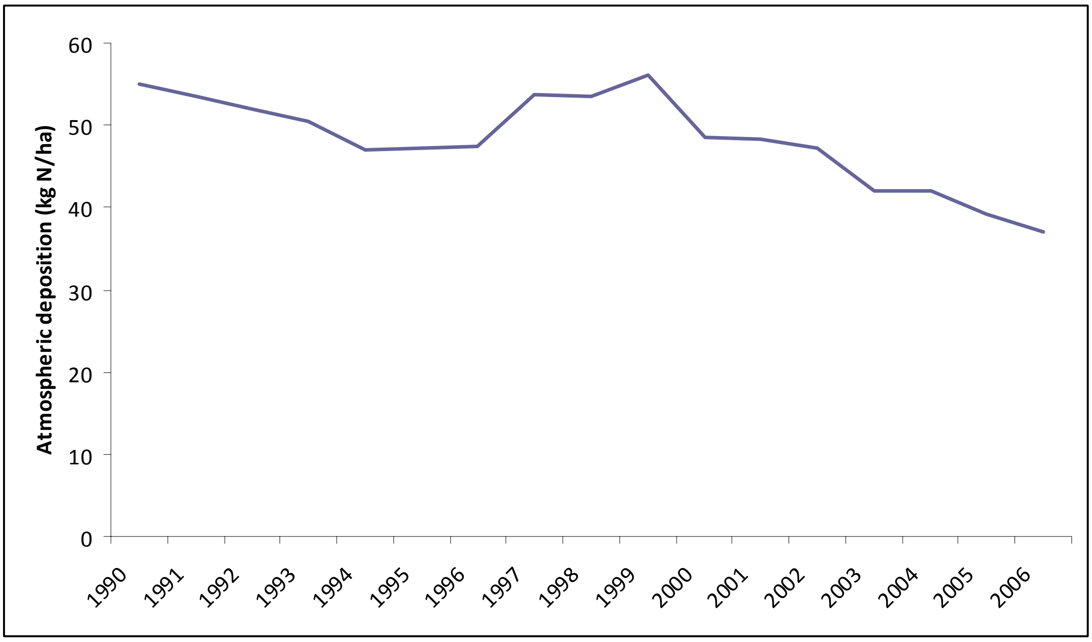

Fig 9.1 Average atmospheric deposition rates in Flanders from 1990 until 2006 (source VMM)

These coefficients were multiplied by the total calibrated crop area of Flanders to obtain the total atmospheric deposition in Flanders. Annexe 1.8 shows the results.

9.1.2 NUTS 3

Atmospheric depositions rates of 2006 at the level of the municipalities were provided by VMM. These rates are calculated with the OPS-model (version 2008). Currently, VITO is working on an update of this OPS-model. In a few months VMM hopes to be able to provide refined atmospheric deposition rates per municipality for 1990 and from 2000 until 2006.
The deposition rates at municipality level were multiplied by the total calibrated crop area of the municipalities. The atmospheric deposition at NUTS 3 was calculated as

the sum of the atmospheric depositions of the municipalities. Annexe 1.8 presents the results.

9.2 Walloon Region

9.2.1 NUTS 1

Atmospheric deposition in the Walloon Region is published in the analytical report of the cell 'State of the Walloon Environment' of the DGARNE of the Public Service of the Walloon Region. These values comprise the total deposition on the whole Walloon territory. To obtain atmospheric deposition on agricultural soil, they were divided by the total surface of the Walloon region and multiplied by the total agricultural surface. As data were only available until 2004, the atmospheric deposition in 2005 and 2006 was estimated by multiplying the average atmospheric deposition rate from 1990 until 2004 with the total agricultural crop area. The results are shown in annexe 1.8. Figure 9.2 shows the average deposition rates in the Walloon Region from 1990 until 2004.

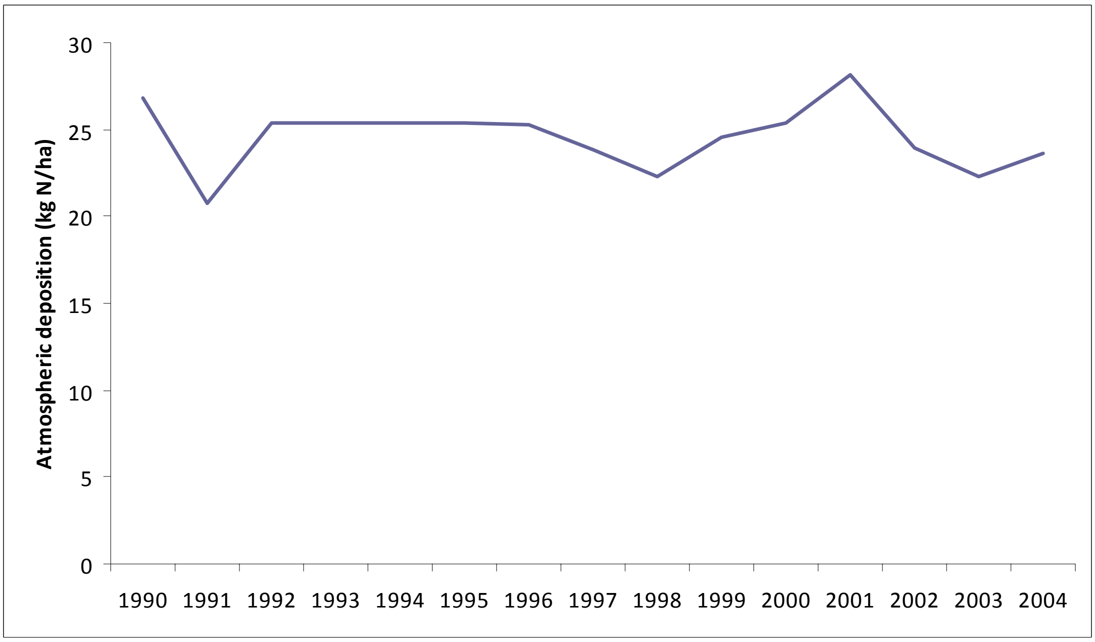

Fig 9.2 Average atmospheric deposition rates in the Walloon Region from 1990 until 2004 (source DGARNE)

9.2.2 NUTS 3

Atmospheric deposition rates were provided by the cell 'State of the Walloon Environment' of the DGARNE of the Public Service of the Walloon Region based on data and research of the Walloon Agency of Air and Climat (AWAC), SITEREM, the Scientific Institute of the Public Service (ISSeP) and the Belgian Interregional Environment Agency (IRCEL-CELINE).
Data were available for 1990, 1996, 2000 and 2004 and were provided in a grid of squares of 5 km by 5 km. Some values were lacking and therefore estimated by taking the average of the surrounding squares. Next, an overlay of a map of the districts and the grid was done and the surfaces of the polygons formed by the overlay were

calculated. The deposition rate of a district was calculated as a weighted average of the deposition rates of the polygons based on the surfaces of the polygons that were located in that district.
The resulting coefficients were multiplied by the total crop area of each district to obtain atmospheric deposition at NUTS 3. The results are shown in annexe 1.8.

9.3 Brussels Capital-Region

Atmospheric depositions rates in 2006 for the municipalities of Brussels Capital-Region were provided by VMM. (VMM personal communication) These rates are calculated with the OPS-model (version 2008). Currently, VITO is working on an update of this OPS-model. In a few months VMM hopes to be able to provide refined atmospheric deposition rates per municipality for 1990 and for 2000 until 2006. (VMM personal communication)
In the meanwhile atmospheric deposition from 1990 until 2005 in Brussels Capital-Region was estimated with the Flemish deposition rates as default. The Flemish deposition rates were multiplied by the total calibrated crop area of Brussels Capital-Region. As for 2006 the deposition rate of the Flemish Region was 7,95% lower than the rate of Brussels Capital-Region, the results for 1990 until 2005 that were based on the Flemish deposition rates were increased by 7,95%. Annexe 1.8 shows the results.

Chapter 10 Other fertilizers

The category ‘other fertilizers’ comprises sewage sludge, waste products, champost and urban compost.

10.1 Flanders

For the Flemish Region data were coming from the Flemish Compost Organisation (VLACO), the Public Waste Agency of Flanders (OVAM), Viaene *et al.* (1999) and the annual reports of Aquafin. (ILVO personal communication)
Data at NUTS 3 were available at the Manure Bank. These data are shown in annexe 1.9. However they were not used to calculate the overall nutrient balance, because the use of other fertilizers was comprised in the manure import data at NUTS 3 (see chapter 11). The sum of the MB values for the Flemish districts is substantially lower than the values for the Flemish Region, so the MB data probably underestimate the use of other fertilizers.

10.2 Walloon Region

For the Walloon Region data on the use of sewage sludge on agricultural soil are published in the report ‘Tableau de bord’ 2008 of the cell ‘State of the Walloon Environment’ of the Directorate-General Agriculture, Natural Resources and Environment (DGARNE) of the Walloon Public Service. Data were expressed as ton dry matter and converted to ton N assuming a nitrogen content of 3,55%. As data were only available from 1994 until 2006, from 1990 until 1993 we assumed that the use of sewage sludge in agriculture remained on the same level as in 1994.
The use of industrial waste products was estimated based on data provided by DGARNE. As data were not available from 1990 until 1997 and from 2003 until 2006, the use of industrial waste products from 1990 until 1997 was assumed to remain at the level of 1998 and from 2003 until 2006 to remain at the level of 2002.
Data on the use of champost and urban compost were not available except for 2005. In the evaluation report of the “Programme de Gestion Durable de l’Azote en Agriculture” (PGDA) of December 2008, the use of other organic fertilizers than sewage sludge and industrial waste products was estimated 1241 ton nitrogen for 2005. As other data were lacking, this estimation was used for all years from 1990 until 2006.
At NUTS 3 data were not available for the Walloon Region.

10.3 Brussels Capital-Region

No data on the use of other fertilizers were available. Therefore the use of other fertilizers in Brussels-Capital-Region was estimated based on the average use of other fertilizers per hectare in the Flemish Region.
The results are shown in annexe 1.9.

Chapter 11 Manure export, import and processing

11.1 Flanders

11.1.1 NUTS 1

For the Flemish Region data were provided by the Manure Bank. From 2004 on details about export and processing are not published separately anymore, but the sum of both categories is still published. The net manure import (sum of import, export and processing) is shown in table 1.10. These data illustrate the increasing importance of manure processing and export since 1996.

11.1.2 NUTS 3

Data at NUTS 3 were not available in the same format as at NUTS 1, but were derived from data about transportation of manure provided by the MB. These data are available per municipality since 2000. Farmers in Flanders have to declare all manure transports to the MB. (VLM, 2009) Three different transportation documents are possible: transportation within the same municipality or to an adjacent municipality, transportation by an authorized manure transporter or transportation via the European Waste Shipment Regulation. For each transport the provider and the receiver of the manure have to declare their activity. (VLM, 2009)
From these data it is not possible to calculate manure import, export and processing separately per district, because transportation within a district or even municipality is also declared by the farmers and manure transporters. Nevertheless it is possible to estimate the net amount of manure that remains (or leaves) a certain municipality after import, export and manure processing.

> Net state of manure input after import, export and processing in a municipality
>
> =
>
> all manure (including other organic fertilizers) that a municipality receives, excluding manure received by a manure processing unit as this manure will not be spread on agricultural soil
>
> –
>
> all manure that leaves a municipality excluding manure provided by producers of other organic fertilizers as this nitrogen is not produced by agriculture

There is a small number of transports for which the activity of the receiver or provider is not specified. These transports were included in our calculations, although some of these receivers may be manure processing units and some of these providers may be producers of other organic fertilizers. As this category comprised few transports, the results should not be biased too much.
Furthermore these data comprise transports of other organic fertilizers. As it is not specified when a receiver received other organic fertilizers or animal manure, these transports of other organic fertilizers can not be left out from calculations. As data at NUTS 3 about the use of other organic fertilizers are included in the import, export and processing data, the data of paragraph 10.1.2 about the use of other fertilizers will

in contrast with the NUTS 1 data, not be included in the calculation of the overall nutrient balance.
The results are shown in annexe 1.10. When we compare the sum of the Flemish districts with the sum of the MB data about import, export and processing for the Flemish Region and the MB data about the use of other fertilizers, the same tendencies are observed from 2000 until 2006, but the sum of the Flemish districts implies substantially more export and processing than the data for the Flemish Region.
A possible reason for this discrepancy could be that the MB data underestimate manure processing and export as explained in paragraph 11.1.1. Another possible reason is that the use of other organic fertilizers is underestimated by the MB. This is shown by the MB data at NUTS 3 about the use of other fertilizers (see annexe 1.9) that give a substantially lower total for the Flemish Region than the data of OVAM, VLACO and Aquafin.

11.2 Walloon Region

Data on manure export, import and processing were not available for the Walloon Region. In the Walloon Region manure import, export and processing is probably much less important, as the manure pressure is lower than in the Flemish Region and manure transportation is regulated by a more strict regional legislation for transportation of waste products.

11.3 Brussels Capital-Region

For Brussels Capital-Region we could not find any data on manure export, import and processing.

Chapter 12 Ammonia emission

12.1 Flanders

12.3.1 NUTS 1

Two main sources of ammonia emission can be distinguished: emission linked to manure (from stables and internal manure storage, from external manure storage, during and after manure spreading and during grazing) and emission linked to the use of mineral fertilisers. According to our results, emission linked to manure represents more or less 95% of the ammonia emission in the Flemish Region.
Data on ammonia emission originating from agriculture were provided by VMM. In the execution report TAPAS 2002 (Lauwers *et al*., 2004) a detailed overview of the VMM-model, developed in 1996 is given. The results are shown in annexe 1.11.
Between 1990 and 2006 ammonia emission decreased by 53% due to a decrease in livestock numbers, use improved feed efficiency measurements, a decrease in the use of mineral fertilizer and higher crop yields.
Recently the methodology has been updated in a project of VMM executed by ILVO ('Optimalisering en actualisering van de emissie-inventaris ammoniak landbouw' – 01-12-2007 until 30-11-2008). An optimalisation and update of the methodology was necessary after some important changes in the Flemish agriculture due to the manure policy changes 'Mestactieplan 2bis' in 2000 and 'Mestdecreet' in 2006. Thus, this project should provide a well structured and updated inventory of ammonia emission and give a better insight in the contribution of different categories of animals and emission stages. The results of the updated model will be available soon and could be used in future calculations. (VMM personal communication 16-02-2009)

12.3.2 NUTS 3

VMM provided data on ammonia emission linked to livestock activities at NUTS 3 from 1996 until 2007. From 1990 until 1995 data are not yet available. However, the updated model (see paragraph 12.3.3) should make it possible to recalculate ammonia emission at NUTS 3 from 1990 until 2007.
VMM could not provide data on ammonia emission linked to the use of inorganic fertiliser at NUTS 3. Therefore the emission at NUTS 3 was estimated based on the use of mineral fertiliser at NUTS 3 (available from 2000 until 2006). In the VMM-model (of 1996), an ammonia emission factor of 1.7% of N per N content in mineral fertilizer was proposed for all soils, except for alkaline clay soils in the "Polders" where a factor of 11.6% was proposed.
The 'Vereniging van Vlaamse Polders en Wateringen' has listed all 'polders' in the Flemish Region with their surface on her website. The position of the 'polders' is shown in a map by province. Based on these data, the total surface of 'polders' and the ratio of 'polders' to the total surface were estimated for each district. Of course we had to make the assumption that the proportion of 'polders' is the same for the agricultural surface as for the whole district. Thus, these ratios could be refined by using exact data on the proportion of 'polders' to the total agricultural surface of each district.

Next, the emission factors were calculated as a weighed average of the proposed emission factors for 'polders' and for the rest of the agricultural soils.
The used emission factors are shown in table 12.1.

Table 12.1 Emission factors (% of N emitted/N content in mineral fertilizer) for inorganic fertilizer by district

District	Emission Factor	District	Emission Factor
Antwerpen	2,08	Tielt	1,70
Mechelen	4,18	Veurne	9,97
Turnhout	1,70	Aalst	1,80
Halle-Vilvoorde	1,70	Dendermonde	7,84
Leuven	1,70	Eeklo	8,63
Brugge	7,24	Gent	3,15
Diksmuide	7,30	Oudenaarde	1,70
Ieper	1,70	Sint-Niklaas	6,80
Kortrijk	1,70	Hasselt	1,70
Oostende	8,49	Maaseik	1,70
Roeselare	1,70	Tongeren	1,70

These emission factors for inorganic fertiliser were multiplied by the amount of mineral fertiliser (kg N) used in each district (see paragraph 5.3.2) to obtain the amount of nitrogen that escapes by ammonia emission linked to the use of inorganic fertiliser. These results were added to the ammonia emission linked to manure to obtain the total ammonia emission linked to agriculture.
The results are shown in annexe 1.11. The sum of the ammonia emission in the Flemish districts can differ slightly from the total ammonia emission in the Flemish Region, because emission linked to the use of mineral fertilizer at NUTS 3 was estimated based on some assumptions concerning the location of 'polders'.

12.2 Walloon Region

12.3.1 NUTS 1

Data on ammonia emission are published in the report 'Tableau de bord" of the cell 'State of the Walloon Environment' of the Directorate-General Agriculture, Natural Resources and Environment (DGARNE) of the Walloon Public Service. As data were only available until 2005, the ammonia emission in 2006 was estimated based on the Belgian ammonia emission data published by the European Environmental Agency (EEA, 2009). For 2004 and 2005 the ammonia emission published by EEA corresponded very well with the sum of the Flemish, Walloon and Brussels ammonia emission data used in this report. Thus, for 2006 the ammonia emission in the Walloon Region was estimated by subtracting the Flemish and Brussels values of the Belgian EEA value.
The results are shown in annexe 1.11. Between 1990 and 2006 ammonia emission in the Walloon Region decreased by 8%. Possible reasons are a decrease of cattle numbers and particularly dairy cows and a decrease of the use of mineral fertilizers.

12.3.2 NUTS 3

Data on ammonia emission were not available at NUTS 3 for the Walloon Region.

12.3 Brussels Capital-Region

Ammonia emission data were not available for Brussels Capital-Region. Therefore, ammonia emission linked to manure was estimated based on Flemish data. For each year ammonia emission linked to manure (total of the Flemish Region) was expressed per kg of nitrogen production and multiplied by the nitrogen production in Brussels Capital Region. Of course this gives only a rough estimation of ammonia emission in Brussels Capital-Region. As in Brussels Capital-Region ammonia emission linked to manure is not very important because of low livestock numbers, the possible error should have only a small impact on the nitrogen balance of Belgium.
Ammonia emission linked to inorganic fertilizer was calculated with an emission factor of 1.7% as proposed by the VMM-model developed in 1996 and added to the ammonia emission linked to manure to obtain the total ammonia emission linked to agriculture of Brussels Capital-Region.
The results are shown in annexe 11.1.

Chapter 13 Soil nitrogen surplus in Belgium

In this chapter we will bring all figures of the previous chapters together and calculate the soil nitrogen surplus in Belgium. As pointed in figure 1.1 soil surplus is the result of following expression:

Soil surplus = N input – N output – ammonia emission

N input =	Livestock N production
	+ Inorganic fertilizer use
	+ Seeds and planting material
	+ Biological N fixation
	+ Atmospheric N deposition
	+ Other organic fertilizers
N output =	Crop removal (marketable + fodder crops)

As explained before, soil surplus in Belgium as a whole was not calculated directly. The Flemish and Walloon agricultural situation and legislation are different and data are gathered by different institutes. Therefore each nitrogen input and output factor was calculated separately for the Flemish Region and the Walloon Region. We will first discuss the results for the Flemish Region and the Walloon Region. Brussels Capital-Region will not be discussed as this region contributes for less than 1% to the Belgian soil surplus. Finally we will present the results for Belgium.

For the Flemish Region an overview of the nitrogen inputs and outputs as well as the resulting soil surplus is presented in annexe 1.12. These figures show that soil surplus in the Flemish Region reduced by 58% between 1990 and 2006. This decrease is caused by different factors. Firstly the livestock nutrient production that is the most important input factor decreased by 15% between 1990 and 2006. The second most important input factor is inorganic fertilizer use that decreased by 43%. Furthermore atmospheric N deposition decreased by 25%. The increase in export and processing and in crop removal also contributed to reduce the soil surplus in the Flemish Region. Ammonia emission decreased by 51% between 1990 and 2006.

In the Walloon Region figures are somewhat different. Annexe 1.13 gives an overview of nitrogen inputs and outputs and the soil surplus. The soil surplus decreased by 22% between 1990 and 2000. This is mainly due to the decrease of 9% in livestock N production and of 24% in inorganic fertilizer use. The atmospheric N deposition also decreased by 8%. Unfortunately no data about import, export and processing were available.
One of the reasons of some Walloon data not being available for the calculation of a gross N balance is that in the Walloon Region other approaches of N balance are adopted to estimate the remaining nitrogen in the soil rather than calculate a theoretical gross N balance. In the context of the PIRENE programme of the Walloon Region the hydrological model 'EPICgrid' has been developed. One of the applications of this hydrological model is a calculation module for the remaining N in agricultural soil until 1,5 meter of depth. (Sohier *et al.*, 2004 and Sohier *et al.*, 2009) EPICgrid takes into account the different forms in which nitrogen is present in the soil (organic and inorganic forms) and models the processes of mineralisation,

immobilisation, nitrification and denitrification. The following N inputs and outputs are considered in this model:

N inputs: Animal manure
Other organic manure
Biological N fixation
Crop residus remaining on agricultural soil
Inorganic fertilizer use
Atmospheric N deposition

N outputs: Leaching of N to groundwater and surface water
N exportation by crop removal
N losses by erosion
Ammonia emission

When these N input and output factors are compared to those of the gross nutrient balance that is calculated in this project, the most important difference is that leaching of N to the groundwater and surface water is considered. Contrary to the EPICgrid model the gross nutrient balance does not have the objective to approximate the nitrogen that is actually present in agricultural soil and therefore does not take into account leaching of N to the groundwater and surface water. For this reason it is difficult to compare the results of both models. Nevertheless we present the results of the EPICgrid model and gross nutrient balance in figure 13.1. The results of the EPICgrid model are averages over three years of the N present in the root zone per hectare of agricultural soil in the Walloon Region until 1,5m of depth, whereas the results of the gross nutrient balance model are the theoretical total soil N surplus per hectare of agricultural soil.
With the EPICgrid model it would also be possible to calculate a nitrogen balance at NUTS 3. It would be interesting to compare these results with our results.

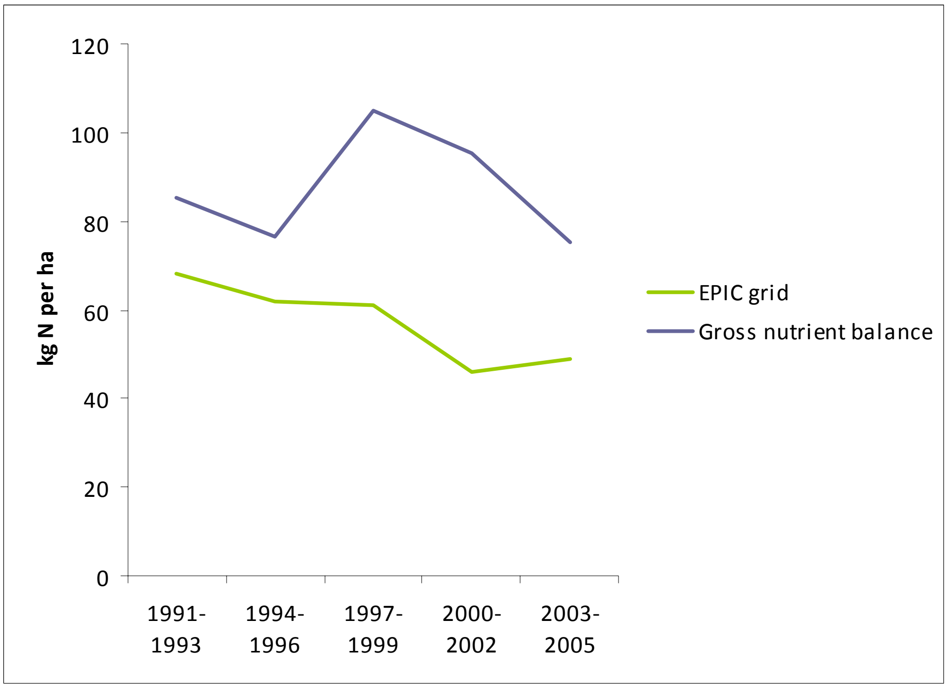

Fig 13.1 Comparison of the results of the EPICgrid model (N actually present in agricultural soil until a depth of 1,5m) with the gross nutrient balance (theoretical soil N surplus)

We calculated soil surplus in Belgium as the sum of the N input and output factors of the Flemish Region, the Walloon Region and Brussels Capital-Region. In annexe 1.14 an overview of the N inputs and outputs as well as the soil surplus is given for Belgium. Figure 13.2 illustrates the importance of the input factors in 2006.

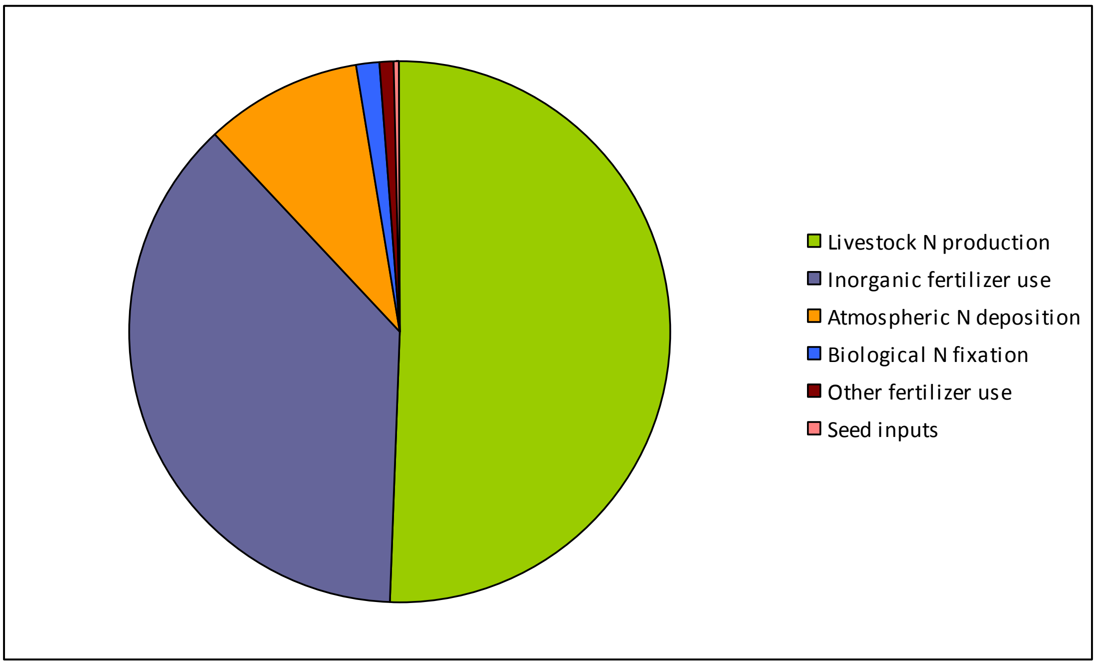

Fig 13.2 N balance input factors in 2006 in Belgium

The most important N input is livestock N production. This factor covers from 50% in 1990 until 55% in 2006 of the total N input. Inorganic fertilizer use is the second most important N input with 37% of the total N input in 1990 and 31% of the total N input in 2006. About 10% of the total N input is caused by atmospheric N deposition. The evolution of these three input factors from 1990 until 2006 is shown in figure 13.3. Seed use, N fixation, import, export and processing and other organic fertilizers are less important N input factors. Figure 13.2 also shows the output factors crop removal and ammonia emission and the resulting soil surplus that reduced with 45% between 1990 and 2006.

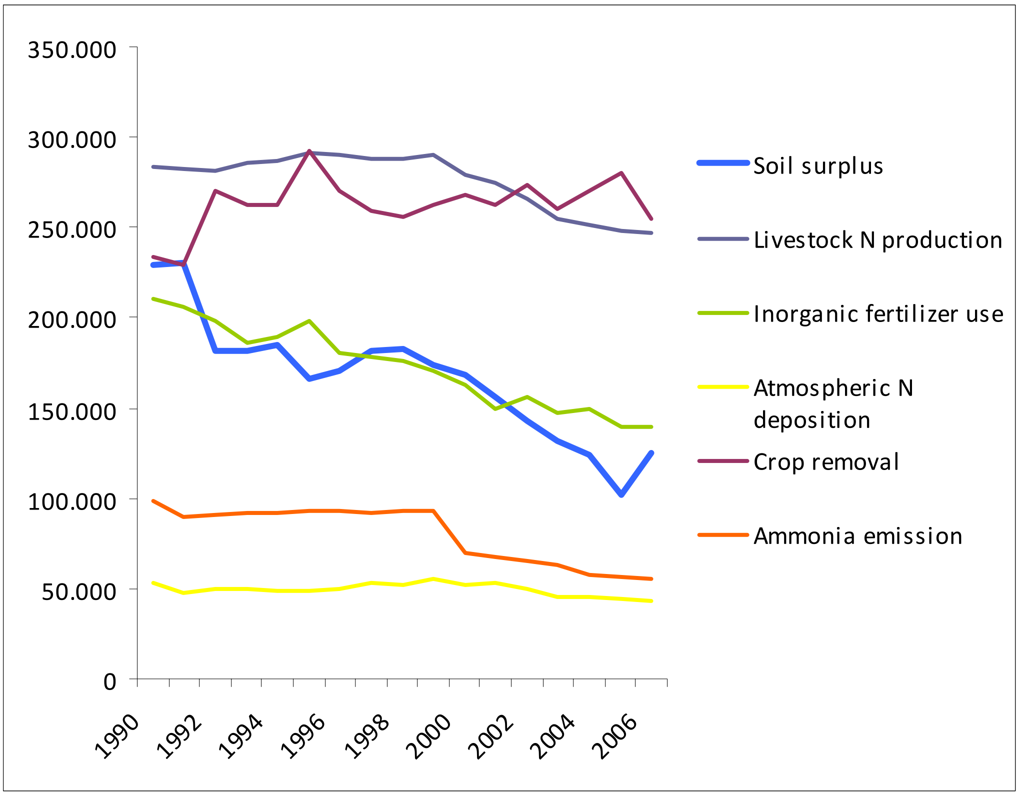

Fig 13.3 Soil surplus and some important N inputs and outputs (ton N) in Belgium from 1990 until 2006

Table 13.1 presents the soil surplus in the Flemish Region, the Walloon Region and Belgium from 1990 until 2006 in kg N per hectare of agricultural soil.

Table 13.1 Soil surplus (kg N per ha) in Belgium

kg per ha	Flanders	Walloon Region	Belgium
1990	242	110	169
1991	249	108	171
1992	221	67	135
1993	196	81	133
1994	189	88	134
1995	185	64	119
1996	174	78	122
1997	157	106	130
1998	159	103	129
1999	141	106	122
2000	145	94	118
2001	119	101	109
2002	111	91	100
2003	96	89	92
2004	92	83	87
2005	87	58	71
2006	91	85	88

Unfortunately we do not yet have all necessary data to calculate the soil surplus in Belgium at NUTS 3. For the Flemish districts we could calculate the soil surplus at NUTS 3 in 2006. The results are shown in table 13.2. These results confirm that soil surplus can be highly variable within the same country.

Table 13.2 Soil surplus at NUTS 3 in Flanders in 2006

District	Soil surplus (ton N)	Soil surplus (kg N per ha)
11	1.796	58
12	510	31
13	3.990	70
23	4.731	116
24	4.637	91
31	3.946	98
32	2.963	99
33	5.934	136
34	3.074	143
35	1.989	106
36	2.157	125
37	1.947	75
38	2.991	145
41	1.630	75
42	1.003	64
43	2.763	108
44	3.897	80
45	3.348	130
46	2.448	95
71	451	17
72	1.229	36
73	2.366	73

Figure 13.4 confirms these differences at NUTS 3. In this map the sum of organic and inorganic fertilizer use that together represent more than 85% of total N input on agricultural soil and N exportation by crop removal that is the most important output factor are compared in 2000 and 2006 per province (NUTS 2). The northwest of Belgium shows the highest nitrogen surplus, while the centre shows the lowest surplus.

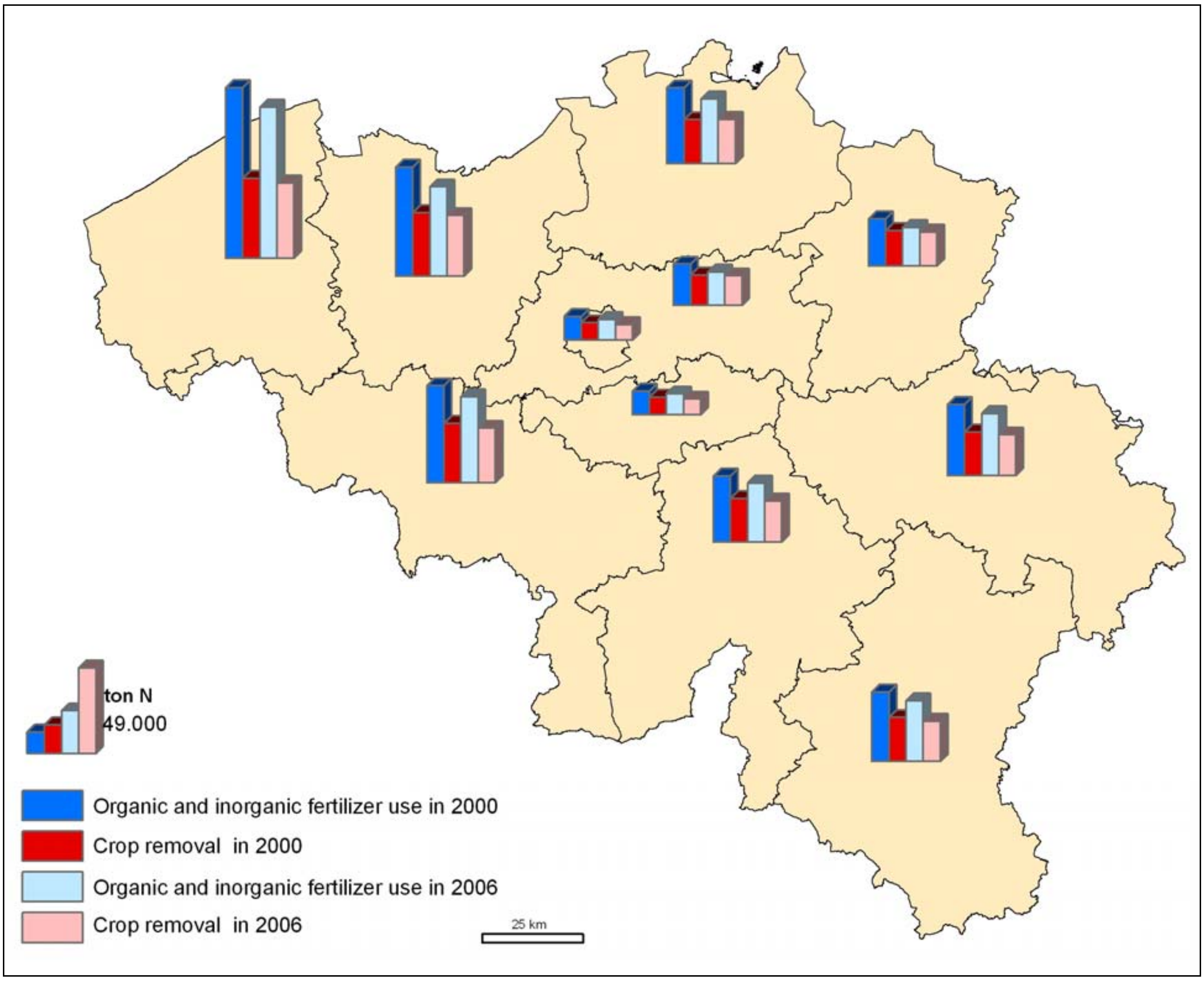

Fig 13.4 Organic and inorganic fertilizer use and crop removal (ton N) in the Belgian provinces in 2000 and 2006

Figure 13.5, 13.6 and 13.7 illustrate once more the differences at NUTS 3. In figure 13.5 the livestock N production per hectare of agricultural soil in 2006 is presented. Livestock N production per hectare is again the highest in the north of Belgium and the lowest in the centre. Figure 13.6 illustrates the inorganic fertilizer use per hectare of agricultural soil in 2006. Differences between districts are less important than for livestock N production. In figure 13.7 the output factor N exportation through crop removal (kg N per hectare of agricultural soil) is presented.

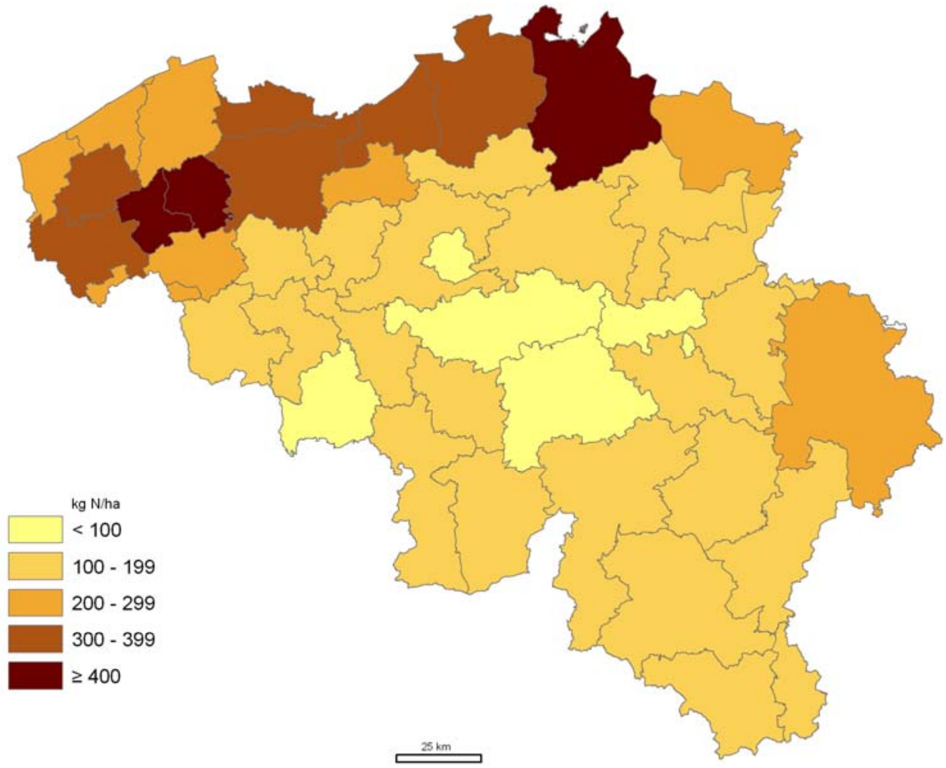

Fig 13.5 Livestock N production (kg N per ha agricultural soil) at NUTS 3 in Belgium in 2006

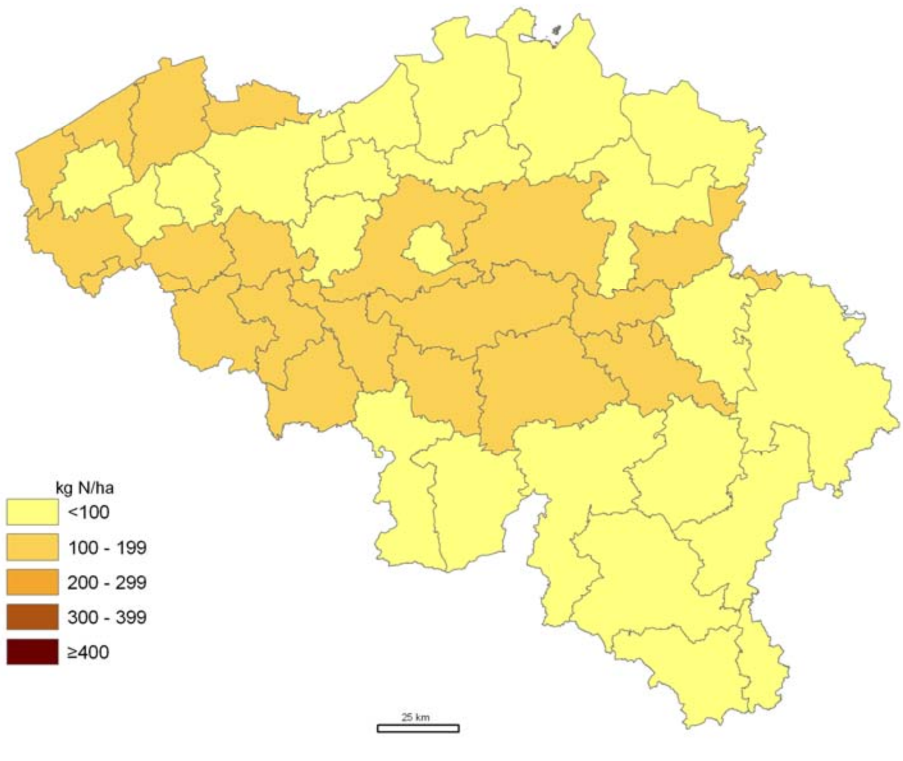

Fig 13.6 Inorganic fertilizer use (kg N per ha agricultural soil) at NUTS 3 in Belgium in 2006

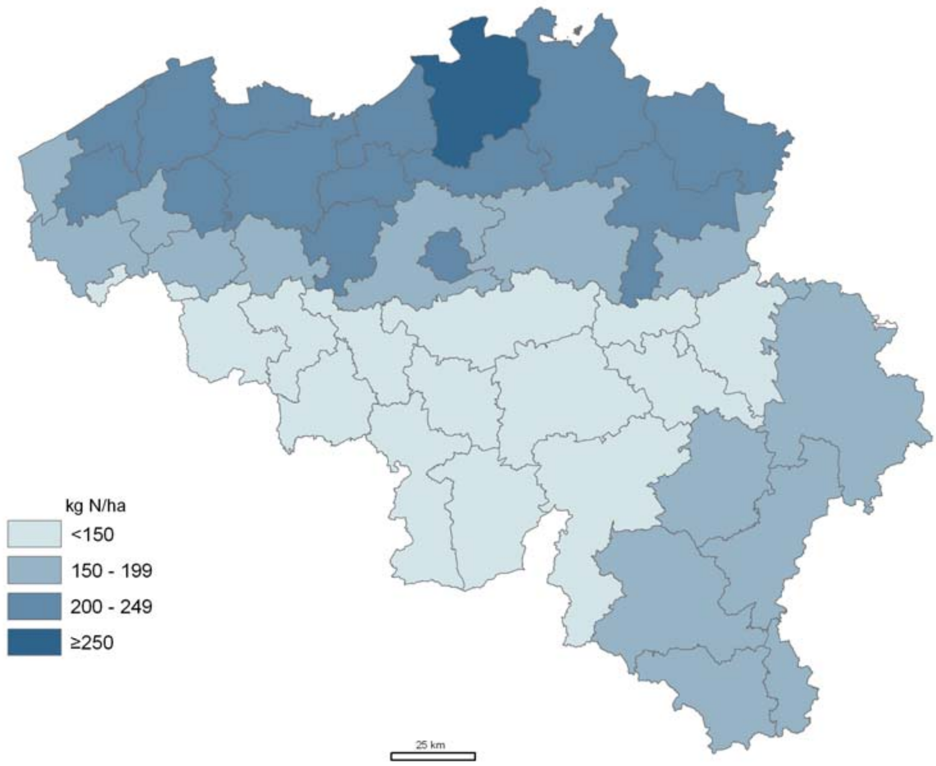

Fig 13.7 N exportation through crop removal (kg N per ha agricultural soil) at NUTS 3 in Belgium in 2006

Chapter 14 Conclusion

In this report we focussed on two aims. Firstly we attempted to calculate a N balance for Belgium as a whole and secondly we attempted to calculate a nutrient balance at NUTS 3 for Belgium. The previous work executed by ILVO in Lauwers *et al*. (2004) and Vervaet *et al*. (2006) for the Flemish Region was a departure point. The calculation modules for the Flemish Region were extended and adapted to the situation in the Walloon Region and Brussels Capital-Region. The N balance for Belgium from 1990 until 2006 could be calculated based on the resulting N balance for the Flemish Region, the Walloon Region and Brussels Capital-Region. In this N balance livestock N production, inorganic fertilizer use, other organic fertilizer use, manure import, export and processing, seed use, biological N fixation, atmospheric N deposition, N exportation through crop removal and ammonia emission were included. However for the Walloon Region and Brussels Capital-Region data about manure import, export and processing were unfortunately not available, but could be approximated to be relatively low.

At NUTS 3 it was more problematic to obtain all necessary data. Most data are gathered by regional administrations at farm level and could be aggregated at NUTS 3. However, the regional administrations and institutes that gather these data do not often aggregate and publish them at NUTS 3. If these data that are linked to the agricultural sector, are aggregated at a lower level than NUTS 1, they are usually aggregated at the level of the agricultural regions and not at NUTS 3. Moreover it takes a lot of time to get a direct access to the individual data at farm level, because this implies a long administrative procedure as these data are protected by the Belgian Commission for the Protection of Privacy.

Despite these difficulties for the Flemish Region most N input and output factors could be calculated from at least 2000 until 2006. Due to some technical problems and the short execution term data about atmospheric N deposition could only be calculated for 2006. However these data will be soon available and this would make it possible to calculate N balances for the Flemish Region from 2000 until 2006 at NUTS 3.

For the Walloon Region it was more difficult to obtain all necessary data, as other approaches of N balance are adopted for policy-making and controlling the N balance at farm level and providing data for gross nutrient balance implies an extra effort from regional administrations and institutes. Nevertheless a lot of data were provided. Missing data are ammonia emission, the use of other organic fertilizers and manure import, export and processing. Atmospheric N deposition data were provided for 1990, 1996, 2000 and 2004 and inorganic fertilizer use was provided for 1999 until 2006.

Another option to calculate a gross nutrient balance for the Walloon districts could be by taking one of the other approaches (for example EPICgrid) as a starting point. It would be interesting to analyse the used calculation methods and N input and output factors and study the possibility to obtain a gross nutrient balance starting from these balances. This method would probably be timesaving for the administrations and institutes, but it would not allow us to compare the importance of the different N input and output factors.

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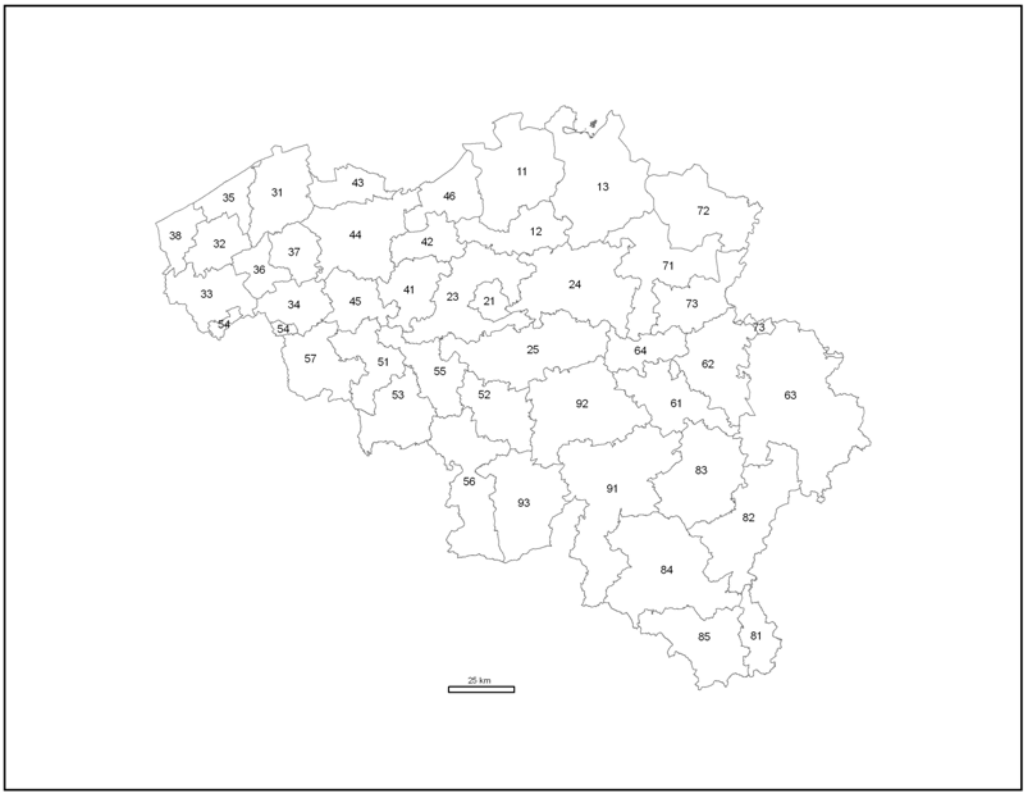
List of abbreviations

APA	Average present animals
AWAC	Agence wallonne de l'air et du climat (Walloon Agency of Air and Climat)
CAE	Centre for Agricultural Economics
DGARNE	Direction Générale Agriculture, Ressources naturelles et Environnement (Directorate-general Agriculture, Natural Resources and Environment)
FAVV-AFSCHA	Federal Agency for the Safety on the Food Chain
FSS	Annual farm structure census of May (Statistics Belgium)
ILVO	Instituut voor Landbouw- en Visserijonderzoek (Institute for Agricultural and Fisheries Research)
IRCEL-CELINE	Interregional Cell for the Environment
ISSeP	Institut Scientifique de Service Publique (Scientific Institute of the Public Service)
MAPII	Mest Actie Plan II (Manure Action Plan II)
MAPIII	Mest Actie Plan III (Manure Action Plan III)
MB	Mestbank (Manure bank of the VLM)
MIRA	Milieurapport Vlaanderen (Environmental Report Flanders)
N	Nitrogen
NGI	National Geographic Institute
NIS	National Institute for Statistics (Statistics Belgium)
NUTS	Nomenclature of territorial units for statistics
OECD	Organisation for Economic Co-operation and Development
OPS	Operational Priority Substances
OVAM	Openbare Vlaamse Afvalstoffenmaatschappij (Public Waste Agency of Flanders)
PGDA	Programme de Gestion Durable de l’Azote en Agriculture (Walloon manure law)
SIGEC	Système Integré de Gestion et Contrôle
TAPAS	Technical Action Plan for Improving Agricultural Statistics
VITO	Vlaams Instituut voor Technologisch Onderzoek (Flemish Institute for Technological Research)
VLACO	Vlaamse Compostorganisatie (Flemish Compost Organisation)
VLM	Vlaamse Landmaatschappij
VMM	Vlaamse Milieumaatschappij (Flemish Environmental Agency)

Annexes

Annexe 1.1 Belgian districts and their reference code

Reference code	Flemish districts	Reference code	Walloon districts
11	Antwerpen	**25**	Nivelles
12	Mechelen	**51**	Ath
13	Turnhout	**52**	Charleroi
23	Halle-Vilvoorde	**53**	Mons
24	Leuven	**54**	Mouscron
31	Brugge	**55**	Soignies
32	Diksmuide	**56**	Thuin
33	Ieper	**57**	Tournai
34	Kortrijk	**61**	Huy
35	Oostende	**62**	Liège
36	Roeselare	**63**	Verviers
37	Tielt	**64**	Waremme
38	Veurne	**81**	Arlon
41	Aalst	**82**	Bastogne
42	Dendermonde	**83**	Marche-en-Famenne
43	Eeklo	**84**	Neufchâteau
44	Gent	**85**	Virton
45	Oudenaerde	**91**	Dinant
46	Sint-Niklaas	**92**	Namur
71	Hasselt	**93**	Philippeville
72	Maaseik		
73	Tongeren	**21**	**Brussels Capital-Region**



Source: NGI

Annexe 1.2 Total crop area per district and per region in Belgium from 1990 until 2006 (source NIS and VLM)

Total crop area (ha)

District	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
11	24.848	25.140	25.520	26.747	27.830	29.158	29.474	29.897	30.325	30.750	31.213	31.492	31.449	31.185	30.601	31.006	30.873
12	13.444	13.216	13.340	13.739	14.297	14.623	14.808	14.933	15.179	15.676	15.811	16.223	16.482	16.727	16.620	16.576	16.615
13	41.387	41.748	42.557	44.645	46.867	49.499	50.277	50.665	52.195	52.934	53.428	54.220	54.930	55.371	55.452	55.845	56.681
23	40.361	39.758	39.010	38.954	39.403	39.771	40.019	40.087	40.397	40.316	40.635	40.701	40.905	40.770	40.463	40.940	40.665
24	47.681	47.200	46.164	46.785	47.698	47.446	48.588	49.032	50.040	50.301	50.482	50.137	50.620	50.924	50.394	50.526	50.973
31	37.368	37.401	37.672	38.437	38.911	39.769	40.234	40.213	40.284	40.316	40.719	41.017	40.794	40.397	40.101	40.215	40.472
32	27.451	27.447	27.577	27.985	28.557	29.044	29.520	29.558	29.712	29.858	30.331	30.136	30.259	30.151	29.934	30.075	30.035
33	43.392	43.327	43.193	43.629	44.031	44.227	44.720	44.313	44.277	44.331	44.591	44.392	44.447	43.956	43.522	43.824	43.546
34	21.468	21.183	20.953	21.160	21.338	21.290	21.522	21.404	21.516	21.614	21.833	22.249	22.313	21.985	21.746	21.734	21.570
35	17.289	17.249	17.276	17.748	17.945	18.331	18.633	18.643	18.795	18.863	19.092	19.138	18.944	19.017	18.604	18.718	18.684
36	17.679	17.547	17.202	17.448	17.406	17.333	17.779	17.141	17.445	17.525	17.632	17.542	17.917	17.619	17.350	17.299	17.281
37	24.203	24.331	24.181	24.678	25.010	25.716	25.899	26.087	26.003	25.612	26.406	25.944	26.112	25.921	25.732	26.080	25.814
38	19.985	19.894	19.577	19.972	20.344	20.276	20.613	20.590	20.679	20.775	20.814	20.437	20.665	20.493	20.489	20.565	20.560
41	19.636	19.550	19.640	19.916	20.313	20.811	20.981	20.913	21.237	21.353	21.602	21.777	21.771	21.690	21.465	21.642	21.650
42	13.869	13.727	13.751	14.243	14.732	15.128	15.239	15.327	15.482	15.704	15.923	15.896	15.840	15.976	15.628	15.764	15.676
43	22.157	22.408	22.527	23.392	23.963	24.387	24.322	24.370	24.707	24.740	25.132	25.218	25.158	25.202	25.296	25.288	25.475
44	43.706	43.737	44.265	45.847	47.257	48.585	48.792	48.557	48.766	48.782	48.978	48.838	48.860	48.790	48.164	48.359	48.613
45	25.015	24.744	24.777	25.120	25.496	25.785	25.883	25.864	25.706	25.823	26.002	25.939	26.035	25.708	25.378	25.391	25.741
46	22.824	22.795	22.861	23.642	24.114	24.710	24.794	25.096	25.492	25.338	25.608	25.633	25.672	26.025	25.530	25.521	25.784
71	24.136	23.963	22.761	23.519	24.112	23.979	24.955	25.493	26.576	27.236	27.501	27.415	27.607	28.245	27.498	27.600	27.321
72	25.081	25.207	26.281	27.761	29.098	31.241	31.554	31.933	32.617	32.877	33.235	33.440	33.694	34.204	33.977	34.476	34.393
73	30.769	30.440	29.633	30.294	30.613	30.292	31.143	31.309	32.251	32.433	32.740	32.387	32.892	32.360	31.761	32.127	32.447
25	64.585	64.421	64.675	65.522	66.080	66.266	66.618	66.459	66.470	66.527	66.848	63.486	63.780	64.012	64.035	63.462	63.091
51	31.447	31.182	31.075	31.377	31.651	31.574	31.809	31.579	31.779	31.544	31.435	30.961	31.283	31.434	31.303	31.020	30.789
52	26.113	25.770	25.695	25.742	25.682	25.690	25.603	25.805	25.963	25.995	25.945	25.833	25.934	26.226	25.889	25.888	25.840
53	30.656	30.638	30.480	30.764	31.104	31.103	31.399	31.481	31.520	31.702	31.587	31.190	30.948	31.050	31.121	31.216	31.146
54	6.633	6.626	6.541	6.553	6.573	6.669	6.730	6.718	6.646	6.541	6.501	6.446	6.470	6.503	6.515	6.426	6.566
55	33.414	33.347	33.282	33.334	33.504	33.606	33.518	33.727	33.804	33.909	33.800	33.725	33.693	33.851	33.832	33.591	33.460
56	51.286	51.053	50.846	50.464	50.864	51.086	50.955	50.986	51.077	51.086	51.156	51.119	51.378	51.252	51.258	50.551	50.917

57	41.798	41.829	41.583	41.673	42.187	42.051	41.614	41.612	41.826	41.910	41.820	41.710	41.880	41.910	41.942	41.912	41.724
61	34.963	34.719	34.538	34.238	34.537	34.744	34.724	34.982	35.342	35.116	35.166	35.656	36.108	35.767	35.570	35.559	35.891
62	29.949	29.546	29.350	29.703	29.937	29.714	29.858	30.101	30.152	30.358	30.232	30.016	29.977	29.702	29.762	29.590	29.187
63	68.111	66.673	65.407	65.106	64.419	63.931	63.346	63.242	63.204	63.285	63.309	63.335	63.427	64.236	64.247	64.179	64.656
64	30.339	30.117	29.764	29.652	29.807	29.797	29.588	29.627	29.603	29.645	29.801	29.867	30.186	30.356	30.368	29.863	30.164
81	10.116	9.971	9.810	9.800	9.845	9.831	9.888	9.965	10.108	10.128	10.288	10.543	10.386	10.398	10.481	10.316	10.243
82	42.778	42.242	42.085	42.591	42.759	43.070	43.408	43.768	44.138	44.658	44.634	44.892	44.532	45.412	45.170	45.009	44.701
83	28.137	27.958	27.745	27.477	27.327	27.352	27.353	27.561	27.675	27.728	28.068	28.422	28.771	28.851	29.216	29.160	29.047
84	37.799	37.430	37.261	38.075	38.227	38.331	38.413	38.959	39.106	39.422	39.519	39.834	39.964	40.363	40.304	40.185	43.079
85	20.951	20.593	20.366	20.783	21.021	21.243	21.664	21.930	22.319	22.694	22.947	23.111	22.775	22.939	23.031	22.790	22.594
91	64.082	63.287	62.612	62.420	62.987	62.871	62.544	62.803	63.343	63.378	63.493	63.382	63.721	63.126	63.504	63.177	62.757
92	64.678	64.675	64.552	64.948	65.172	65.076	65.414	65.479	64.992	65.367	64.603	64.418	64.429	64.471	64.540	64.109	63.803
93	34.904	35.138	34.686	34.374	34.790	34.682	34.865	34.813	35.171	35.558	35.558	36.719	36.929	37.373	37.683	37.542	37.156
Statistical discrepancy*	0	-347	-629	-995	-1.375	-1.727	-2.104	-2.584	-3.059	-3.094	-9	-76	-490	-1.614	-163	1.723	0
Brussels Capital-Region	726	608	793	676	539	516	711	725	734	744	493	382	254	255	262	379	404
Flemish Region	603.752	602.012	600.370	615.033	628.340	640.026	648.022	649.320	657.097	660.096	666.615	670.163	673.290	672.228	664.091	669.408	672.591
Walloon Region	752.738	747.215	742.353	744.596	748.472	748.686	749.311	751.597	754.238	756.551	756.710	754.666	756.567	759.231	759.772	755.545	756.811
Belgium	1.357.216	1.349.835	1.343.516	1.360.305	1.377.351	1.389.228	1.398.044	1.401.643	1.412.069	1.417.391	1.423.818	1.425.211	1.430.111	1.431.714	1.424.125	1.425.332	1.429.806

The figures in green are calibrated crop areas (see paragraph 3.1)

The figures in blue are not calibrated. (see paragraph 3.2)

* The sum of the Flemish districts does not correspond with the value for the Flemish Region due to other calculation methods and data sources.

Annexe 1.3 Livestock nutrient production per district and per region in Belgium from 1990 until 2006

Total nitrogen excretion (ton N)

District	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
11	9.360	9.552	9.470	9.567	9.702	10.351	10.337	10.288	10.346	10.457	10.081	9.677	9.537	9.168	9.019	8.803	8.853
12	2.800	2.730	2.717	2.718	2.596	2.595	2.581	2.476	2.472	2.469	2.361	2.343	2.226	2.175	2.099	2.050	2.011
13	20.650	20.933	20.631	21.736	22.334	23.121	23.217	22.866	23.320	23.645	22.239	21.229	21.020	20.184	19.715	19.120	19.359
23	5.624	5.495	5.394	5.357	5.430	5.374	5.438	5.253	5.084	5.140	5.065	4.842	4.791	4.598	4.486	4.439	4.413
24	5.969	5.841	5.887	5.742	5.757	5.816	5.966	5.702	5.680	5.621	5.415	5.236	4.981	4.789	4.555	4.569	4.502
31	13.161	12.989	13.133	13.382	13.068	13.200	13.043	13.122	12.989	12.852	12.133	11.462	11.032	10.635	10.519	10.375	10.432
32	9.634	9.498	9.758	10.150	10.391	10.794	10.696	10.638	10.922	10.895	10.221	9.773	9.697	9.139	8.988	9.057	9.125
33	14.085	13.955	13.943	14.483	14.775	15.098	15.204	15.332	15.448	15.591	14.655	13.893	13.341	13.092	12.694	12.645	12.707
34	5.861	5.737	5.739	5.909	5.938	5.888	6.138	5.944	5.927	5.922	5.611	5.460	5.247	4.993	4.966	4.827	4.818
35	4.596	4.573	4.556	4.723	4.762	4.822	4.855	4.768	4.854	4.831	4.507	4.310	4.243	4.054	3.972	3.922	3.996
36	8.865	8.812	8.956	9.232	8.794	8.878	8.821	8.753	8.810	8.808	8.137	7.442	7.305	7.007	6.805	6.932	6.790
37	12.840	14.234	14.963	15.702	15.364	16.089	16.050	16.192	16.210	16.064	14.945	14.313	13.586	13.127	12.960	12.791	12.791
38	3.735	3.793	3.960	4.220	4.481	4.691	4.786	4.777	4.929	4.894	4.732	4.479	4.370	4.202	4.298	4.039	4.172
41	3.777	3.734	3.683	3.802	3.742	3.769	3.714	3.580	3.325	3.461	3.386	3.257	3.211	2.957	2.898	2.848	2.834
42	4.285	4.139	3.984	3.961	3.955	3.923	3.993	3.785	3.676	3.701	3.501	3.344	3.215	3.141	3.037	3.001	2.949
43	7.444	7.021	7.234	7.530	7.771	7.945	7.829	7.889	7.868	8.063	7.663	7.416	7.208	7.137	6.916	6.726	6.811
44	16.107	15.665	15.716	16.084	15.927	16.525	16.382	16.253	15.992	16.004	15.299	14.550	14.204	13.403	12.915	12.694	12.619
45	5.081	4.886	4.895	4.929	4.916	4.917	4.870	4.706	4.709	4.740	4.615	4.378	4.162	3.955	3.876	3.887	3.867
46	8.291	8.014	8.019	8.252	8.078	8.143	8.142	8.231	8.259	8.213	8.003	7.597	7.278	7.149	6.816	6.715	6.714
71	4.108	3.894	3.721	3.743	4.012	3.677	3.751	3.715	3.791	3.624	3.387	3.327	3.203	3.041	2.913	2.744	2.699
72	9.616	9.727	9.707	9.853	10.057	10.199	10.312	10.196	10.196	10.185	9.840	9.553	9.246	7.848	8.746	8.549	8.321
73	5.743	5.621	5.429	5.564	5.484	5.447	5.385	5.298	5.254	5.159	4.938	4.940	4.703	4.396	4.174	4.115	3.990
25	5.338	5.222	5.155	5.081	5.186	5.250	5.138	5.033	4.937	4.896	4.867	5.093	4.795	4.570	4.596	4.444	4.385
51	4.680	4.583	4.490	4.470	4.447	4.412	4.339	4.271	4.228	4.212	4.122	4.305	4.188	4.012	3.978	3.962	3.847
52	2.689	2.665	2.683	2.672	2.669	2.751	2.720	2.722	2.654	2.731	2.692	2.784	2.739	2.613	2.519	2.526	2.455
53	3.262	3.234	3.140	3.067	3.012	3.029	2.983	2.911	2.856	2.828	2.784	2.754	2.590	2.466	2.449	2.410	2.307
54	1.775	1.698	1.784	1.821	1.794	1.842	1.787	1.721	1.821	1.870	1.928	1.993	1.902	1.899	1.884	1.907	1.736
55	4.967	4.923	4.836	4.777	4.799	4.889	4.777	4.674	4.679	4.722	4.676	4.809	4.642	4.427	4.411	4.356	4.298

56	6.567	6.588	6.493	6.351	6.360	6.440	6.347	6.339	6.266	6.400	6.417	6.729	6.401	6.062	6.124	5.960	5.902
57	5.073	5.115	5.044	5.062	5.181	5.200	5.077	5.051	4.934	4.965	4.997	5.132	4.977	4.805	4.796	4.781	4.761
61	4.126	4.045	4.032	4.047	3.978	4.053	3.966	4.065	4.035	4.166	4.159	4.327	4.130	4.008	4.053	4.041	4.058
62	4.294	4.249	4.189	4.233	4.170	4.177	4.037	4.023	3.957	3.974	3.890	3.973	3.789	3.660	3.592	3.539	3.458
63	14.773	14.473	14.061	13.882	13.660	13.463	13.188	12.955	12.919	12.921	12.716	12.967	12.554	12.110	11.943	11.725	11.581
64	2.333	2.283	2.278	2.268	2.239	2.253	2.252	2.201	2.295	2.320	2.254	2.286	2.195	2.090	2.124	2.172	2.160
81	1.332	1.329	1.280	1.309	1.312	1.323	1.344	1.339	1.327	1.347	1.320	1.388	1.314	1.254	1.256	1.254	1.252
82	8.048	8.110	7.922	8.033	8.209	8.208	8.254	8.322	8.332	8.438	8.364	8.714	8.539	8.301	8.207	8.128	8.120
83	4.653	4.684	4.510	4.542	4.514	4.570	4.540	4.582	4.586	4.647	4.603	4.805	4.647	4.575	4.615	4.602	4.534
84	6.532	6.598	6.468	6.558	6.644	6.740	6.770	6.922	6.902	7.030	7.010	7.416	7.157	6.891	6.873	6.902	6.900
85	2.940	2.972	2.937	2.936	2.981	3.060	3.086	3.085	3.171	3.236	3.242	3.412	3.180	3.021	3.017	2.976	2.946
91	8.229	8.423	8.316	8.382	8.431	8.449	8.472	8.479	8.485	8.577	8.574	8.916	8.613	8.318	8.358	8.367	8.341
92	5.854	5.883	5.840	5.755	5.824	5.842	5.682	5.619	5.531	5.654	5.545	5.665	5.400	5.293	5.229	5.251	5.178
93	4.219	4.290	4.231	4.283	4.323	4.388	4.387	4.391	4.392	4.463	4.476	4.642	4.524	4.335	4.407	4.381	4.333
Brussels Capital-Region	34	31	33	34	41	35	37	32	30	31	28	29	27	23	23	26	31
Flemish Region	181.633	180.843	181.494	186.639	187.330	191.263	191.507	189.765	190.064	190.341	180.735	172.817	167.801	160.186	157.359	154.847	154.769
Walloon Region	101.685	101.364	99.690	99.527	99.732	100.339	99.146	98.705	98.308	99.395	98.638	102.111	98.278	94.712	94.432	93.680	92.549
Belgium	283.352	282.238	281.217	286.200	287.103	291.637	290.690	288.502	288.402	289.767	279.401	274.957	266.106	254.921	251.814	248.553	247.349

Annexe 1.4 Total inorganic fertilizer use per district and per region in Belgium from 1990 until 2006 (source VLM, DGARNE and NIS)

Total inorganic fertilizer use (ton N)

District	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
11	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	3.193	2.847	2.880	2.887	3.023	2.640	2.306
12	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.709	1.442	1.486	1.444	1.396	1.298	1.217
13	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	4.018	3.623	3.769	3.766	3.884	3.722	3.562
23	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	6.375	5.593	5.524	5.359	5.364	4.958	4.836
24	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	7.122	6.106	5.912	5.704	5.808	5.607	5.521
31	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	4.500	4.249	4.314	4.252	4.261	4.318	4.412
32	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	2.957	2.829	2.887	2.970	2.903	2.767	2.949
33	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	4.548	4.258	4.331	4.545	4.570	4.509	4.526
34	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	2.718	2.386	2.460	2.476	2.439	2.358	2.406
35	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	2.544	2.337	2.295	2.330	2.253	2.179	2.094
36	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.676	1.567	1.616	1.640	1.579	1.551	1.586
37	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.958	1.949	2.107	2.127	2.063	2.064	2.142
38	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	2.736	2.640	2.559	2.583	2.503	2.438	2.484
41	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	2.781	2.231	2.231	2.052	1.940	1.765	1.788
42	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.784	1.511	1.587	1.510	1.500	1.367	1.299
43	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	3.299	3.005	3.035	3.021	2.990	2.861	2.807
44	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	5.816	5.134	5.161	4.940	4.906	4.637	4.548
45	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	4.158	3.502	3.425	3.333	3.182	3.018	3.009
46	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	2.600	2.341	2.391	2.451	2.431	2.365	2.227
71	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	2.198	1.985	1.958	1.915	1.956	1.797	1.758
72	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	2.953	2.572	2.629	2.437	2.515	2.424	2.339
73	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	4.061	3.673	3.570	3.486	3.464	3.331	3.335
25	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	8.881	8.810	7.804	8.153	7.768	8.129	7.670	7.590
51	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	4.223	4.141	3.644	3.875	3.687	3.786	3.562	3.501
52	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	3.542	3.492	3.257	3.400	3.252	3.333	3.159	3.099
53	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	3.997	3.961	3.486	3.651	3.478	3.646	3.494	3.481
54	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	903	886	772	825	775	803	755	764
55	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	4.424	4.379	3.949	4.181	3.928	4.067	3.831	3.812

56	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	6.221	6.066	5.440	5.749	5.313	5.416	5.048	5.025
57	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	5.695	5.618	4.965	5.272	5.013	5.205	4.986	4.926
61	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	4.359	4.231	3.901	4.116	3.762	3.833	3.662	3.610
62	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	3.687	3.560	3.234	3.299	3.026	3.089	2.916	2.855
63	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	6.821	6.574	5.422	5.789	5.341	5.291	4.829	4.708
64	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	3.863	3.760	3.496	3.663	3.483	3.606	3.392	3.428
81	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.209	1.172	1.014	1.061	960	977	884	870
82	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	5.077	4.686	4.219	4.255	3.923	3.793	3.417	3.323
83	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	3.203	3.016	2.636	2.854	2.547	2.531	2.295	2.257
84	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	4.600	4.246	3.509	3.806	3.459	3.369	3.032	3.188
85	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	2.598	2.460	2.087	2.214	2.000	1.963	1.766	1.715
91	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	7.577	7.219	6.459	6.872	6.149	6.265	5.845	5.620
92	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	8.572	8.215	7.607	7.826	7.279	7.553	7.244	7.109
93	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	4.295	4.148	3.896	4.077	3.744	3.878	3.641	3.513
Statistical discrepancy*	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-3.560	1.399	2.649	625	1.677	186	1.845
Brussels Capital-Region	132	110	137	104	80	83	96	94	96	89	56	39	26	26	26	36	38
Flemish Region	110.060	108.409	103.929	94.321	93.579	102.728	87.193	84.095	85.935	79.104	75.710	67.782	68.151	67.220	66.896	63.825	63.084
Walloon Region	99.876	97.638	94.034	91.503	95.511	95.085	92.916	93.951	90.511	91.124	87.076	82.194	87.564	79.517	82.243	75.764	76.302
Belgium	210.069	206.156	198.100	185.928	189.170	197.895	180.205	178.140	176.542	170.318	162.842	150.014	155.741	146.763	149.165	139.625	139.424

*The sum of the Belgian districts does not correspond to the total for Belgium due to different calculation methods and data sources.

Annexe 1.5 Total crop removal per district and per region in Belgium from 1990 until 2006

Crop removal (ton N)

District	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
11	5.495	5.531	6.164	6.524	6.742	7.468	6.757	7.401	7.536	7.790	8.224	8.227	8.253	8.141	8.182	8.215	7.930
12	2.578	2.559	2.836	2.922	3.035	3.321	2.972	3.240	3.237	3.460	3.850	3.859	3.882	3.929	3.981	3.972	3.902
13	8.897	8.907	10.045	10.663	10.731	11.854	11.007	12.277	12.401	12.947	13.251	13.305	13.486	13.495	14.025	14.021	13.622
23	6.739	6.705	7.290	7.487	7.367	8.189	7.899	8.372	8.338	8.358	8.280	8.093	8.179	8.147	8.464	8.339	8.061
24	6.996	6.954	7.503	7.831	7.869	8.589	8.785	9.160	9.170	9.643	9.333	8.832	9.091	9.133	9.459	9.235	9.078
31	7.250	7.263	8.139	8.511	8.552	9.458	8.797	9.505	9.544	9.782	9.524	9.458	9.530	9.349	9.476	9.318	9.103
32	4.980	4.960	5.499	5.751	5.787	6.429	6.023	6.508	6.390	6.621	6.612	6.466	6.573	6.478	6.609	6.464	6.240
33	7.101	7.194	7.889	8.287	8.104	8.822	8.611	9.099	8.805	9.162	8.672	8.446	8.689	8.516	8.764	8.508	8.142
34	3.479	3.495	3.825	3.997	3.909	4.265	4.166	4.436	4.287	4.450	4.324	4.189	4.428	4.322	4.446	4.259	4.106
35	3.124	3.165	3.404	3.563	3.567	4.019	3.890	4.033	4.028	4.070	4.260	4.153	4.208	4.228	4.227	4.116	4.019
36	2.691	2.709	2.952	3.141	3.006	3.295	3.199	3.343	3.265	3.462	3.295	3.181	3.319	3.203	3.258	3.183	3.061
37	4.251	4.347	4.882	5.216	5.199	5.779	5.347	5.959	5.894	6.061	5.619	5.421	5.524	5.396	5.484	5.403	5.164
38	3.231	3.239	3.454	3.678	3.681	4.066	4.098	4.223	4.134	4.261	3.965	3.707	3.928	3.978	4.101	3.922	3.788
41	3.780	3.750	4.157	4.304	4.336	4.790	4.415	4.769	4.810	4.952	4.942	4.867	4.929	4.857	4.939	4.873	4.747
42	2.782	2.717	3.017	3.152	3.242	3.580	3.219	3.516	3.507	3.670	3.777	3.739	3.730	3.717	3.748	3.720	3.588
43	4.150	4.253	4.783	4.996	5.047	5.446	5.119	5.569	5.558	5.764	5.594	5.456	5.598	5.524	5.732	5.586	5.371
44	8.465	8.608	9.751	10.127	10.353	11.093	10.211	11.119	11.052	11.415	11.347	11.172	11.264	11.082	11.315	11.151	10.790
45	4.293	4.254	4.661	4.898	4.809	5.281	5.070	5.409	5.222	5.465	5.401	5.235	5.371	5.253	5.353	5.169	5.076
46	4.029	4.050	4.575	4.783	4.789	5.290	5.039	5.492	5.514	5.687	5.464	5.257	5.410	5.463	5.603	5.469	5.332
71	3.742	3.619	3.959	4.090	4.223	4.491	4.325	4.743	4.821	5.377	5.973	5.586	5.661	5.843	5.783	5.685	5.536
72	5.179	5.230	6.025	6.369	6.367	7.050	6.512	7.195	7.177	7.412	7.952	7.952	7.977	8.051	8.272	8.303	7.957
73	4.896	4.803	5.287	5.557	5.597	6.091	5.867	6.278	6.350	6.804	6.610	6.243	6.397	6.301	6.329	6.162	6.149
25	9.228	9.312	10.245	10.123	9.765	10.540	10.827	10.044	9.692	10.057	10.004	8.958	9.758	9.434	10.080	9.955	9.036
51	4.930	4.930	5.800	5.638	5.339	5.828	5.548	4.884	4.693	4.831	4.849	4.578	4.923	4.665	4.927	5.107	4.354
52	3.946	3.924	4.446	4.277	4.052	4.388	4.324	4.005	3.888	4.004	3.963	3.839	4.089	3.906	4.158	4.238	3.763
53	4.748	4.714	5.402	5.172	5.014	5.520	5.405	4.915	4.736	4.880	4.845	4.412	4.796	4.572	4.895	5.005	4.444
54	992	1.004	1.177	1.143	1.067	1.193	1.161	1.070	1.030	1.035	1.052	973	1.037	981	1.012	1.091	969
55	5.292	5.256	6.238	5.813	5.708	6.320	5.814	5.230	4.993	5.217	5.242	5.074	5.416	5.114	5.440	5.637	4.862

56	8.848	8.509	10.688	9.476	9.487	10.792	9.632	7.953	7.701	7.932	8.125	7.791	8.226	7.432	8.026	8.738	7.348
57	6.189	6.282	7.064	6.935	6.575	7.099	6.937	6.462	6.208	6.457	6.478	5.969	6.570	6.263	6.607	6.748	5.940
61	5.439	5.349	6.436	5.875	5.821	6.607	6.167	5.299	5.224	5.271	5.403	5.228	5.601	5.103	5.458	5.940	5.146
62	4.909	4.646	5.876	5.369	5.479	6.039	5.507	4.673	4.527	4.656	4.720	4.602	4.825	4.393	4.686	5.192	4.303
63	13.729	12.398	17.222	14.566	14.727	17.166	14.034	9.912	9.524	9.467	10.567	10.309	10.762	9.224	10.001	12.710	9.690
64	4.128	4.233	4.500	4.414	4.341	4.707	4.789	4.546	4.313	4.571	4.438	4.058	4.605	4.527	4.772	4.646	4.335
81	1.805	1.688	2.230	2.002	1.953	2.266	1.997	1.660	1.670	1.575	1.807	1.717	1.776	1.570	1.708	1.969	1.595
82	8.063	7.410	10.442	8.863	9.338	11.050	9.162	6.826	7.061	6.702	7.620	8.123	7.710	6.708	7.176	9.005	7.102
83	5.172	4.809	6.602	5.778	5.709	6.745	5.678	4.447	4.457	4.306	4.868	4.843	5.116	4.332	4.698	5.735	4.496
84	7.058	6.571	9.145	8.111	8.152	9.734	8.178	6.760	6.913	6.036	7.164	6.646	6.861	5.873	6.294	7.923	6.693
85	3.882	3.599	4.913	4.384	4.438	5.205	4.475	3.567	3.557	3.457	3.954	3.813	3.935	3.362	3.621	4.419	3.418
91	10.948	10.485	13.258	11.825	11.928	13.491	11.980	9.790	9.652	9.599	10.122	10.050	10.465	9.229	9.956	11.479	9.338
92	9.546	9.651	11.011	10.293	10.199	11.212	11.002	9.938	9.478	9.766	9.525	9.309	9.776	9.223	9.968	10.242	9.020
93	6.083	5.955	7.400	6.502	6.568	7.411	6.625	5.425	5.284	5.431	5.600	5.698	5.971	5.397	5.832	6.649	5.402
Statistical discrepancy*	0	0	0	0	0	0	0	0	0	0	1.438	3.162	5.451	4.505	3.251	2.782	2.503
Brussels Capital-Region	115	101	133	123	79	97	115	132	142	131	95	75	57	55	59	78	89
Flemish Region	108.128	108.311	120.099	125.849	126.310	138.665	131.329	141.649	141.039	146.614	147.706	146.006	150.879	148.910	150.801	147.854	143.264
Walloon Region	124.933	120.725	150.096	136.557	135.658	153.314	139.245	117.407	114.602	115.249	120.346	115.989	122.219	111.307	119.316	132.429	111.255
Belgium	233.176	229.137	270.327	262.528	262.047	292.075	270.688	259.188	255.783	261.995	268.147	262.071	273.154	260.272	270.175	280.361	254.607

*The sum of the Belgian districts does not correspond to the total for Belgium due to different calculation methods and data sources.

Annexe 1.6 Total nitrogen input by seed use and planting materials per district and per region in Belgium from 1990 until 2006

Total seed input (ton N)

District	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
11	12,2	12,9	13,0	13,4	17,9	16,9	17,7	18,5	19,5	18,8	20,5	19,6	18,8	18,8	19,8	21,3	22,4
12	8,2	8,2	8,4	8,2	9,7	9,0	8,8	8,4	8,6	8,0	9,3	8,5	8,8	8,6	8,9	8,9	9,3
13	24,4	26,4	26,1	25,3	29,3	30,0	31,2	32,8	35,1	35,7	39,5	42,3	41,4	43,0	44,7	45,2	50,1
23	64,5	63,7	66,2	60,3	63,6	63,5	65,4	65,2	67,6	63,5	68,0	58,3	60,8	58,8	64,3	62,4	62,6
24	73,7	73,5	74,7	72,7	73,9	74,1	75,5	73,8	76,2	71,3	77,4	68,0	70,5	68,9	72,1	70,2	72,2
31	42,0	41,0	42,3	40,4	42,9	42,9	45,7	44,5	45,6	45,9	47,6	42,4	46,1	45,3	48,5	47,5	49,1
32	40,1	40,7	42,2	39,2	42,8	43,2	44,6	42,3	44,4	45,8	45,4	39,6	43,5	41,4	46,6	45,1	46,5
33	94,4	90,4	93,7	88,5	91,7	88,3	90,2	87,0	89,8	87,8	88,6	75,1	79,4	75,3	83,1	83,8	82,9
34	46,9	43,5	44,6	41,3	43,3	42,8	42,7	39,4	41,4	40,2	41,8	37,1	39,7	36,5	41,4	41,1	40,8
35	25,7	26,5	27,0	26,3	26,5	27,0	29,9	29,2	29,3	28,7	30,3	26,4	29,6	30,0	31,7	31,1	32,2
36	31,9	31,0	31,8	28,3	30,6	31,0	32,0	28,2	28,9	28,8	29,2	25,6	27,6	24,8	27,6	26,7	28,6
37	36,0	33,8	34,7	31,3	32,8	33,9	35,7	33,6	35,9	36,2	38,4	30,9	32,4	29,8	33,9	33,3	35,1
38	40,0	41,0	41,6	40,0	41,5	41,3	43,5	43,8	45,7	45,0	45,3	39,3	42,0	41,5	43,5	44,2	45,1
41	20,6	20,4	21,9	21,3	23,2	23,0	23,0	22,5	23,7	22,7	24,6	19,5	21,8	19,7	22,2	21,7	22,0
42	10,0	9,7	9,5	9,0	11,4	9,9	10,0	9,7	10,4	9,0	10,6	8,8	9,7	9,6	9,7	9,5	9,7
43	30,8	31,3	31,2	30,0	32,8	32,4	33,7	32,6	34,0	35,4	37,5	35,7	37,9	36,3	39,8	40,0	40,7
44	42,5	42,7	45,8	40,2	48,6	46,3	48,0	44,9	48,1	47,2	50,6	43,0	48,0	44,3	49,2	48,1	50,1
45	49,6	49,2	50,3	45,5	48,5	47,8	48,5	46,5	46,8	44,1	47,2	40,6	43,9	40,1	44,7	43,9	43,9
46	28,3	27,7	28,3	27,3	28,7	28,8	29,2	28,5	30,1	27,3	29,4	25,3	28,5	27,2	27,6	27,4	27,7
71	23,5	22,8	22,5	22,1	22,7	22,2	23,1	22,0	22,5	21,4	23,4	20,8	21,4	21,3	21,7	22,5	21,9
72	16,9	17,2	17,9	18,6	20,2	22,9	23,6	23,0	24,5	23,7	27,3	26,2	27,0	26,7	26,7	28,4	27,2
73	35,5	35,4	34,7	34,4	34,9	34,7	35,2	36,5	37,4	36,0	37,6	35,2	36,9	36,2	36,9	36,6	39,0
25	116,6	116,9	121,2	118,5	120,3	115,3	116,6	118,9	122,0	115,4	121,1	114,2	115,4	115,9	120,1	120,3	120,6
51	50,9	52,4	54,9	53,8	56,3	54,3	56,2	53,9	55,8	54,0	55,7	53,8	54,1	55,7	58,2	57,9	58,3
52	43,9	44,6	46,0	45,3	45,2	43,1	43,7	45,4	46,1	43,4	45,9	45,6	46,2	47,6	48,1	48,0	48,7
53	51,4	51,7	53,6	53,5	57,2	57,1	58,9	58,1	59,3	58,6	60,7	55,8	56,1	56,8	60,3	60,9	62,0
54	14,8	14,2	15,0	14,1	14,7	14,8	14,9	13,9	14,3	13,8	13,6	11,9	12,7	12,2	13,4	13,1	13,5
55	50,5	51,1	54,3	49,6	54,5	53,1	53,7	53,2	54,1	51,9	54,0	52,0	54,0	53,6	57,4	57,6	58,7
56	52,7	54,0	59,6	55,0	57,6	57,5	58,3	59,7	61,5	60,2	60,5	59,2	61,8	61,0	64,6	65,1	65,1

57	85,0	85,5	89,2	81,8	85,3	83,8	83,1	79,7	81,7	79,5	82,6	74,7	76,4	75,8	81,6	81,7	84,2
61	45,4	46,3	47,4	44,9	45,6	45,0	44,5	46,0	49,0	44,3	46,6	45,2	48,5	46,9	47,9	46,8	46,6
62	29,6	28,7	30,0	29,7	34,1	30,3	30,1	30,4	31,6	29,8	30,1	30,8	29,1	28,8	29,6	29,7	30,5
63	2,6	6,1	5,2	6,3	12,7	8,3	9,9	6,9	6,4	4,7	7,1	4,9	4,4	4,7	5,1	5,5	5,5
64	54,7	55,5	54,9	53,1	52,3	51,3	52,2	53,1	54,5	51,2	53,2	51,9	53,0	52,6	55,5	53,6	56,6
81	7,3	6,7	7,7	8,4	9,3	8,4	8,2	8,4	8,2	7,7	8,7	7,0	7,4	7,2	7,4	7,2	7,2
82	11,7	10,6	10,3	10,7	17,9	15,5	14,2	14,8	17,0	17,1	16,6	19,2	14,7	15,5	15,4	15,6	15,4
83	12,7	13,3	16,3	15,5	17,6	15,8	15,9	16,4	17,4	15,8	16,3	14,5	14,1	13,7	15,0	14,7	14,6
84	12,2	13,1	14,5	15,8	21,4	20,2	18,6	21,3	20,4	18,1	18,7	13,2	13,3	13,7	13,9	13,5	13,3
85	9,2	9,4	10,9	11,2	11,8	11,9	11,8	11,7	11,7	10,9	11,7	9,2	9,6	8,9	9,3	8,8	8,8
91	56,3	55,8	57,4	56,3	59,8	53,8	53,3	54,8	56,0	53,3	55,5	52,4	52,3	52,4	53,3	52,3	51,4
92	100,6	102,7	107,0	102,1	104,7	104,1	105,0	107,8	108,8	103,2	105,7	102,3	101,7	103,6	106,9	106,6	105,4
93	31,0	33,0	33,9	32,2	34,6	30,5	31,5	32,7	33,3	32,0	34,4	33,9	34,8	36,1	36,9	37,1	35,8
Statistical discrepancy*	0,0	0,0	0,0	0,0	-0,1	-0,3	-0,4	-0,6	-0,7	-0,7	-1,0	-0,6	-0,7	-1,1	-1,4	-1,6	-1,4
Brussels Capital-Region	1,4	1,0	1,3	1,0	0,8	0,6	1,3	1,3	1,3	1,3	0,8	0,5	0,4	0,3	0,4	0,5	0,5
Flemish Region	797,6	788,8	808,5	763,8	817,2	811,4	836,7	812,3	844,7	821,7	868,7	767,7	815,2	783,1	843,4	837,2	857,7
Walloon Region	838,9	851,7	889,4	857,8	912,8	874,2	880,6	887,1	909,2	864,8	898,8	851,6	859,5	862,8	899,9	895,9	902,4
Belgium	1.637,9	1.641,6	1.699,2	1.622,6	1.730,7	1.686,2	1.718,6	1.700,7	1.755,2	1.687,8	1.768,4	1.619,8	1.675,0	1.646,2	1.743,6	1.733,6	1.760,6

*The sum of the Belgian districts does not correspond to the total for Belgium due to different calculation methods and data sources.

Annexe 1.7 Total nitrogen input by biological nitrogen fixation per district and per region in Belgium from 1990 until 2006

Total nitrogen fixation (ton N)

District	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
11	111,2	113,8	112,6	117,6	128,0	127,6	128,2	135,3	144,0	146,7	139,0	159,2	147,8	140,9	148,0	174,9	191,0
12	65,2	63,2	60,1	62,0	65,0	64,4	66,4	65,9	67,8	69,0	70,8	72,0	73,6	78,1	72,6	73,5	77,6
13	199,9	196,9	202,0	209,6	224,2	231,9	234,2	236,2	245,1	250,3	251,8	301,1	279,8	279,1	289,9	346,5	364,0
23	180,3	181,6	170,0	172,8	171,7	173,2	170,4	170,7	168,8	170,0	170,6	177,9	179,4	177,0	181,3	199,4	206,7
24	255,4	259,4	230,6	222,8	240,9	208,1	233,5	228,9	238,4	238,7	239,0	241,7	246,4	245,7	254,9	271,0	290,2
31	255,1	271,9	232,4	245,2	246,5	225,7	222,0	231,4	241,6	237,5	225,9	247,1	220,8	231,1	211,2	232,3	245,7
32	201,7	215,4	182,6	183,6	180,9	166,5	172,1	178,9	187,2	191,8	192,2	195,0	193,0	192,3	185,6	195,3	199,7
33	269,7	290,9	247,1	249,0	256,7	243,0	247,7	258,5	258,8	292,5	284,9	337,9	328,8	355,2	347,1	346,6	365,7
34	144,5	161,3	136,6	140,1	150,3	136,5	140,2	155,9	176,7	205,3	191,0	213,3	201,6	204,6	200,3	213,3	218,6
35	170,8	172,1	142,1	139,4	136,7	120,6	121,8	119,5	130,8	139,9	124,3	114,8	99,9	107,9	98,8	110,6	114,4
36	129,8	124,9	113,5	112,3	115,2	101,5	102,5	107,1	107,6	116,9	106,5	116,0	110,6	120,8	113,7	117,3	113,8
37	149,8	164,4	136,9	141,4	140,3	135,2	131,0	138,2	153,3	139,9	137,4	147,8	143,8	148,2	147,7	158,6	147,7
38	151,3	172,2	151,2	159,2	159,1	139,2	159,4	168,5	160,4	159,8	146,9	152,6	141,2	140,9	137,2	142,7	143,7
41	80,7	81,2	79,8	81,8	86,3	85,9	84,9	84,1	87,8	88,8	88,7	96,2	99,8	102,5	100,7	115,2	116,3
42	56,4	59,5	56,3	57,8	60,4	61,4	62,9	61,9	62,9	63,3	64,9	66,4	66,6	69,2	69,0	74,4	77,7
43	136,0	143,2	124,2	117,5	117,1	114,2	120,0	119,5	131,7	133,1	124,0	136,6	121,4	122,7	128,6	142,6	131,0
44	188,7	193,0	191,3	199,1	203,4	208,5	206,7	209,6	212,9	210,0	205,6	226,3	227,3	226,6	236,5	248,9	259,2
45	115,2	117,3	122,7	124,6	129,8	126,5	140,3	136,3	156,1	174,3	174,4	195,8	197,3	209,6	214,6	220,4	234,4
46	105,6	102,3	101,9	103,8	102,4	106,4	112,2	113,5	112,7	116,7	115,1	119,7	122,4	127,3	120,6	119,3	126,5
71	160,6	191,7	155,8	147,1	157,6	138,8	164,4	147,8	155,1	164,6	172,2	165,9	163,2	161,9	166,5	160,6	176,0
72	150,6	155,0	148,4	157,9	161,8	160,0	169,5	172,3	191,9	194,7	188,6	204,9	215,3	210,7	212,7	239,1	250,0
73	153,1	160,7	147,6	152,0	152,0	140,8	151,2	157,3	161,7	169,3	163,6	173,5	172,8	177,1	172,6	195,1	208,1
25	418,5	495,4	459,3	484,3	464,8	443,4	447,7	463,7	466,7	488,1	455,4	423,9	425,6	441,1	432,7	439,8	456,4
51	141,6	153,4	156,2	149,6	148,2	159,5	162,4	163,5	169,0	188,3	194,5	249,0	224,0	249,6	251,8	254,8	267,5
52	147,9	152,1	155,2	167,5	167,0	146,2	142,9	135,3	139,5	135,8	134,0	137,2	129,9	134,0	125,6	136,5	134,2
53	244,3	278,8	281,2	311,6	324,2	285,1	272,4	275,9	268,2	283,4	256,9	270,7	267,9	267,8	259,9	254,0	254,1
54	42,8	43,4	41,3	44,4	42,3	38,2	38,0	41,3	38,4	41,0	39,1	43,7	44,4	53,0	54,1	54,1	55,5
55	186,9	195,6	204,8	213,0	213,0	203,4	201,2	200,2	206,1	212,8	198,5	216,5	198,7	220,8	223,6	217,0	229,9

56	377,0	390,1	368,2	410,5	425,3	348,8	327,0	359,4	342,5	319,0	271,5	279,2	271,0	277,6	286,2	288,0	282,4
57	231,6	254,1	252,5	246,4	229,6	240,0	234,9	243,4	252,2	273,2	269,6	320,6	336,6	379,2	373,4	378,3	384,5
61	298,9	285,8	291,7	268,0	264,9	251,3	238,8	264,6	265,0	258,4	254,5	250,2	253,3	273,3	271,5	268,7	255,0
62	165,0	183,3	156,7	164,5	163,0	148,1	147,5	155,6	158,1	155,8	154,5	159,8	154,3	163,2	161,8	155,0	164,3
63	284,0	277,3	270,4	267,0	263,0	260,5	256,5	255,8	256,1	256,6	257,1	260,5	260,3	261,3	260,9	261,4	266,3
64	251,4	277,4	264,9	237,9	245,2	233,2	210,3	232,9	247,6	248,2	244,0	252,6	251,8	256,7	261,6	256,2	275,7
81	53,0	51,3	51,9	49,3	50,2	45,7	47,8	52,2	51,4	48,7	50,1	47,0	50,3	51,2	54,0	49,7	55,5
82	177,6	171,9	175,7	172,0	176,7	175,4	178,4	187,2	180,6	181,6	182,5	191,2	197,4	196,4	186,7	191,4	207,5
83	165,8	133,1	136,3	127,0	125,2	125,2	125,2	127,2	126,2	119,6	124,5	166,1	158,9	159,3	159,6	165,6	158,4
84	206,5	200,0	201,2	201,3	199,5	194,3	191,2	189,9	201,8	190,7	190,6	201,1	205,1	200,3	195,9	196,5	214,4
85	102,0	108,3	99,7	109,2	103,8	101,0	103,3	101,1	104,7	103,9	105,7	110,5	115,1	124,1	124,7	126,0	124,5
91	429,9	469,4	422,0	454,5	391,8	351,0	341,5	354,9	345,8	322,1	332,9	373,0	357,0	376,2	361,1	376,0	380,6
92	501,3	524,7	520,1	537,8	498,5	460,8	452,4	490,9	492,1	477,4	436,5	438,8	465,0	471,0	484,6	459,4	439,6
93	232,7	254,8	256,2	266,1	253,4	211,0	206,9	215,7	189,0	178,5	157,7	180,4	178,1	203,6	188,6	197,5	183,2
Statistical discrepancy*	3,8	3,9	2,1	1,1	0,0	-0,3	-1,0	0,4	5,3	9,2	67,5	84,6	85,9	71,1	55,8	112,5	185,6
Brussels Capital-Region	6,4	5,8	8,8	5,6	3,9	2,1	2,9	3,6	3,8	3,9	2,9	3,9	1,9	1,0	1,0	1,9	3,1
Flemish Region	3.435,5	3.595,7	3.247,9	3.297,8	3.386,2	3.215,6	3.340,3	3.397,8	3.558,8	3.682,3	3.644,7	3.946,3	3.838,6	3.900,5	3.866,1	4.210,1	4.443,7
Walloon Region	4.658,8	4.900,2	4.765,7	4.881,9	4.749,6	4.422,0	4.326,4	4.510,7	4.501,0	4.483,1	4.310,1	4.572,1	4.544,9	4.759,9	4.718,0	4.725,8	4.789,5
Belgium	8.100,7	8.501,7	8.022,4	8.185,3	8.139,7	7.639,7	7.669,6	7.912,1	8.063,5	8.169,3	7.957,8	8.522,3	8.385,4	8.661,4	8.585,1	8.937,8	9.236,4

*The sum of the Belgian districts does not correspond to the total for Belgium due to different calculation methods and data sources.

Annexe 1.8 Total nitrogen input by atmospheric deposition per district and per region in Belgium from 1990 until 2006

Total atmospheric deposition (ton N)

District	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
11	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.077
12	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	410
13	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.917
23	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.214
24	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.236
31	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.472
32	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.210
33	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.955
34	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.049
35	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	654
36	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	863
37	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.543
38	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	859
41	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	649
42	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	456
43	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.048
44	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.887
45	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	971
46	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	843
71	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	623
72	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.043
73	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	865
25	1.619	n.a	n.a	n.a	n.a	n.a	1.703	n.a	n.a	n.a	1.514	n.a	n.a	n.a	1.311	n.a	n.a
51	682	n.a	n.a	n.a	n.a	n.a	736	n.a	n.a	n.a	651	n.a	n.a	n.a	583	n.a	n.a
52	976	n.a	n.a	n.a	n.a	n.a	957	n.a	n.a	n.a	761	n.a	n.a	n.a	730	n.a	n.a
53	643	n.a	n.a	n.a	n.a	n.a	690	n.a	n.a	n.a	630	n.a	n.a	n.a	798	n.a	n.a
54	165	n.a	n.a	n.a	n.a	n.a	181	n.a	n.a	n.a	159	n.a	n.a	n.a	108	n.a	n.a
55	745	n.a	n.a	n.a	n.a	n.a	767	n.a	n.a	n.a	701	n.a	n.a	n.a	711	n.a	n.a

56	1.314	n.a	n.a	n.a	n.a	n.a	1.268	n.a	n.a	n.a	1.196	n.a	n.a	n.a	1.150	n.a	n.a
57	936	n.a	n.a	n.a	n.a	n.a	1.009	n.a	n.a	n.a	924	n.a	n.a	n.a	708	n.a	n.a
61	852	n.a	n.a	n.a	n.a	n.a	872	n.a	n.a	n.a	890	n.a	n.a	n.a	862	n.a	n.a
62	961	n.a	n.a	n.a	n.a	n.a	919	n.a	n.a	n.a	891	n.a	n.a	n.a	866	n.a	n.a
63	1.770	n.a	n.a	n.a	n.a	n.a	1.501	n.a	n.a	n.a	1.578	n.a	n.a	n.a	1.504	n.a	n.a
64	729	n.a	n.a	n.a	n.a	n.a	751	n.a	n.a	n.a	736	n.a	n.a	n.a	710	n.a	n.a
81	266	n.a	n.a	n.a	n.a	n.a	218	n.a	n.a	n.a	288	n.a	n.a	n.a	258	n.a	n.a
82	1.048	n.a	n.a	n.a	n.a	n.a	920	n.a	n.a	n.a	1.073	n.a	n.a	n.a	1.006	n.a	n.a
83	664	n.a	n.a	n.a	n.a	n.a	569	n.a	n.a	n.a	634	n.a	n.a	n.a	628	n.a	n.a
84	989	n.a	n.a	n.a	n.a	n.a	848	n.a	n.a	n.a	1.030	n.a	n.a	n.a	962	n.a	n.a
85	564	n.a	n.a	n.a	n.a	n.a	487	n.a	n.a	n.a	642	n.a	n.a	n.a	571	n.a	n.a
91	1.527	n.a	n.a	n.a	n.a	n.a	1.330	n.a	n.a	n.a	1.421	n.a	n.a	n.a	1.298	n.a	n.a
92	1.765	n.a	n.a	n.a	n.a	n.a	1.687	n.a	n.a	n.a	1.531	n.a	n.a	n.a	1.317	n.a	n.a
93	854	n.a	n.a	n.a	n.a	n.a	799	n.a	n.a	n.a	795	n.a	n.a	n.a	804	n.a	n.a
Brussels Capital-Region	43	35	45	37	28	26	37	42	43	45	26	20	13	12	12	16	16
Flemish Region	33.278	32.231	31.196	30.987	29.562	30.249	30.766	34.815	35.180	37.040	32.291	32.303	31.860	28.271	27.975	26.278	24.868
Walloon Region	20.182	15.532	18.860	18.898	18.978	18.965	18.962	17.887	16.814	18.613	19.225	21.219	18.082	16.925	17.929	18.555	18.586
Belgium	53.503	47.799	50.101	49.922	48.568	49.240	49.764	52.745	52.037	55.698	51.541	53.542	49.955	45.208	45.917	44.850	43.471

*The sum of the Flemish and Walloon districts does not correspond to the total for Flanders and the Walloon Region due to different calculation methods and data sources.

Annexe 1.9 Total use of other organic fertilizers in Belgium from 1990 until 2006

Total use of other organic fertilizers (ton N)

District	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
11	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	15	20	32	10	12	16	16
12	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	84	90	95	93	104	76	76
13	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	40	37	58	66	70	54	54
23	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	173	192	186	187	202	183	179
24	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	225	262	285	354	372	393	388
31	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	20	29	19	27	33	28	28
32	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	23	29	33	6	8	6	6
33	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	49	66	88	21	27	26	26
34	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	27	21	26	9	10	16	16
35	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	19	27	34	26	28	26	24
36	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	9	20	25	28	31	27	27
37	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	48	32	37	26	29	22	22
38	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	41	44	53	14	6	9	9
41	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	32	44	54	32	27	31	31
42	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	35	37	32	19	28	33	33
43	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	12	11	9	11	13	12	12
44	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	29	39	30	25	23	32	32
45	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	79	59	77	45	39	39	39
46	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	6	19	12	8	14	9	9
71	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	63	78	105	144	191	186	184
72	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	46	55	104	115	97	67	65
73	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	80	77	126	174	181	183	181
25	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
51	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
52	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
53	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
54	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
55	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

56	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
57	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
61	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
62	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
63	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
64	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
81	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
82	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
83	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
84	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
85	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
91	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
92	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
93	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Brussels Capital-Region	3	2	3	2	2	2	3	5	3	3	2	1	1	1	1	1	1
Flemish Region	2.213	2.213	2.241	2.248	2.505	2.711	3.094	4.040	3.002	2.602	2.361	2.432	2.286	2.607	2.578	2.508	2.100
Walloon Region	2.160	2.160	2.160	2.160	2.160	2.183	2.241	2.328	2.266	2.216	2.269	2.267	2.324	2.380	2.375	2.334	2.322
Belgium	4.375	4.375	4.404	4.410	4.667	4.895	5.338	6.373	5.271	4.821	4.632	4.700	4.612	4.988	4.954	4.844	4.423

*The sum of the Flemish districts does not correspond to the total for Flanders Region due to different calculation methods and data sources.

Annexe 1.10 Net nitrogen input after import, export and processing in Belgium from 1990 until 2006

Net N input after import, export and processing (ton N)

District	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
11	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-837	-1.100	-933	-1.044	-1.028	-716	-857
12	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.002	1.176	1.367	1.170	1.100	1.085	1.051
13	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-2.860	-4.159	-3.752	-3.843	-4.054	-3.789	-3.671
23	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	2.169	2.602	3.130	3.262	2.931	3.042	2.771
24	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	2.405	2.932	3.462	3.107	2.905	3.009	2.761
31	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	104	-590	-355	-735	-860	-1.120	-1.025
32	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-1.227	-1.447	-1.524	-1.760	-1.891	-1.839	-1.930
33	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-931	-1.485	-1.541	-1.850	-2.234	-2.449	-2.553
34	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	106	-70	75	-270	-334	-287	-296
35	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	561	385	342	313	245	232	171
36	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-2.051	-2.585	-2.590	-2.266	-2.428	-2.467	-2.410
37	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-5.062	-6.736	-6.558	-6.671	-6.200	-6.389	-6.385
38	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	554	338	517	454	361	292	267
41	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.232	1.426	1.697	1.700	1.587	1.574	1.498
42	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	313	446	515	532	556	546	460
43	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-748	-1.081	-965	-982	-978	-1.089	-968
44	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-1.178	-1.898	-1.733	-1.760	-1.875	-1.823	-1.829
45	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.094	1.352	1.385	1.128	1.131	1.076	1.041
46	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-570	-601	-657	-519	-651	-604	-597
71	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	878	1.003	979	1.174	1.083	1.164	1.059
72	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-310	-678	-637	-706	-1.204	-987	-1.096
73	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	407	821	871	1.322	712	668	634
25	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
51	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
52	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
53	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
54	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
55	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

56	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
57	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
61	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
62	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
63	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
64	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
81	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
82	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
83	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
84	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
85	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
91	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
92	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
93	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Brussels Capital-Region	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Flemish Region	-722	-811	-909	-1.018	-1.137	-1.682	-935	-1.737	-1.224	-1.965	-2.501	-7.960	-4.334	-6.673	-10.700	-10.300	-10.254
Walloon Region	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Belgium	-722	-811	-909	-1.018	-1.137	-1.682	-935	-1.737	-1.224	-1.965	-2.501	-7.960	-4.334	-6.673	-10.700	-10.300	-10.254

* The numbers in green include the use of other organic fertilizers.
* For the calculation of the Belgian values, the net N input after import, export and processing is estimated 0 for the Walloon Region and Brussels Capital-Region.
* The sum of the Flemish districts does not correspond to the total for Flanders Region due to different calculation methods and data sources.

Annexe 1.11 Ammonia emission per district and per region in Belgium from 1990 until 2006

Ammonia emission (ton N)

District	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
11	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	2.513	2.424	2.366	2.268	1.974	1.908	1.882
12	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	594	582	555	538	476	462	439
13	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	5.577	5.250	5.177	4.915	4.252	4.094	4.023
23	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.226	1.184	1.167	1.120	1.009	988	890
24	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.456	1.395	1.340	1.270	1.106	1.118	1.057
31	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	3.425	3.224	3.121	3.028	2.643	2.586	2.565
32	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	3.011	2.865	2.860	2.728	2.341	2.330	2.403
33	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	4.041	3.795	3.648	3.557	3.062	3.027	3.033
34	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.440	1.376	1.330	1.252	1.107	1.063	1.072
35	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.427	1.347	1.328	1.281	1.116	1.089	1.078
36	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	2.434	2.180	2.154	2.059	1.716	1.726	1.781
37	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	4.193	3.950	3.760	3.637	3.104	3.028	3.184
38	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.514	1.445	1.407	1.371	1.256	1.176	1.200
41	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	808	788	771	699	619	599	560
42	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	960	902	869	846	747	723	694
43	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	2.246	2.155	2.090	2.061	1.798	1.719	1.747
44	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	4.002	3.793	3.679	3.449	2.935	2.846	2.879
45	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.189	1.132	1.062	1.007	886	878	781
46	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	2.244	2.126	2.036	2.000	1.693	1.653	1.569
71	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	863	845	811	770	667	629	534
72	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	2.516	2.383	2.301	2.046	1.935	1.863	1.763
73	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.337	1.311	1.240	1.166	984	961	738
25	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
51	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
52	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
53	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
54	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
55	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

56	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
57	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
61	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
62	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
63	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
64	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
81	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
82	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
83	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
84	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
85	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
91	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
92	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
93	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Brussels Capital-Region	16	13	15	14	16	14	15	13	12	13	8	8	7	6	6	6	7
Flemish Region	76.314	68.822	69.365	70.995	70.726	72.505	71.768	71.381	71.881	71.830	48.738	46.255	44.759	42.689	37.091	36.157	35.554
Walloon Region	21.780	21.356	20.934	20.594	20.702	20.778	21.104	20.995	20.956	21.276	20.879	21.278	20.793	20.285	20.130	20.010	20.041
Belgium	98.110	90.192	90.313	91.603	91.444	93.297	92.887	92.389	92.850	93.119	69.626	67.542	65.560	62.980	57.227	56.173	55.602

*The sum of the Flemish districts does not correspond to the total for Flanders Region due to different calculation methods and data sources.

Annexe 1.12 Soil nitrogen surplus in Flanders from 1990 until 2006

N-balance (ton N)	Livestock N production	Import, export and processing	Inorganic fertilizer use	Other fertilizer use	Atmospheric N deposition	Biological N fixation	Seed inputs	Total input	Crop removal	Ammonia emission	Soil surplus
1990	181.633	-722	110.060	2.213	33.278	3.435	798	**330.695**	105.249	76.314	**149.131**
1991	180.843	-811	108.409	2.213	32.231	3.596	789	**327.271**	105.631	68.822	**152.817**
1992	181.494	-909	103.929	2.241	31.196	3.512	808	**322.271**	117.537	69.365	**135.369**
1993	186.639	-1.018	94.321	2.248	30.987	3.531	764	**317.471**	123.261	70.995	**123.215**
1994	187.330	-1.137	93.579	2.505	29.562	3.604	817	**316.260**	123.822	70.726	**121.712**
1995	191.263	-1.682	102.728	2.711	30.249	3.548	811	**329.628**	136.022	72.505	**121.101**
1996	191.507	-935	87.193	3.094	30.766	3.573	837	**316.035**	128.869	71.768	**115.398**
1997	189.765	-1.737	84.095	4.040	34.815	3.567	812	**315.357**	139.037	71.381	**104.939**
1998	190.064	-1.224	85.935	3.002	35.180	3.635	845	**317.438**	138.349	71.881	**107.207**
1999	190.341	-1.965	79.104	2.602	37.040	3.752	822	**311.696**	144.831	71.830	**95.034**
2000	180.735	-2.501	75.710	2.361	32.291	3.677	869	**293.142**	145.240	48.738	**99.163**
2001	172.817	-7.960	67.782	2.432	32.303	4.017	768	**272.159**	144.440	46.255	**81.463**
2002	167.801	-4.334	68.151	2.286	31.860	3.879	815	**270.459**	148.697	44.759	**77.003**
2003	160.186	-6.673	67.220	2.607	28.271	3.927	783	**254.155**	146.734	42.689	**64.732**
2004	157.359	-10.700	66.896	2.578	27.975	3.954	843	**248.905**	148.625	37.091	**63.189**
2005	154.847	-10.300	63.825	2.508	26.278	4.290	837	**242.286**	145.712	36.157	**60.417**
2006	154.769	-10.254	63.084	2.100	24.868	4.472	858	**239.897**	141.092	35.554	**63.251**

Annexe 1.13 Soil nitrogen surplus in the Walloon Region from 1990 until 2006

N-balance (ton N)	Livestock N production	Import, export and processing	Inorganic fertilizer use	Other fertilizer use	Atmospheric N deposition	Biological N fixation	Seed inputs	Total input	Crop removal	Ammonia emission	Soil surplus
1990	101.685	n.a.	99.876	2.160	20.182	4.659	839	**229.400**	124.933	21.780	**82.688**
1991	101.364	n.a.	97.638	2.160	15.532	4.900	852	**222.445**	120.725	21.356	**80.364**
1992	99.690	n.a.	94.034	2.160	18.860	4.766	889	**220.399**	150.096	20.934	**49.370**
1993	99.527	n.a.	91.503	2.160	18.898	4.882	858	**217.829**	136.557	20.594	**60.678**
1994	99.732	n.a.	95.511	2.160	18.978	4.750	913	**222.043**	135.658	20.702	**65.683**
1995	100.339	n.a.	95.085	2.183	18.965	4.422	874	**221.867**	153.314	20.778	**47.775**
1996	99.146	n.a.	92.916	2.241	18.962	4.326	881	**218.471**	139.245	21.104	**58.122**
1997	98.705	n.a.	93.951	2.328	17.887	4.511	887	**218.269**	117.407	20.995	**79.867**
1998	98.308	n.a.	90.511	2.266	16.814	4.501	909	**213.309**	114.602	20.956	**77.751**
1999	99.395	n.a.	91.124	2.216	18.613	4.483	865	**216.697**	115.249	21.276	**80.171**
2000	98.638	n.a.	87.076	2.269	19.225	4.310	899	**212.417**	120.346	20.879	**71.191**
2001	102.111	n.a.	82.194	2.267	21.219	4.572	852	**213.214**	115.989	21.278	**75.946**
2002	98.278	n.a.	87.564	2.324	18.082	4.545	860	**211.652**	122.219	20.793	**68.640**
2003	94.712	n.a.	79.517	2.380	16.925	4.760	863	**199.157**	111.307	20.285	**67.565**
2004	94.432	n.a.	82.243	2.375	17.929	4.718	900	**202.597**	119.316	20.130	**63.151**
2005	93.680	n.a.	75.764	2.334	18.555	4.726	896	**195.955**	132.429	20.010	**43.517**
2006	92.549	n.a.	76.302	2.322	18.586	4.790	902	**195.452**	111.255	20.041	**64.156**

* For the calculation of the soil N surplus, the net N input after import, export and processing is estimated 0.

Annexe 1.14 Soil nitrogen surplus in Belgium from 1990 until 2006

N-balance (ton N)	Livestock N production	Import, export and processing	Inorganic fertilizer use	Other fertilizer use	Atmospheric N deposition	Biological N fixation	Seed inputs	Total input	Crop removal	Ammonia emission	Soil surplus
1990	283.352	-722	210.069	4.375	53.503	8.101	1.638	**560.316**	233.176	98.110	**229.030**
1991	282.238	-811	206.156	4.375	47.799	8.502	1.642	**549.901**	229.137	90.192	**230.572**
1992	281.217	-909	198.100	4.404	50.101	8.022	1.699	**542.634**	270.327	90.313	**181.994**
1993	286.200	-1.018	185.928	4.410	49.922	8.185	1.623	**535.251**	262.528	91.603	**181.119**
1994	287.103	-1.137	189.170	4.667	48.568	8.140	1.731	**538.241**	262.047	91.444	**184.750**
1995	291.637	-1.682	197.895	4.895	49.240	7.640	1.686	**551.312**	292.075	93.297	**165.939**
1996	290.690	-935	180.205	5.338	49.764	7.670	1.719	**534.450**	270.688	92.887	**170.875**
1997	288.502	-1.737	178.140	6.373	52.745	7.912	1.701	**533.634**	259.188	92.389	**182.057**
1998	288.402	-1.224	176.542	5.271	52.037	8.064	1.755	**530.848**	255.783	92.850	**182.214**
1999	289.767	-1.965	170.318	4.821	55.698	8.169	1.688	**528.496**	261.995	93.119	**173.382**
2000	279.401	-2.501	162.842	4.632	51.541	7.958	1.768	**505.642**	268.147	69.626	**167.869**
2001	274.957	-7.960	150.014	4.700	53.542	8.522	1.620	**485.395**	262.071	67.542	**155.782**
2002	266.106	-4.334	155.741	4.612	49.955	8.385	1.675	**482.139**	273.154	65.560	**143.425**
2003	254.921	-6.673	146.763	4.988	45.208	8.661	1.646	**455.514**	260.272	62.980	**132.262**
2004	251.814	-10.700	149.165	4.954	45.917	8.585	1.744	**451.479**	270.175	57.227	**124.076**
2005	248.553	-10.300	139.625	4.844	44.850	8.938	1.734	**438.244**	280.361	56.173	**101.709**
2006	247.349	-10.254	139.424	4.423	43.471	9.236	1.761	**435.410**	254.607	55.602	**125.201**

Informatie

Federale Overheidsdienst Economie, KMO, Middenstand en Energie

De Algemene Directie Statistiek en Economische Informatie maakt deel uit van de Federale Overheidsdienst Economie, KMO, Middenstand en Energie. We hebben de opdracht om aan de informatiebehoeften van zowel overheid, bedrijfswereld als burgers te voldoen, en dit door hen allerlei actuele cijfers over de toestand van het land aan te bieden.

Waar vindt u de statistische en economische informatie ?

Op onze websites http://statbel.fgov.be (statistieken) en http://economie.fgov.be (economie)

In vijf grote steden van het land heeft het publiek toegang tot :

- ◊ Jaarboeken, gespecialiseerde publicaties en een selectie van diskettes en cd-rom's.
- ◊ Een leeszaal, waar men onze publicaties maar ook statistische publicaties van andere FOD en Belgische en internationale instellingen kan raadplegen.

Al onze bibliotheken zijn op werkdagen open van 8u30 tot 16u30 (Brussel) en van 9 tot 12 en van 13 tot 16 uur (andere).

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Trein (B) : Noord station
Metro (M) : lijn 2, station Rogier
Trams : 3, 52, 55, 56, 81, 90
halte Rogier of Noord
Bus STIB : 38, 58, 61
halte Rogier of Noord
Bus De Lijn : 318, 351, 358, 410, 526, 554
halte Noord

Antwerpen

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Trein (B) : Centraal Station
Metro (M) : halte Opera
Tram-Bus : vlakbij (Fr. Rooseveltplaats)

Charleroi

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Trein (B) : Charleroi Sud, 20 min van het station (Place Buisset, Rue du Collège, Place Charles II, Boulevard Tirou, Rue de la Montagne)

Bus : halte Tirou
Autoweg : kleine ring van Charleroi - uitrit Gare du Sud

Gent

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Trein (B): Gent St.-Pieters
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Trein (B): station Guillemins of Palais
Tram-Bus : (Guillemins) 1 en 4 halte Sauvenière
Parking (P): Neujean (op 20 m - zelfde straatkant)
Mercure (tegenover)

economie
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