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Delegations will find attached document SWD(2026) 232 final - Part 18/27.

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PART 18/27

COMMISSION STAFF WORKING DOCUMENT

Member State country fiche on the implementation of Council Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources based on Member States reports for the period 2020–2023

European Commission

Luxembourg

Country staff working document
on the implementation of the Nitrates Directive

Period: 2020-2023

Contents

1. KEY FINDINGS AND RECOMMENDATIONS

Luxembourg submitted its report under the Nitrates Directive for the period 2020-2023 in July 2024 ([1]) via electronic reporting on Reportnet 3 portal ([2]).

This country staff working document is presented in line with the reporting guidelines and it is based on the data reported by the Member State ([3]), Eurostat and other EU official data sources. The Luxembourgish authorities were consulted for factual correctness. There may be differences with the information presented in their national report.([4])

The numbers presented below are indicators of the situation in the Member State but need further interpretation to draw specific conclusions. In some cases, changes in the monitoring networks and in methodology for assessing trophic status may complicate comparisons between reporting periods.

1.1. Key findings

Pressures from agriculture

In Luxembourg, the utilised agricultural area (UAA) accounts for 51% of the country's total land area, which is higher than the EU average (38%). The livestock density is 1.2 livestock units per hectare (LSU/ha) of UAA, which is higher than the EU average of 0.7 LSU/ha. Luxembourg did not report the gross nutrient and phosphorous balance to Eurostat for the period 2020-2023.

Monitoring network

For groundwater, the density of the monitoring network is around 7 stations per 1 000 km^2, which is like the EU average (7 stations). Compared to the previous reporting period, the density decreased by 15%.

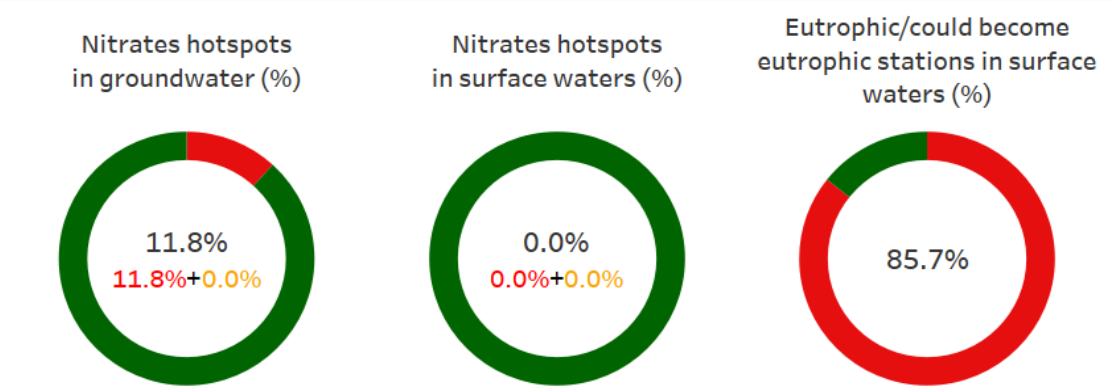
For surface freshwater, the density of the monitoring network is around 5 stations per 1 000 km^2, which is lower than the EU average (7 stations). Compared to the previous reporting period, the density decreased by 13%. The monitoring network includes river stations, but no stations in lakes/reservoirs.

Luxembourg is a landlocked country and therefore no saline surface waters are being monitored.

([1]) Final version was received in November 2024.
([2]) Reportnet 3 is an e-Reporting platform for reporting environmental and climate data to the European Environment Agency (EEA).
([3]) Only monitoring points electronically reported with nitrate concentration or trophic status, which were not removed from the monitoring network were considered for this assessment.
([4]) A uniform data-processing approach is applied to all Member States. In some instances, this may not fully correspond to the specific methodology used in the Member State.

Water quality

Figure 1 – Share of monitoring points showing pollution in groundwater and surface waters ([5])



Note: The percentage share of **nitrate hotspots** refers to monitoring points with average annual nitrate concentrations ≥ 50 mg/l (red), or between 37.5 and 49.99 mg/l with an increasing trend (orange). This is calculated relative to the total number of points with measurements. The percentage share of monitoring points classified as **eutrophic or could become eutrophic** (red) is calculated relative to the total number of points with trophic status reported.

In **groundwater**, 88.2% of monitoring points show nitrate concentrations below 50 mg/l.

Overall, 11.8% of monitoring points fall in two categories illustrated in Figure 1, i.e., they show nitrate concentrations ≥ 50 mg/l (11.8%), or between 37.5 and 49.99 mg/l with an increasing trend (0%). Compared to the data reported in the previous period, this represents a decrease of 13.2 percentage points (from 25.0% to 11.8%).

Compared to the previous reporting period, nitrate concentrations decreased in 35.2% of groundwater monitoring points and increased in 23.5%. Among points with nitrate concentration ≥ 50 mg/l, nitrate concentrations decreased in both monitoring points.

In **surface water**, 100% of monitoring points show nitrate concentration below 50 mg/l and 14.3% are classified as non-eutrophic.

No monitoring points showed nitrate concentrations ≥ 50 mg/l, or between 37.5 and 49.99 mg/l with an increasing trend as illustrated in Figure 1. 93 % of surface water monitoring stations show nitrate concentrations ≥ 10 mg/l.

Compared to the previous reporting period, nitrate concentrations decreased in 35.7% of surface water monitoring points and increased in 14.3%.

The share of monitoring points reported as eutrophic/could become eutrophic is 85.7% as illustrated in Figure 1. This represents a decrease of 14.3 percentage points compared to the data reported in the previous period (from 100% to 85.7%).

Nitrate Vulnerable Zones

([5]) Luxembourg authorities informed the Commission of errors in reporting of data on eutrophication in some monitoring points. However, these changes could not anymore be taken into account in this report

In line with Article 3 paragraph 5, Luxembourg applies an action programme with mandatory measures throughout the entire national territory.

Action Programme

During the reporting period, Luxembourg did not modify its action programme applied to the whole territory. However, in 2021, a new regulation with some stricter measures was established for the protection zones around Lake Haute-Sûre.

1.2. Recommendations

- Review and where necessary reinforce measures to improve water quality, notably with a view to addressing:
    - high or increasing nitrate concentrations in surface waters
    - eutrophication of surface water bodies
- Improve representativeness and coverage of monitoring networks and reported data by extending the monitoring network in lakes
- Close existing data gaps on nutrient balances in the reporting to Eurostat
- When preparing the Nitrates Action Programme:
    - take into account objectives and deadlines of the Water Framework Directive, ensuring coherence with the 4th RBMP
    - consider introducing limitations on phosphorus fertilisation, if not yet implemented
    - ensure the cooperation between competent authorities in different sectors, such as agriculture and water, and with stakeholders
    - consider where measures could be simplified without compromising on results, working with the Commission and the other member States in the light of the findings of the evaluation of the Nitrates Directive
- Promote the dissemination of best practice, scientific knowledge and innovation to:
    - improve the analysis of expected future evolution in water quality and develop gap assessments for the nutrient load reductions required to reach water quality objectives
    - accelerate preparedness and resilience of action programmes and measures in the context of climate change

2. PRESSURES FROM AGRICULTURE

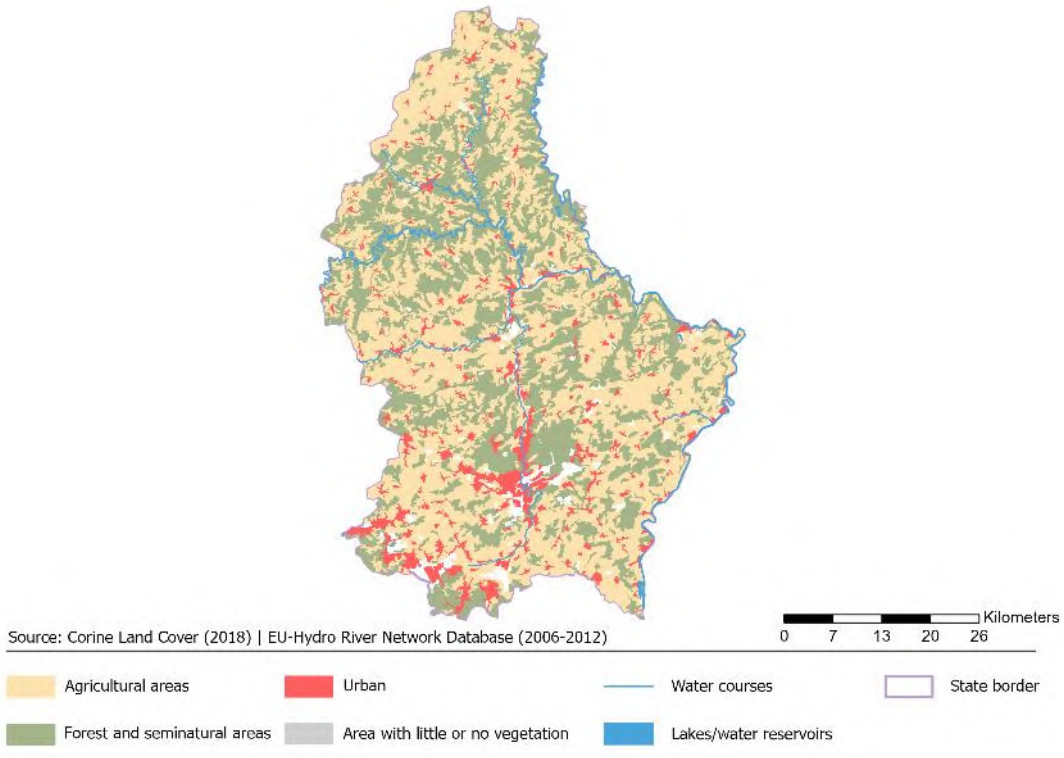
In Luxembourg, animal production accounted for the largest portion of the agricultural sector's output value with 55.0% in the reporting period 2020-2023. Crop production followed with 37.8%, and other outputs made up 7.3% ([6]). Additionally, the share of agricultural land used for organic farming increased from 4.1% in the reporting period 2016-2019 to 5.7% in the reporting period 2020-2023. ([7])

The risk of diffuse pollution of waters by nutrients from agriculture is primarily dependent on the agricultural pressures in the Member State, expressed in terms of utilised agricultural area (UAA), livestock density, the use of mineral and manure fertilisers, as well as the nitrogen and phosphorus balance. This section describes the evolution of these indicators.

2.1. Land use

The map below presents the distribution of land use in Luxembourg along with watercourses and lakes/water reservoirs.

Figure 2 – Land use distribution in Luxembourg



([6]) Source: Eurostat (aact_eaa01)
([7]) Source: Eurostat (ef_m_org)

The utilised agricultural area (UAA) in Luxembourg ([8]) covered 133 thousand hectares in 2023, making up 51.4% of the country's total land area. Permanent grassland accounts for 52.4% of UAA, followed by arable land at 46.4% and permanent crops at 1.2%.

Table 1 – Evolution of the utilised agricultural area

	2010	2013	2016	2020	2023
utilised agricultural area (1000 ha)	131.1	131.0	130.7	132.1	133.0
arable land (1000 ha)	62.0	62.6	62.0	62.3	61.7
permanent grassland (1000 ha)	67.6	66.9	67.1	68.3	69.8
permanent crops (1000 ha)	1.5	1.5	1.5	1.6	1.6
kitchen gardens (1000 ha)	0.0	0.0	0.0	0.0	0.0

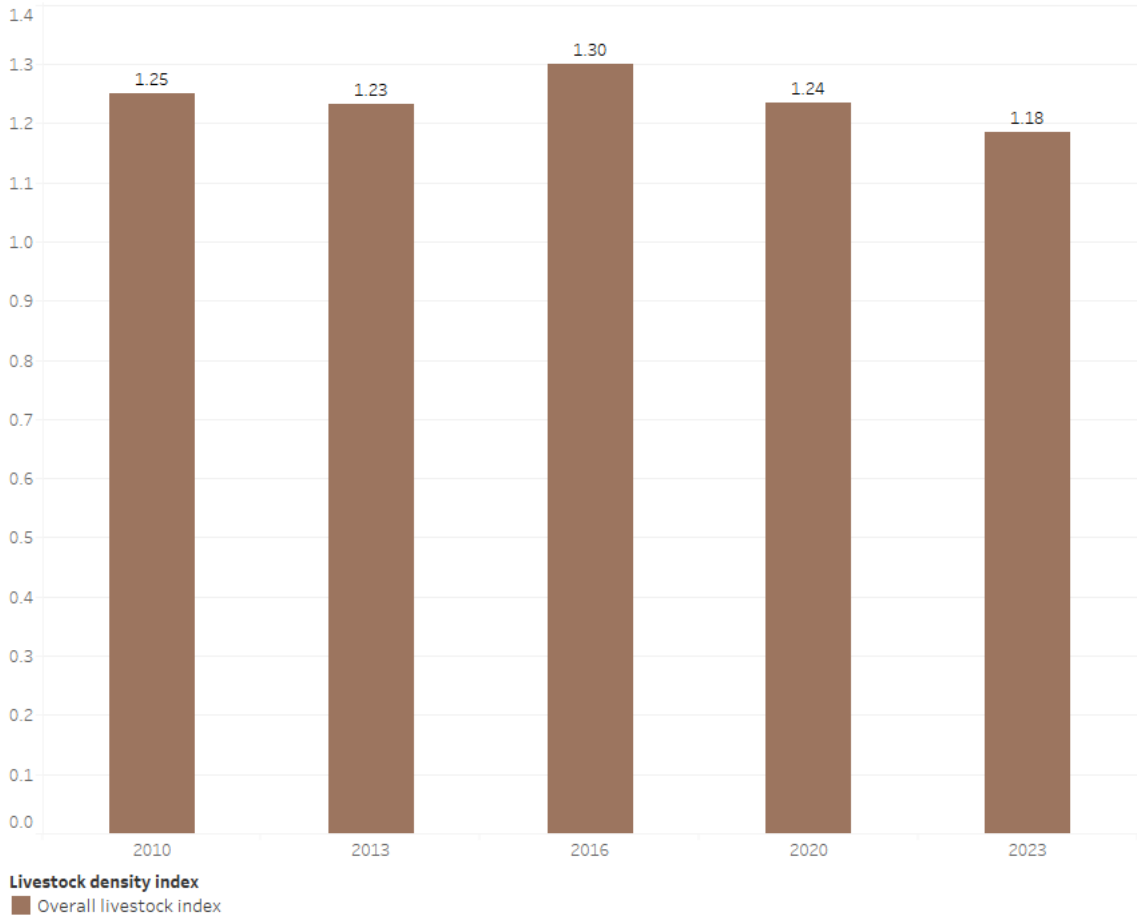
Source: Eurostat (ef_lus_main)

([8]) Including agricultural land abroad. For the period 2020-2023 7.6% of the UAA was situated in the neighbouring countries.

2.2. Livestock density

In Luxembourg, the livestock density was 1.18 livestock units per hectare (LSU/ha) of UAA in 2023. It peaked in 2016 and has since declined.

Figure 3 – Evolution of livestock density (LSU/ha UAA)



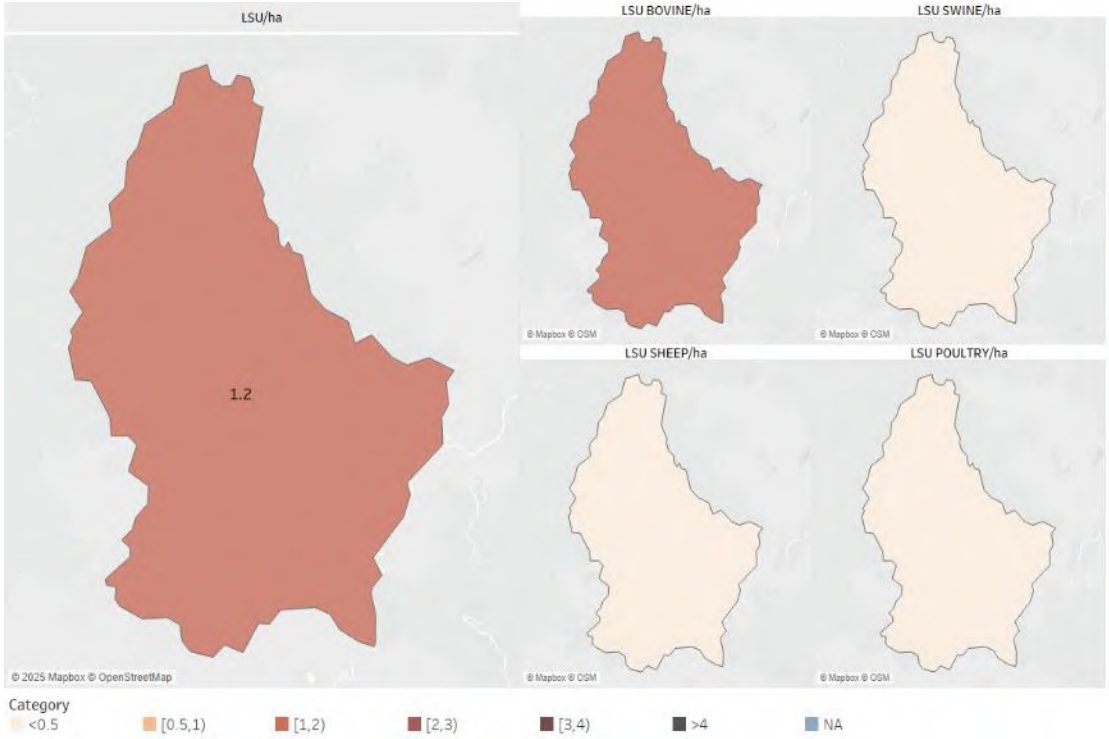
Source: Eurostat (ef_fsi_lskds)

Table 2 – Evolution of the livestock numbers by animal type

	2007	2010	2013	2016	2020	2023
live bovines (Million heads)	0.19	0.19	0.20	0.20	0.19	0.18
of which dairy cows (Million heads)	0.04	0.05	0.05	0.05	0.05	0.06
live pigs (Million heads)	0.09	0.09	0.09	0.10	0.08	0.07
live poultry (Million heads)	NA	0.09	0.11	0.12	0.14	NA
live sheep (Million heads)	NA	0.01	0.01	0.01	0.01	NA
live goats (Million heads)	0.00	0.00	NA	NA	NA	NA

Source: Eurostat, for live poultry and live sheep data complemented with FAOSTAT

Figure 4 – Livestock density distribution by animal type (LSU/ha UAA) at NUTS2 level in 2020 ([9])



Source: Eurostat (Livestock units: ef_lsk_main; Utilised agricultural area: ef_lus_main)

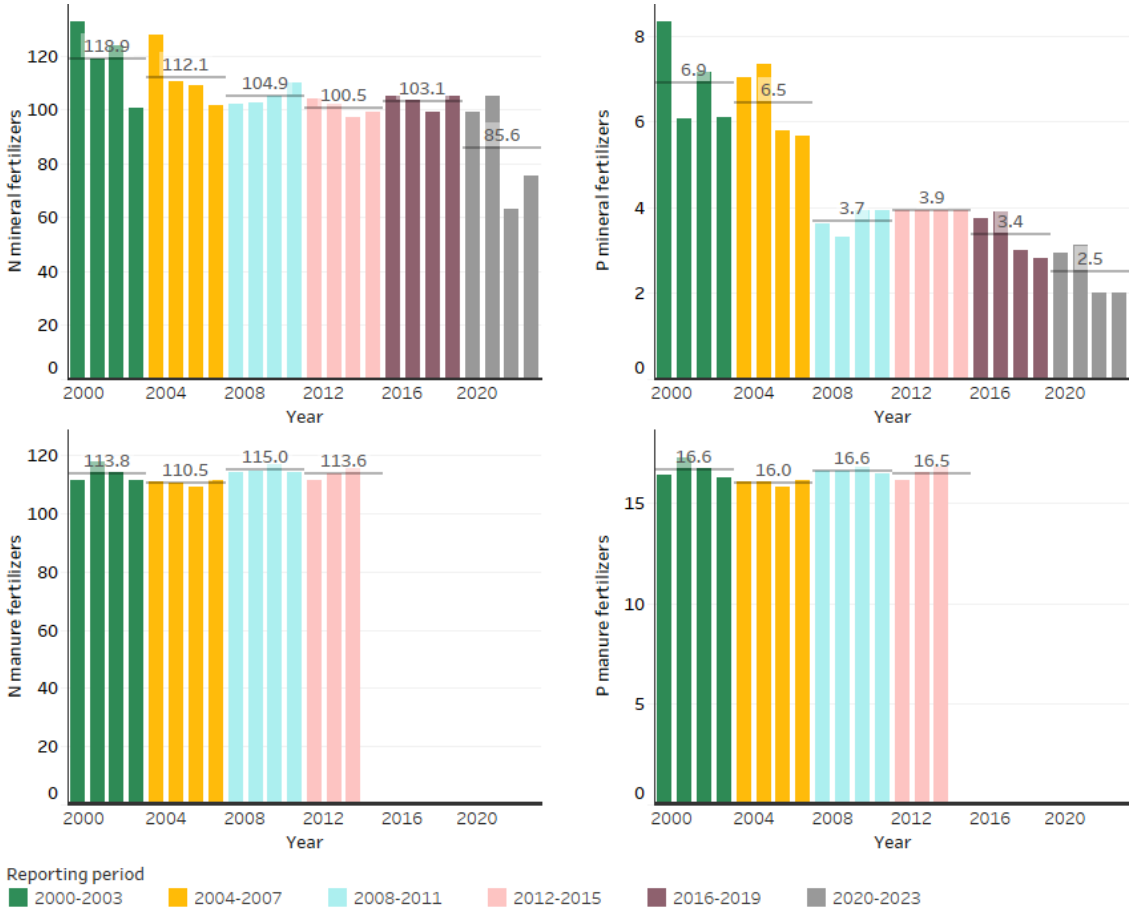
([9]) Latest available data.

2.3. Nitrogen and phosphorus fertiliser use

In Luxembourg, the **use of nitrogen (N) fertilisers** was 85.6 kg/ha UAA for N mineral fertilisers in 2020-2023 and 113.6 kg/ha UAA for N manure fertilisers in 2012-2014 ([10]). No data on use of manure fertilisers are available at Eurostat since 2015 ([11]).

The **use of phosphorus (P) fertilisers** was 2.5 kg/ha UAA for mineral fertilisers in 2020-2023 and 16.5 kg/ha UAA for manure fertilisers in 2012-2014 ([12]). No data on use of manure fertilisers are available at Eurostat since 2015 ([13]).

Figure 5 – Evolution of nitrogen and phosphorus fertiliser use (kg/ha UAA)



Source: Eurostat (aei_pr_gnb)

([10]) According to the most recent values estimated by Eurostat.
([11]) Additional data were included in the national report.
([12]) According to the most recent values estimated by Eurostat.
([13]) Additional data were included in the national report.

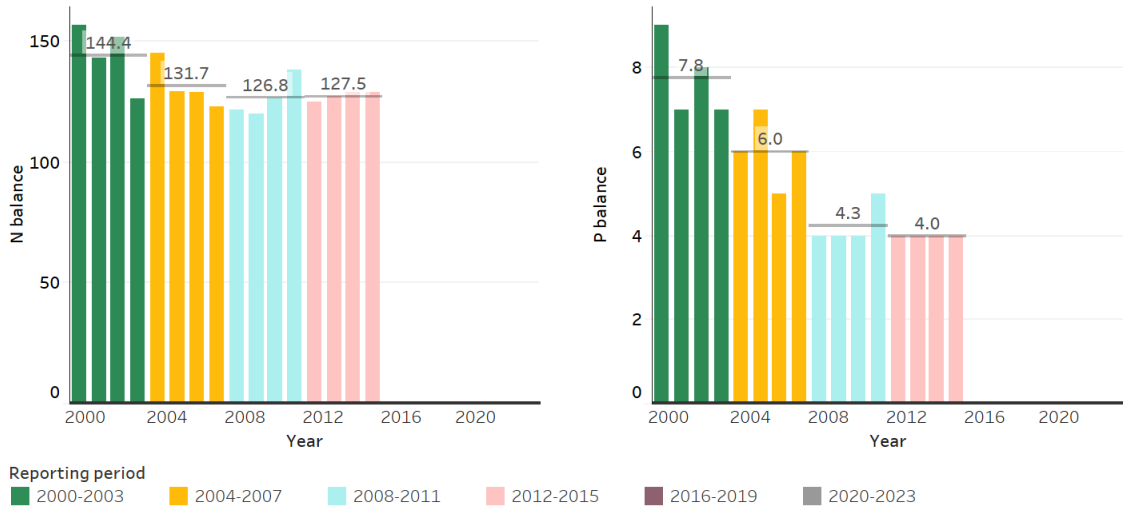
2.4. Nitrogen and phosphorus balance

The nutrient balance ([14]) per hectare of agricultural land (kg/ha UAA) is an indicator of the success that farmers have had in implementing balanced fertilisation and of the resulting nutrient pressures from agriculture. A high surplus (positive balance) indicates a risk of emissions into water and air.

In Luxembourg, the **gross nitrogen (N) balance** was 127.5 kg/ha UAA in 2012-2015 ([15]). No data are available at Eurostat since since 2016 ([16]).

The gross **phosphorus (P) balance** was 4.0 kg/ha UAA in 2012-2015 ([17]). No data are available at Eurostat since 2016 ([18]).

Figure 6 – Evolution of gross nitrogen and phosphorus balance (kg/ha UAA)



Source: Eurostat (aei_pr_gnb)

2.5. Nitrogen discharge to the environment

Luxembourg provided information that the nitrogen losses from agriculture to environment were 2.3 kilotonnes during the reporting period 2016-2019 and 2.5 kilotonnes during the reporting period 2020-2023. The agricultural sector's contribution to the country's total nitrogen loss increased from 71.7% to 75.8%.

([14]) Gross nutrient balance (aei_pr_gnb)
([15]) Estimated values by Eurostat.
([16]) Additional data were included in the national report.
([17]) Estimated values by Eurostat.
([18]) Additional data were included in the national report.

3. NITRATE VULNERABLE ZONES

Article 20(3) of the amended Water Act of 19 December 2008 designates the entire national territory as a vulnerable zone, in particular in the context of the protection of the North Sea against eutrophication.

In line with Article 3 paragraph 5, Luxembourg applies an action programme with mandatory measures throughout the entire national territory (whole country approach) since 1994 and is thus exempted from designating NVZ.

4. NITRATES IN GROUNDWATER

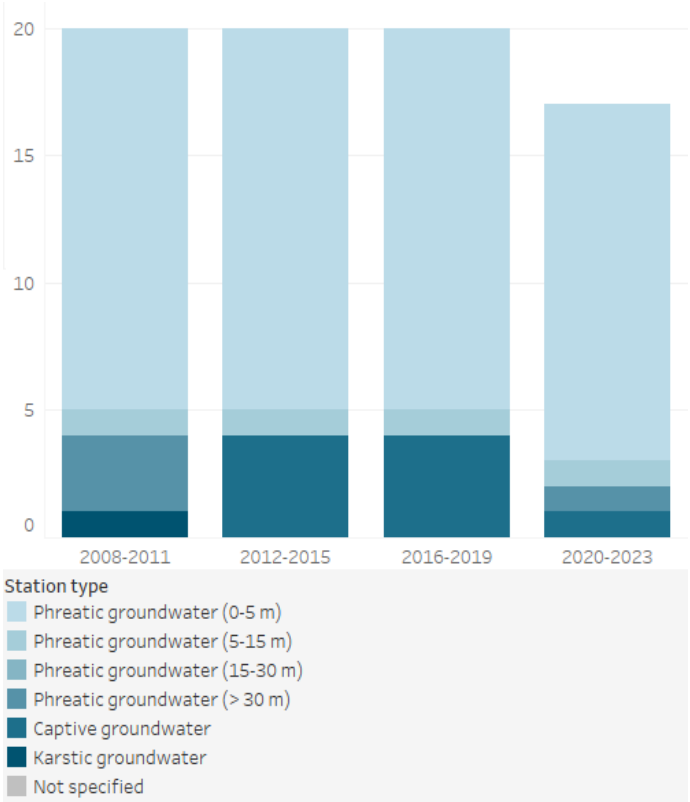
4.1. Monitoring of nitrate concentrations in groundwater

Groundwater monitoring in Luxembourg is managed by the national Water Management Administration (Administration de la gestion de l'eau). Initially, the nitrates monitoring network was designed on the basis of the stations available in 2005. Apart from this official monitoring network, the so called "future monitoring network" was established in 2016 that is more representative of the status of groundwater bodies and the impact of agricultural activities. However, data from this latter network weren't electronically reported and therefore they are not included in this document.

During the reporting period 2020-2023 nitrate concentrations were reported at 17 groundwater monitoring points. The station density was 6.6 stations per 1 000 km^2.

The overall number of monitoring points decreased by 3 (15.0%) compared to the previous reporting period. The graph below presents the changes in the monitoring network over the last four reporting periods.

Figure 7 – Evolution of groundwater monitoring network (monitoring points with measurements of nitrates)



For the reporting period 2020-2023, changes in nitrate concentrations compared to the previous monitoring period (trends) were assessed for all reported 17 monitoring points. The table below presents the number of monitoring points with measurements and trends in the last four reporting periods.

Table 3 – Number of groundwater monitoring points with measurements of nitrates and trends by station type ([19]) ([20])

	Stations with measurements				Stations with trends			
Station type	2008-2011	2012-2015	2016-2019	2020-2023	2008-2011	2012-2015	2016-2019	2020-2023
Phreatic groundwater (0-5 m)	15	15	15	14	15	15	15	14
Phreatic groundwater (5-15 m)	1	1	1	1	1	1	1	1
Phreatic groundwater (15-30 m)								
Phreatic groundwater (> 30 m)	3			1	2			1
Captive groundwater		4	4	1		4	4	1
Karstic groundwater	1				1			
Not specified								
Total	20	20	20	17	19	20	20	17

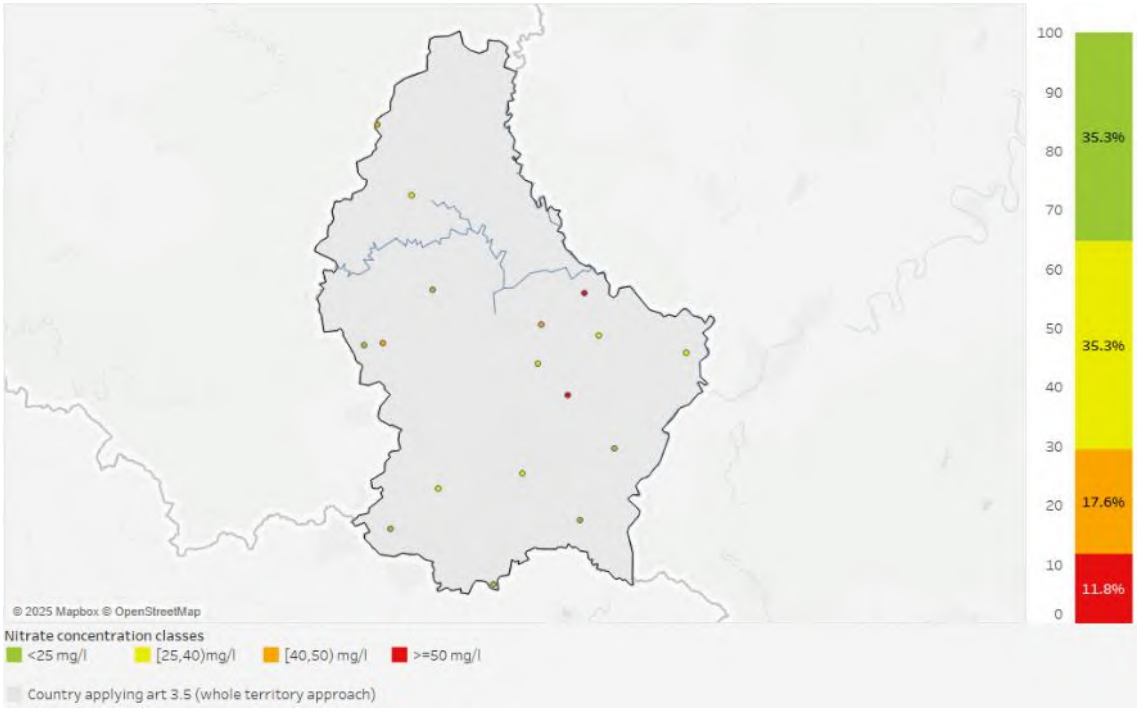
([19]) The new phreatic groundwater station (>30m) station that appears in the 2020-2023 cycle was previosly classified as karstic in preceding reporting cycles.

([20]) Luxembourg reported that monitoring was discontinued in 5 monitoring points relative to the previous reporting period. Discontinuation may be due to nitrate concentrations below 25 mg/l, change in station code or type, or other specific reasons.

4.2. Nitrate concentrations in groundwater

In Luxembourg, 11.8% of groundwater monitoring points showed average nitrate concentrations equal to or above the drinking water threshold of 50 mg/l, whereas 17.6% had concentrations between 40-49.99 mg/l, 35.3% showed concentrations between 25-39.99 mg/l and 35.3% below 25 mg/l. The figure below shows a spatial distribution of the average annual mean nitrate concentrations and the shares in corresponding nitrate concentration classes.

Figure 8 – Map of average annual mean nitrate concentrations in groundwater and share of monitoring points by nitrate concentration class in the reporting period 2020-2023



Note: In the map, monitoring points with higher values are plotted on top.

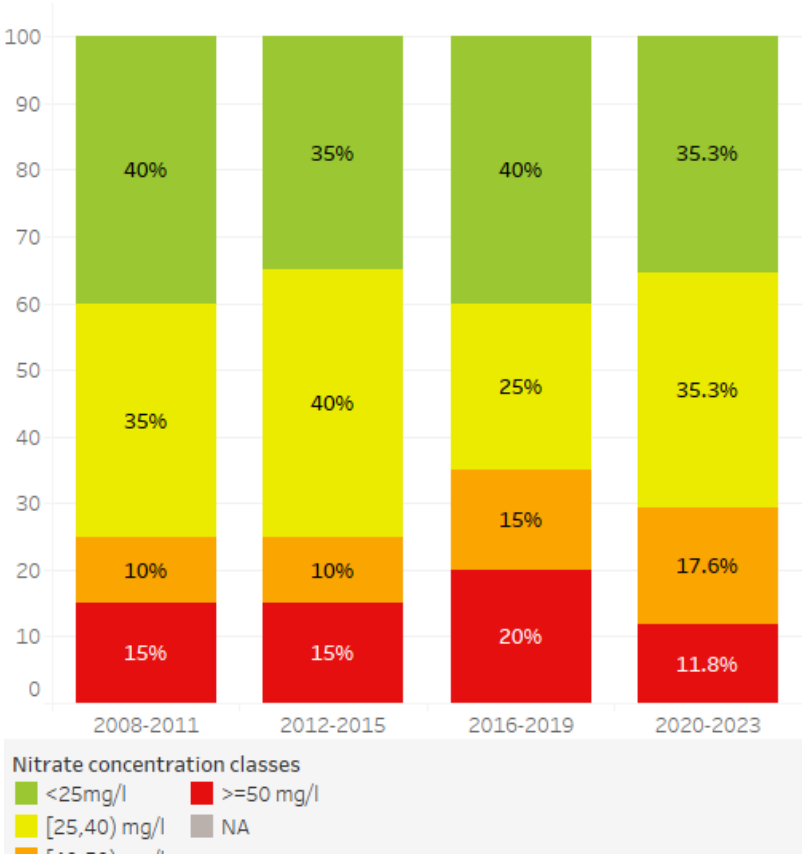
The station type category with the highest share of points with nitrate concentrations equal to or above the threshold 50 mg/l was phreatic groundwaters at depth 0-5m with a share of 14.3%, as shown in the table below.

Table 4 – Share of groundwater monitoring points by nitrate concentration class (mg/l) in the reporting period 2020-2023, categorised by station type

	Number of stations	% of Total	<25	[25,40)	[40,50)	>=50
Phreatic groundwater (0-5 m)	14	82.4%	35.7%	28.6%	21.4%	14.3%
Phreatic groundwater (5-15 m)	1	5.9%		100.0%		
Phreatic groundwater (15-30 m)						
Phreatic groundwater (> 30 m)	1	5.9%		100.0%		
Captive groundwater	1	5.9%	100.0%			
Karstic groundwater						
Not specified						
Total	17	100.0%	35.3%	35.3%	17.6%	11.8%

Compared to the previous reporting period, the share of monitoring points with nitrate concentrations ≥ 50 mg/l decreased from 20% to 11.8%. The share of monitoring points <25 mg/l decreased from 40% to 35.3% while the share of monitoring points in 25-39.99 mg/l increased by more than 10% from 25% to 35.3%. The category 40-49.99mg/l also saw an increase from 15% to 17.6%. These changes might be explained due to the reduction of 3 monitoring points compared to the previous monitoring period. The graph below presents the share of monitoring points per classes of nitrate concentrations in the last four reporting periods.

Figure 9 – Share of monitoring points in groundwater by class of nitrate concentration ([21]) in the current and previous reporting periods

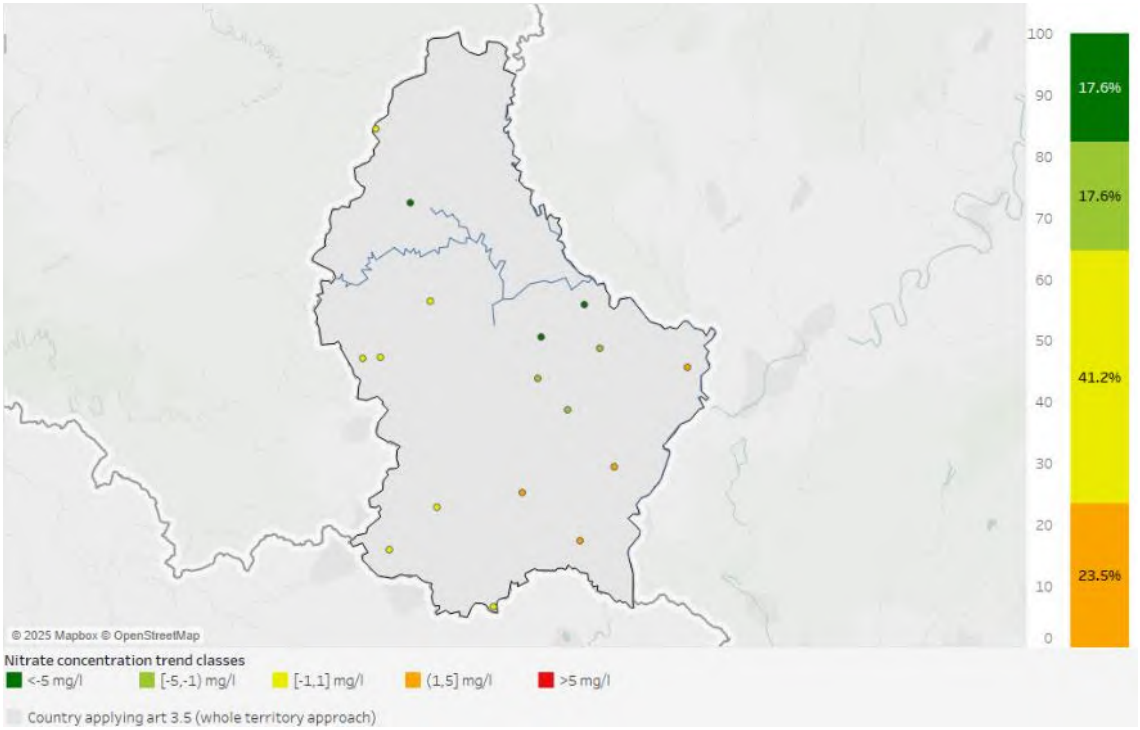


([21]) Average of annual mean values over the reporting period.

4.3. Trends in nitrate concentrations in groundwater

Compared to the last reporting period, there has been a decrease of nitrate concentrations in 35.2% of monitoring points and an increase in 23.5%. For the remaining 41.2% there was no significant change. The increase or decrease can be categorised as weak if it is between 1 and 5 mg/l, and as strong if its above 5 mg/l.

Figure 10 – Map of trends in average annual mean nitrate concentrations ([22]) in groundwater between the periods 2016-2019 and 2020-2023 and share of monitoring points by trend class



Note: In the map, monitoring points with higher values are plotted on top.

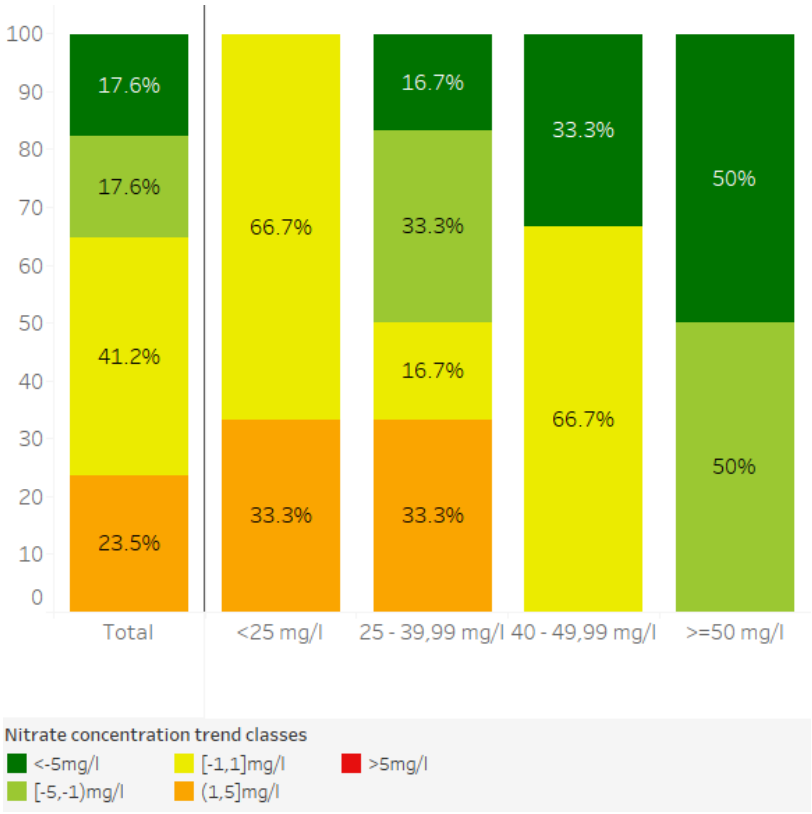
Table 5 – Share of groundwater monitoring points by trend class (mg/l) between the periods 2016-2019 and 2020-2023, categorised by station type monitoring points by trend class (mg/l) between the periods 2016-2019 and 2020-2023, categorised by station type

	Total Number of Stations	% Total Number of Stations	<-5	[-5,-1)	[-1,1]	(1,5]	>5
Phreatic groundwater (0-5 m)	14	82.4%	21.4%	14.3%	50%	14.3%	
Phreatic groundwater (5-15 m)	1	5.9%		100%			
Phreatic groundwater (15-30 m)							
Phreatic groundwater (>30 m)	1	5.9%				100%	
Captive groundwater	1	5.9%				100%	
Karstic groundwater							
Not specified							
Total	17	100.0%	17.6%	17.6%	41.2%	23.5%	

([22]) The average of annual mean values of nitrate concentrations over the reporting period 2020-2023 compared to the average for the reporting period 2016-2019.

When looking at the trend for waters that are polluted in the current reporting period (above 50 mg/l), there has been a decrease of nitrate concentration for all monitoring points between the previous and the current reporting periods. The graph below shows the increase (in red and orange) and decreases (in green) per nitrate concentration class.

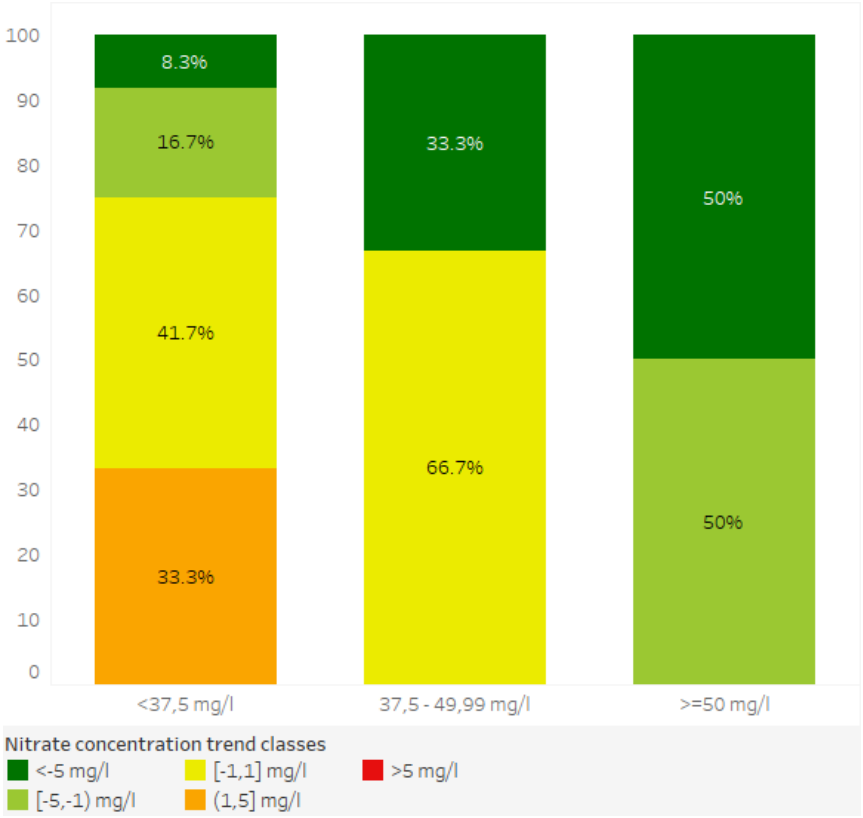
Figure 11 – Share of groundwater monitoring points by classes of trend between the periods 2016-2019 and 2020-2023, across different nitrate concentration classes (<24.99 mg/l, 25-39.99 mg/l, 40-49.99 mg/l and ≥50mg/l) ([23])



([23]) Nitrate concentration classes as per the Nitrates Directive report.

To better align the water quality assessment with the thresholds defined under the Groundwater Directive, trends were also calculated for the water quality class with nitrate concentrations between 37.5-49.99 mg/l. When looking at the trend in this concentration category, there has been a decrease for 33.3% of monitoring points and stable trend in 66.7% of monitoring points.

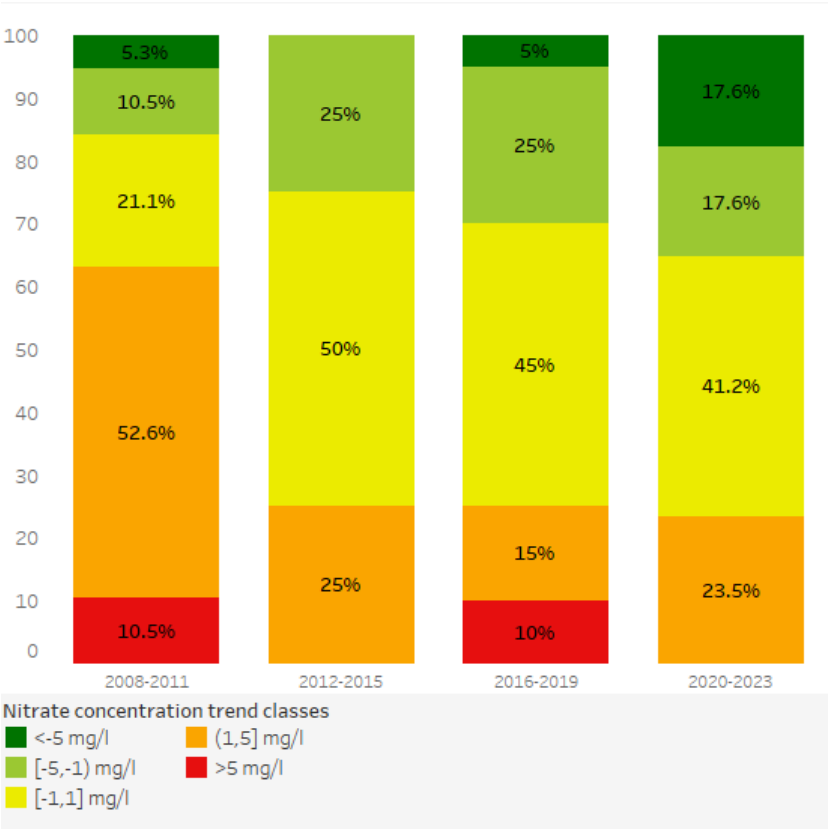
Figure 12 – Share of groundwater monitoring points by classes of trend between the periods 2016-2019 and 2020-2023, in different nitrate concentration classes (<37.5 mg/l, 37.5-49.99 mg/l and ≥50mg/l) ([24])



([24]) Nitrate concentration classes as in the Water Framework Directive guidance on GW status and trend assessment as division of nitrates quality standard (50mg/l and 75 % of this value [37.5 mg/l]).

Compared to the previous reporting period, there is a higher share of monitoring points with decreasing nitrate concentrations (35.2% in the current reporting period compared to 30% in the previous reporting period) and a lower share of monitoring points with increasing nitrate concentrations (23.5% compared to 25%). The graph below shows the share of monitoring points with increases (in red and orange), decreases (in green) and without significant change (in yellow) in nitrate concentrations between reporting periods.

Figure 13 – Share of groundwater monitoring points by class of nitrate concentration trend ([25]) in the current and previous reporting periods

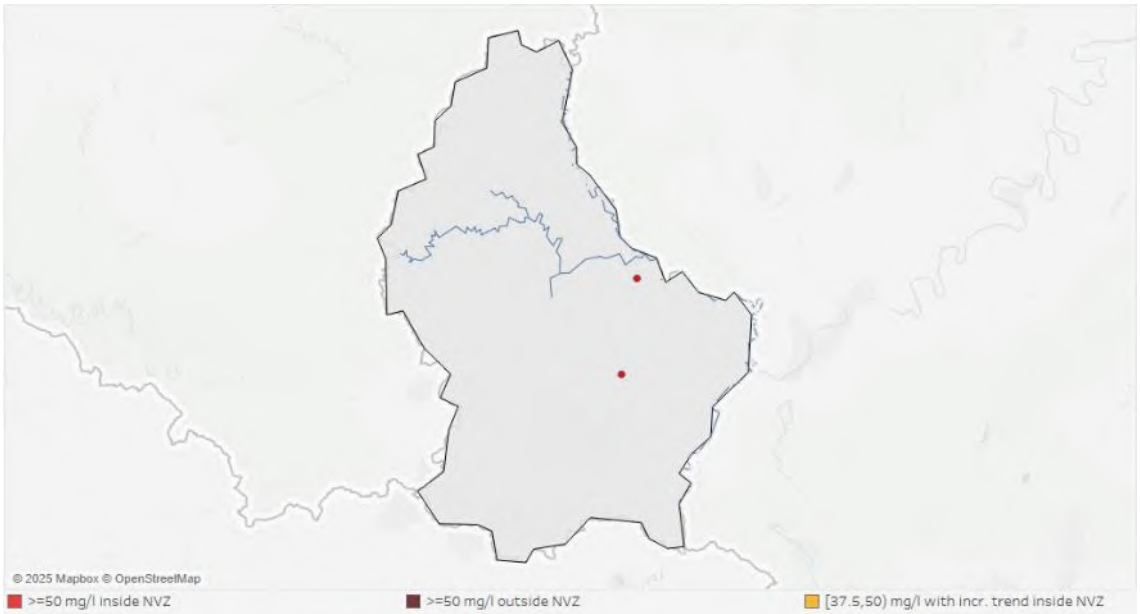


([25]) Change in average nitrate concentrations to the previous reporting period.

4.4. Nitrate pollution hotspots in groundwater

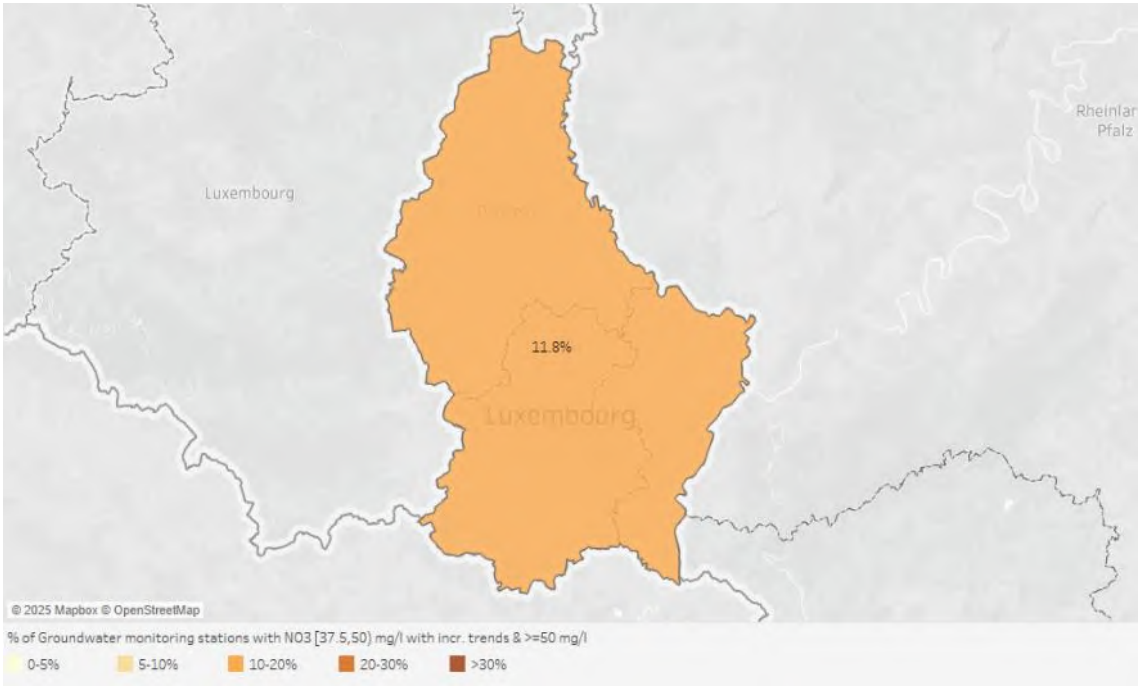
A nitrate pollution hotspot in groundwater is defined here as a monitoring point where the average annual nitrate concentration is either ≥ 50 mg/l or between 37.5 and 49.99 mg/l with an increasing trend. In Luxembourg there are 2 groundwater nitrate pollution hotspots.

Figure 14 – Groundwater nitrate pollution hotspots



		inside NVZ	outside NVZ	Total
Groundwater	[37.5,50) with incr. trend			
	>=50	2		2
Not Specified	[37.5,50) with incr. trend			
	>=50			
Total		2		2

Figure 15 – Share of groundwater nitrate pollution hotspots at NUTS2 level



5. NITRATES IN SURFACE WATERS

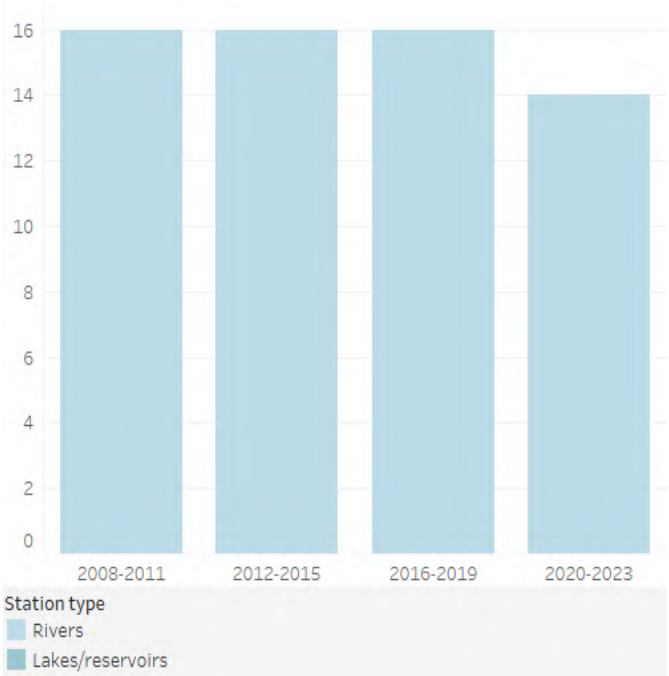
5.1. Monitoring of nitrate concentrations in surface waters

Surface waters are monitored by the Water Management Administration (Administration de la gestion de l'eau). These monitoring campaigns are carried out, on the one hand, as part of programmes to monitor the evolution of nitrate concentrations in the context of the Nitrates Directive and, on the other hand, under the Water Framework Directive.

During the reporting period 2020-2023 nitrate concentrations were reported at 14 surface water monitoring points. All of them were in rivers. The freshwater monitoring points density was 5.4 stations per 1 000 km^2. Luxembourg is a landlocked country and therefore no saline surface waters are being monitored.

The overall number of monitoring points decreased by 2 (12.5%) compared to the previous reporting period. Since the previous reporting period included only river monitoring points, these two stations were also river monitoring points. The graph below presents the changes in the monitoring network over the last four reporting periods.

Figure 16 – Evolution of surface water monitoring network (monitoring points with measurements of nitrates)



In this reporting period, changes in nitrate concentrations compared to the previous monitoring period (trends) were assessed for 14 monitoring points, accounting for 100% of all points with measurements. The share of monitoring points with trends remained at 100% compared to the previous reporting period. The table below presents the number of monitoring points and the number of monitoring points with trends in the last four reporting periods.

Table 6 – Number of surface water monitoring points with measurements of nitrates and trends per type ([26])

	Stations with measurements				Stations with trends			
Station type	2008-2011	2012-2015	2016-2019	2020-2023	2008-2011	2012-2015	2016-2019	2020-2023
Rivers	16	16	16	14	16	16	16	14
Lakes/reservoirs								
Total	16	16	16	14	16	16	16	14

([26]) Luxembourg reported that monitoring was discontinued in 2 monitoring points relative to the previous reporting period. Discontinuation may be due to nitrate concentrations below 25 mg/l, change in station code or type, or other specific reasons.

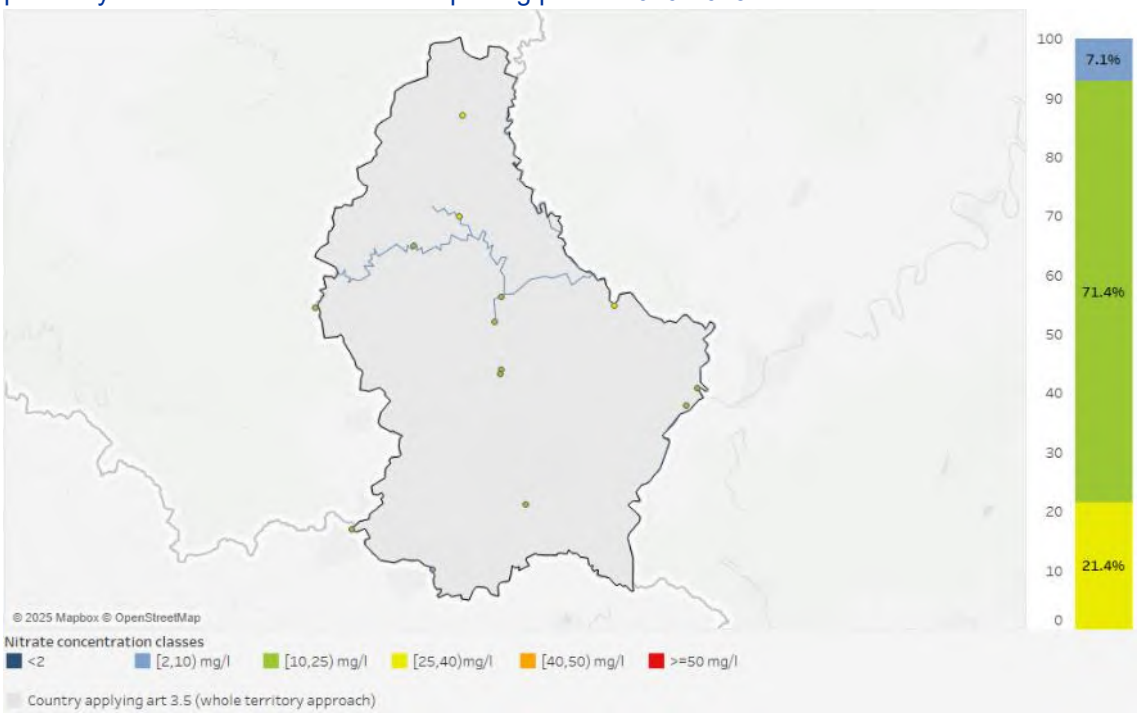
5.2. Nitrate concentrations in surface waters

Rivers

In Luxembourg, no monitoring points in rivers showed average nitrate concentrations equal to or above the drinking water threshold of 50 mg/l and concentrations between 40-49.99 mg/l, 21.4% showed concentrations between 25-39.99 mg/, 71.4% in the class 10-24.99 mg/l, 7.1% in the class 2-9.99 mg/l and none below 2 mg/l.

It is relevant to look at the distribution in nitrate concentration classes below 25 mg/l for surface water as there can be a risk of eutrophication in lower concentration classes.

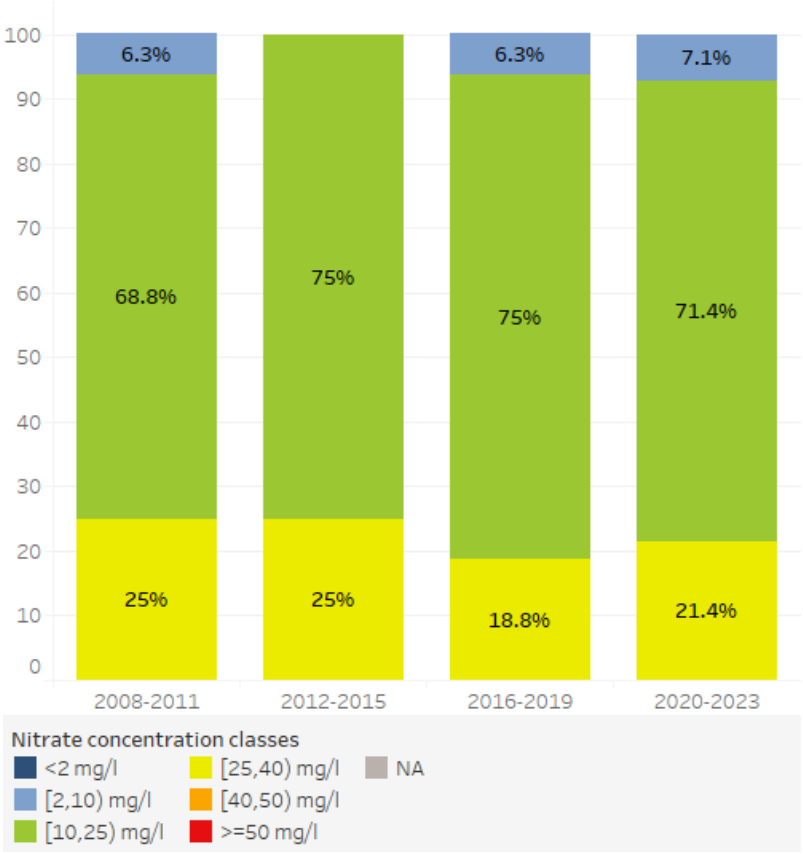
Figure 17 – Map of average annual mean nitrate concentrations in rivers and share of monitoring points by concentration class in the reporting period 2020-2023



Note: In the map, monitoring points with higher values are plotted on top.

Compared to the previous reporting period, the share of monitoring points in rivers with concentrations ≥ 50 mg/l remained at 0%. The graph below presents the shares of monitoring points per classes of nitrate concentration in the last four reporting periods. Over the last four reporting periods, there was a decrease in the share of monitoring points with nitrate concentrations 25-39.99 mg/l, falling from 25.0% to 21.4%.

Figure 18 – Share of monitoring points in rivers by class of nitrate concentration ([27]) in the current and previous reporting periods



Lakes/water reservoirs

No monitoring data is reported for in lakes/water reservoirs.

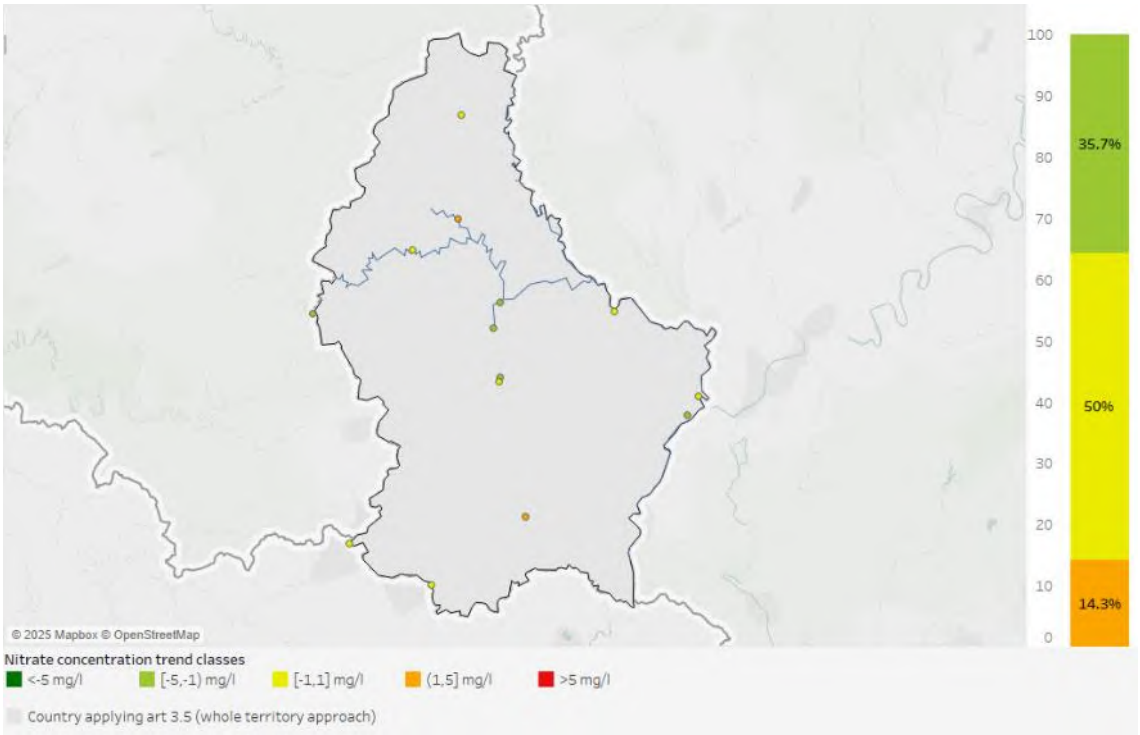
([27]) Average of annual mean values over the reporting period.

5.3. Trends in nitrate concentrations in surface waters

Rivers

Compared to the last reporting period, there has been a decrease of nitrate concentrations in 35.7% of monitoring points and an increase in 14.3%. For the remaining 50% there was no significant change. The increase or decrease can be categorised as weak if it is between 1 and 5 mg/l, and as strong if its above 5 mg/l.

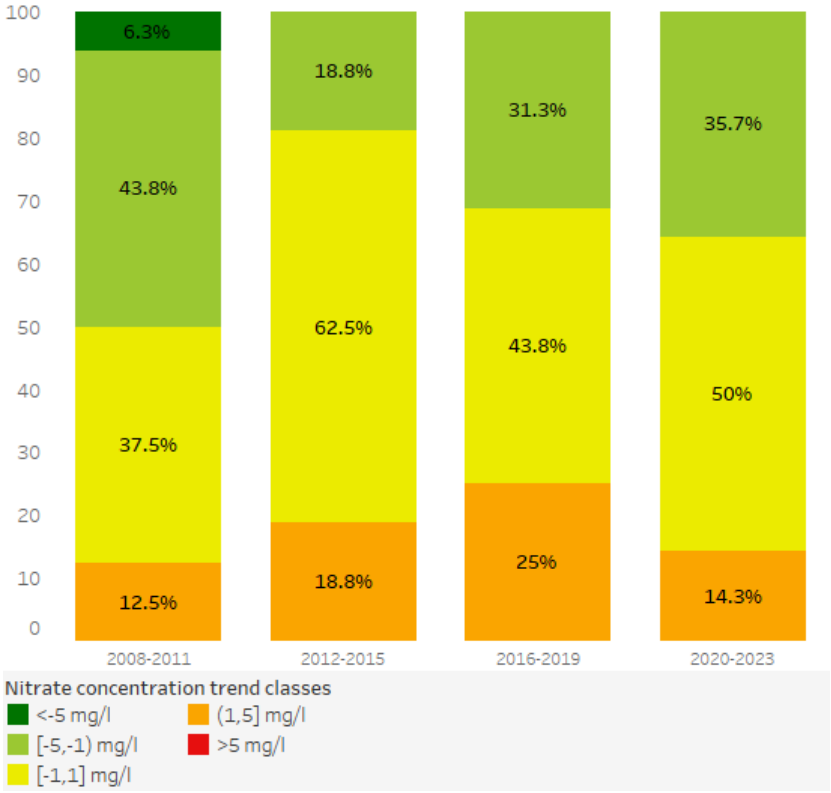
Figure 19 – Map of trends in average annual mean nitrate concentrations in rivers between the periods 2016-2019 and 2020-2023 and share of monitoring points by trend class



Note: In the map, monitoring points with higher values are plotted on top.

Compared to the previous reporting period, there is a higher share of monitoring points with decreasing nitrate concentrations (35.7% in the current reporting period compared to 31.3% in the previous reporting period compared) and a lower share of monitoring points with increasing nitrate concentrations (14.3% compared to 25.0%). The graph below shows the share of monitoring points with increases (in red and orange), decreases (in green) and without significant change (in yellow) in nitrate concentrations between reporting periods.

Figure 20 – Share of monitoring points in rivers by class of nitrate concentration trend ([28]) in the current and previous reporting periods



([28]) Change in average nitrate concentrations to the previous reporting period.

5.4. Nitrate pollution hotspots in surface waters

A nitrate pollution hotspot is defined here as a monitoring point where the average annual nitrate concentration is either ≥ 50 mg/l or between 37.5 and 49.99 mg/l with an increasing trend. In Luxembourg there were no such nitrate pollution hotspots in surface waters in the reporting period 2020-2023.

6. EUTROPHICATION OF SURFACE WATERS

Luxembourg maintains an identical monitoring network for nitrates and for the trophic status managed by the national Water Management Administration. Monitoring campaigns are carried out, on the one hand, as part of programmes to monitor the evolution of nitrate concentrations in the context of the Nitrates Directive and, on the other hand, under the Water Framework Directive.

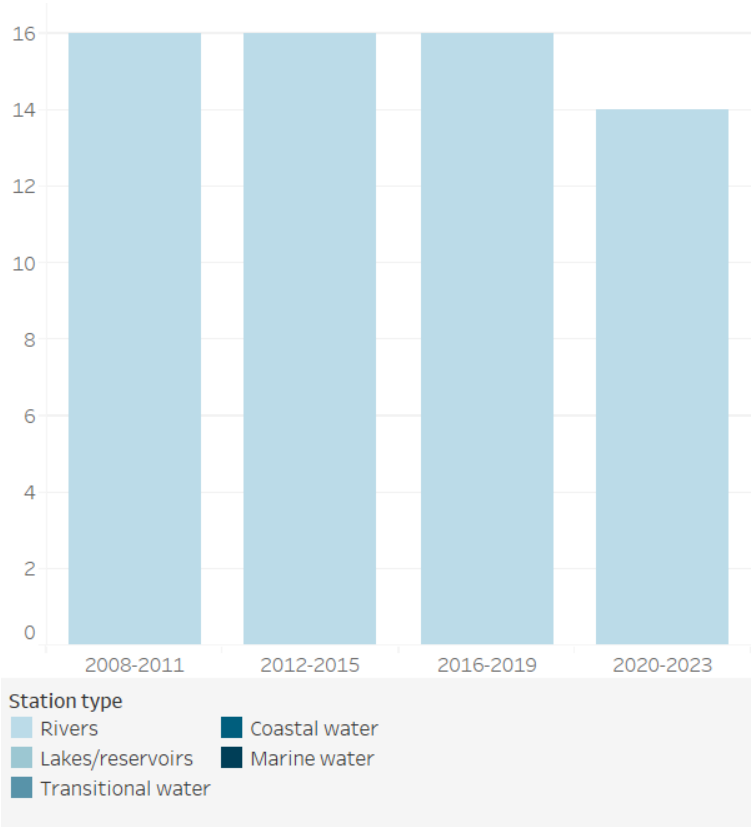
Luxembourg authorities informed the Commission of errors in reporting of data on eutrophication in some monitoring points. However, these changes could not anymore be taken into account in this report.

6.1. Monitoring of trophic status in surface waters

During the reporting period 2020-2023 trophic status was reported at 14 monitoring points ([29]). Among these, all were in rivers. The station density of monitoring points, where trophic status was assessed was 5.4 stations per 1 000 km^2.

The overall number of freshwater monitoring points decreased by 2 compared to the previous reporting period.

Figure 21 – Evolution in surface water monitoring network (number of points with trophic status reported)



([29]) Luxembourg authorities informed the Commission of errors in reporting of data on eutrophication in some monitoring points. However, these changes could not anymore be taken into account in this report.

Table 7 – Number of monitoring points with trophic status by station type ([30])

Station type	Stations with trophic status			
	2008-2011	2012-2015	2016-2019	2020-2023
Rivers	16	16	16	14
Lakes/reservoirs				
Total	16	16	16	14

6.2. Methodology for the assessment of trophic status

The methodology to assess trophic status involved the evaluation of various parameters such as nitrates, total phosphorus, and ortho-phosphates.

Luxembourg reported that limit values of nitrates used in the eutrophication assessment for the Nitrates Directive align with those for the Water Framework Directive, whereas in case of phosphorus they have not been legally binding aligned yet.

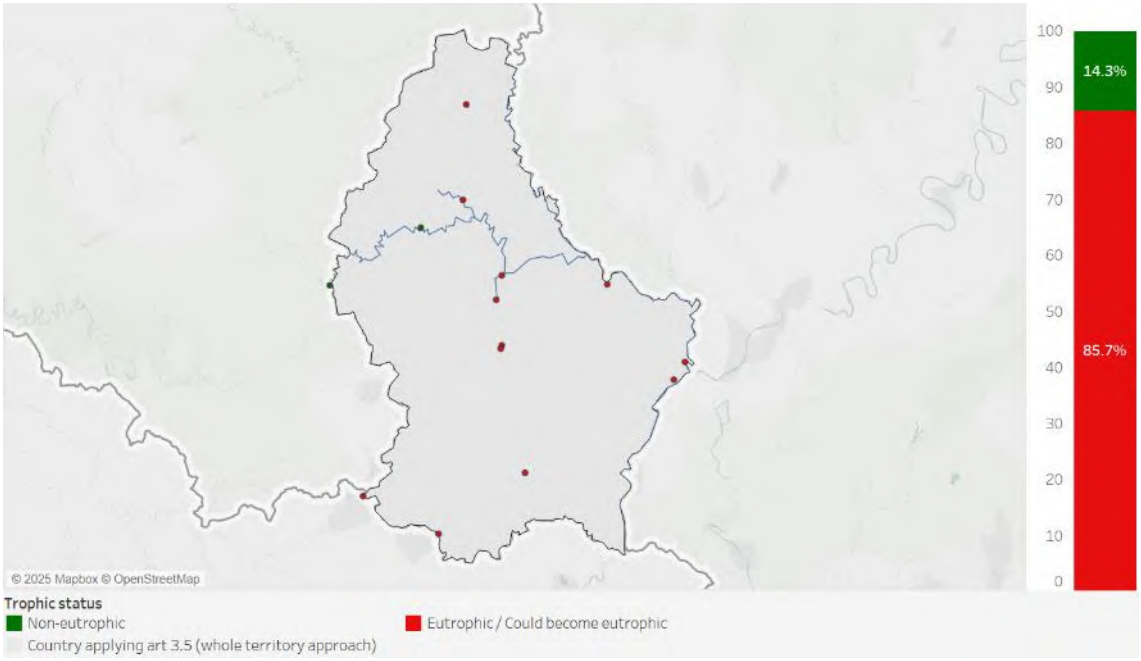
([30]) Luxembourg reported that monitoring was discontinued in 2 monitoring points relative to the previous reporting period. Discontinuation may be due to nitrate concentrations below 25 mg/l, change in station code or type, or other specific reasons.

6.3. Eutrophication of surface waters

Rivers

85.7% of monitoring points in rivers were eutrophic/could become eutrophic. The figure below shows the shares in respective classes in a graph and spatial distribution in the map.

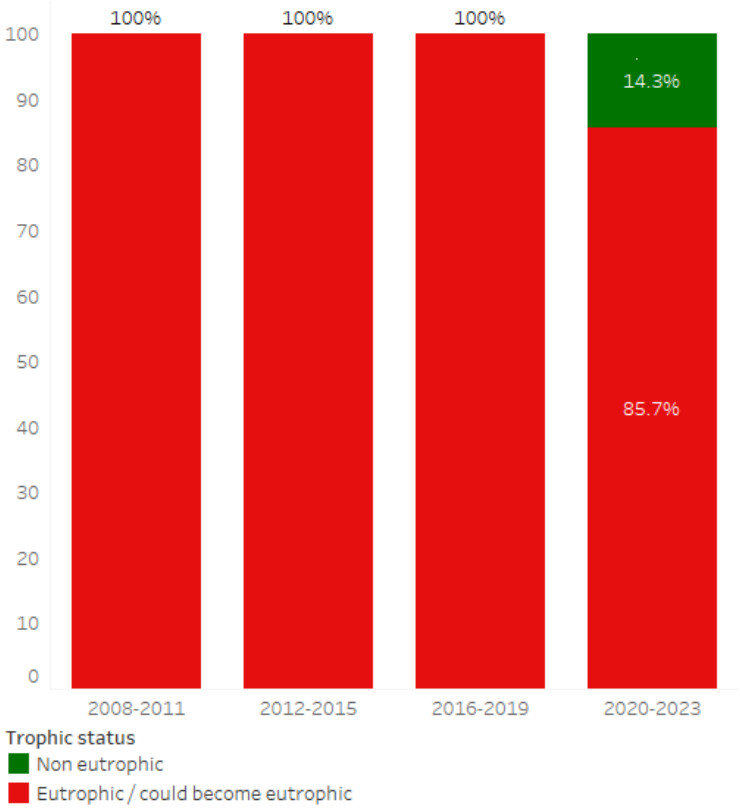
Figure 22 – Map of trophic status in rivers and share of monitoring points by trophic class in the reporting period 2020-2023



Note: In the map, eutrophic/could become eutrophic monitoring points are plotted on top.

Compared to the previous reporting period, the share of eutrophic/could become eutrophic monitoring points decreased from 100% to 85.7%. The graph below displays the share of monitoring points per classes of nitrate concentration in the last four reporting periods. In all three previous reporting periods the share of eutrophic/could become eutrophic monitoring points was at 100%.

Figure 23 – Share of monitoring points in rivers by class of trophic status in the current and previous reporting periods



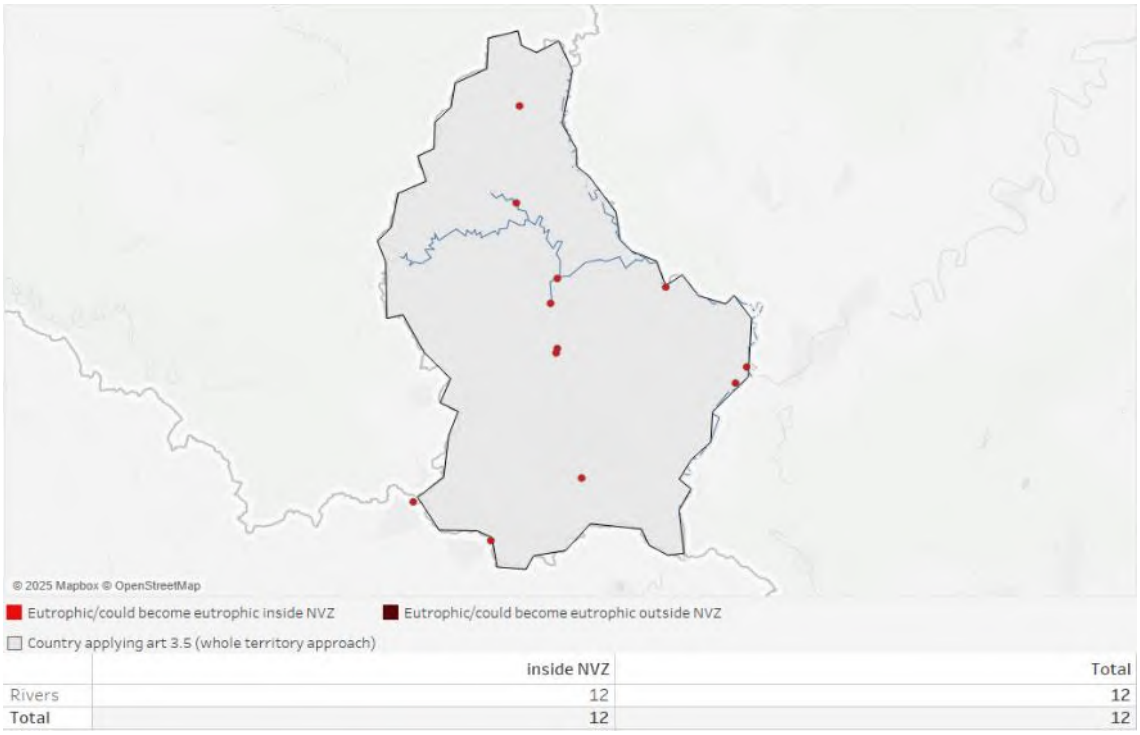
Lakes and water reservoirs

No monitoring data is reported for in lakes/water reservoirs.

6.4. Eutrophication hotspots in surface waters

A eutrophication hotspot in surface waters is defined here as a monitoring point with trophic status evaluated as “eutrophic” or “could become eutrophic”. Overall, there are 12 surface water monitoring points which were reported eutrophic/could become eutrophic.

Figure 24 – Eutrophic/could become eutrophic monitoring points



	inside NVZ	Total
Rivers	12	12
Total	12	12

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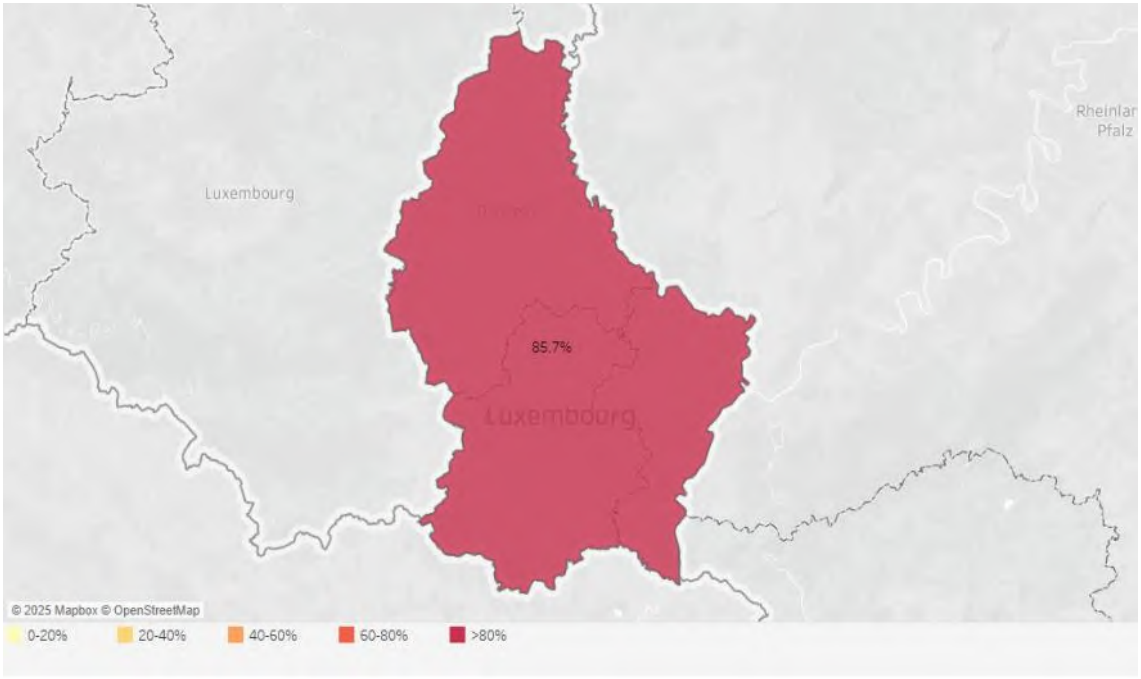
Figure 25 – Share of eutrophic/could become eutrophic monitoring points at NUTS2 level



7. NITRATES ACTION PROGRAMME

The Nitrates Directive mandates the establishment of a code of good agricultural practice that shall be implemented by farmers on a voluntary basis, and promoted through training and information for farmers. Action programmes with mandatory requirements for farms should be established and enforced in NVZ or across the entire territory with mandatory measures applicable to all farms in those areas. These requirements primarily focus on implementing good practices for the handling of fertilisers and manure on farms to minimise the risk of nutrient leaching and run-off from fields. Annex II and III of the directive set the types of measures to be included. The directive leaves wide discretion to Member States to design the measures in line with local circumstances. Compliance with the action programme measures is monitored by public authorities.

The action programmes contain measures concerning fertiliser application (periods when land application of different types of fertilisers is prohibited, land application on steeply sloping ground, prohibition of land application on water-saturated, flooded, frozen or snow-covered ground, the conditions for land application of fertiliser near watercourses, balanced fertilisation and the amount of livestock manure that can be applied to the land), and the capacity of storage vessels for livestock manure. They may also include additional measures in relation to fertilizer planning and record keeping, land use management, including the use of crop rotation systems, minimum vegetation cover during sensitive periods, irrigation systems and other relevant measures complementing the nitrates action programme.

7.1. Measures in the action programme and code of good agricultural practices

The "*Règlement grand-ducal du 24.11.2000 concernant l'utilisation de fertilisants azotés dans l'agriculture*" (GoL 2000) sets out Luxembourg's provisions of the Code of Good Agricultural Practice (CGAP) and the action programme. The original law of 2000 was amended by different revisions in 2005, 2010, 2012, 2013 and 2014 (see consolidated version).

In addition, the "*Règlement grand-ducal du 9.07.2013*" (GoL 2013) sets out stricter measures regarding the use of N-fertilisers in agriculture in protected zones for groundwater bodies used as a drinking water. The latter was amended in 2015 and 2023. Luxemburg has designated its whole territory as a nitrate vulnerable zone (NVZ). The prohibitions and restrictions set out in GoL 2000 and GoL 2013 are applicable to the whole country.

Since 2020, no changes have been made to the general legislation (GoL 2000). For the drinking water protection zones (GoL 2013), a revision was made in 2023, but it did not modify the provisions related to fertilization or the use of livestock waste in agriculture. In 2021, specific legislation (GoL 2021) was adopted for the region of the Lake of Haute Sûre. It delineates protection zones around the Haute-Sûre Lake and determines the types of installations, works, and activities that are prohibited, regulated, or subject to

authorization in these zones, including provisions regarding fertilization and the use and management of livestock waste in agriculture.

A consolidated overview of the action programme currently in force is provided in a separate document ([31]).

7.2. Controls

The Water Management Administration is responsible for monitoring the implementation of the provisions of the national law (GoL 2000). Additionally, the Environmental Police and the Customs Administration are responsible for monitoring the implementation of environmental legislation. The Control Unit of the Ministry of Agriculture (UNICO) performs on-site controls to ensure the compliance with eligibility conditions for Community aid, and with the CAP's conditionality standards under the CAP .

In the period 2020-2023, 78 pollution incidents of agricultural origin were identified through inspections by the Water Management Administration. The main causes of pollution were poor handling (mainly due to negligence) during the storage of agricultural manure and/or silage on farms, followed by non-compliance with the mandatory buffer zone along watercourses during manure spreading and spills of milk.

In the reporting period 2020-2023, each year, 55 farms or 3.2% of the farms (on average) were inspected for CAP's conditionality requirements by the Control Unit of the Ministry of Agriculture. No information is available on the number of non-compliances with conditionality or with the action programme.

([31]) https://environment.ec.europa.eu/publications/summaries-national-nitrates-action-programmes_en

8. WATER QUALITY OUTLOOK

There is no specific statistical model applied to forecast further developments of nitrate concentrations, eutrophication or the impact of action programmes. Nonetheless, in the report there are some general assumptions about potential future developments of the water quality.

Meanwhile, the LuxZPS platform is being developed in order to assess the evaluation of the measures and ensure close monitoring of protected areas. This platform will centralise all data for each area and shell clarify the impact of the measures, identify specific improvement potentials and provide better forecasts of water body quality trends.

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