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# 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


# Malta

Country staff working document
on the implementation of the Nitrates Directive

Period: 2020-2023

# Contents

# 1. KEY FINDINGS AND RECOMMENDATIONS

Malta submitted its report under the Nitrates Directive for the period 2020-2023 in February 2025 ([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 Maltese 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 Malta, the utilised agricultural area (UAA) accounts for 28% of the country's total land area, which is lower than the EU average (38%). The livestock density is 3.3 livestock units per hectare (LSU/ha) of UAA, which is higher than the EU average of 0.7 LSU/ha. Malta did not report the gross nitrogen and phosphorus balances to Eurostat for the period 2020-2023.

### Monitoring network

For groundwater, the density of the monitoring network is around 140 stations per 1 000 km$^2$, which is higher than the EU average (8 stations). Compared to the previous reporting period, the density remained stable.

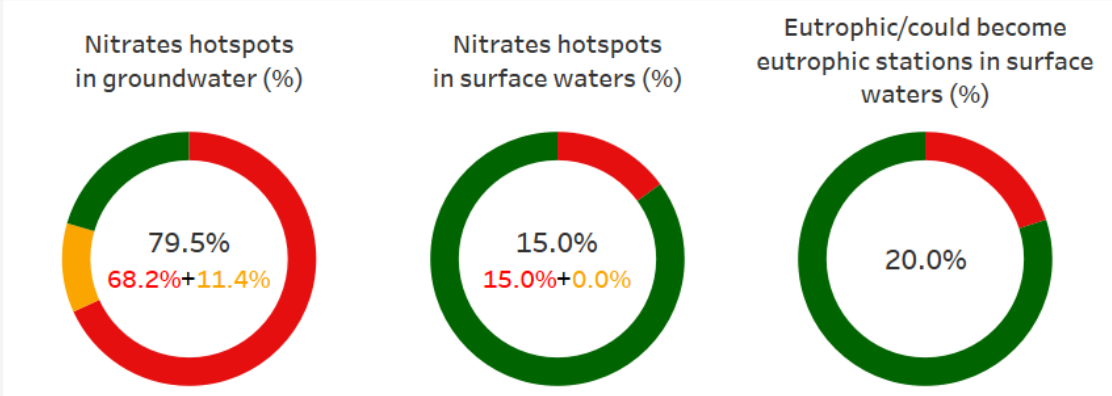
For surface freshwater, the density of the monitoring network is around 16 stations per 1 000 km$^2$, which is higher than the EU average (7 stations). In the previous reporting period, there were no freshwater monitoring points. The monitoring network includes river and lakes/water reservoir stations.

For surface saline waters, the monitoring network includes transitional and coastal waters. However, unlike in the previous reporting period, nitrates were not reported for marine waters.

([1]) Final version was received in May 2025.
([2]) Reportnet 3 is 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 nitrate and eutrophic pollution hotspots in groundwater and surface waters




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**, 31.8% of monitoring points show nitrate concentrations below 50 mg/l.

Overall, 79.5% of monitoring points fall into two categories illustrated in Figure 1, i.e. they show nitrate concentrations ≥ 50 mg/l (68.2%) or between 37.5 and 49.99 mg/l with an increasing trend (11.4%). Compared to the data reported in the previous reporting period, this represents an increase of 11.4% (from 68.2% to 79.6%).

Compared to the previous reporting period, nitrate concentrations decreased at 12.5% of groundwater monitoring points and increased at 80.0%. Among monitoring points with nitrate concentration ≥ 50 mg/l, increases (88.9%) were more frequent than decreases (7.4%).

In **surface water** ([5]), 85.0% of monitoring points show nitrate concentrations below 50 mg/l and 80.0% are classified as non-eutrophic.

Overall, 15% of monitoring points fall in two categories illustrated in Figure 1, i.e. they show nitrate concentrations ≥ 50 mg/l (15%) or between 37.5 and 49.99 mg/l with an increasing trend (0%). Compared to the data reported in the previous reporting period, this represents an increase of 15 percentage points. 15% of surface water monitoring stations show nitrate concentrations ≥ 10 mg/l, which is relevant for eutrophication.

Compared to the previous reporting period, nitrate concentrations remained stable in all monitoring points.

The share of monitoring points reported as eutrophic/could become eutrophic is 20.0%, as illustrated in Figure 1 ([6]). A comparison with the previous reporting period is not

([5]) The surface water monitoring results provide a one-year review (2021) of nitrate concentrations in coastal waters, and a two-year review (2021- 2022 and 2022-2023) of nitrate concentrations in inland surface and transitional waters.

([6]) The measurement period for eutrophication assessment covered 2021-2023.

possible due to changes in the monitoring network, as no freshwaters were assessed for trophic status in 2016-2019.

### Nitrates Vulnerable Zones

Malta has designated as a nitrate vulnerable zone its whole territory where it applies an action programme with mandatory measures ([7]).

### Action Programme

Malta did not modify its action programme during the reporting period.

## 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 groundwaters
  - high or increasing nitrate concentrations in surface waters
  - eutrophication of surface water bodies
- 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

([7]) As a result, and for practical terms Malta is included in the 'whole territory approach' category of countries.

# 2. PRESSURES FROM AGRICULTURE

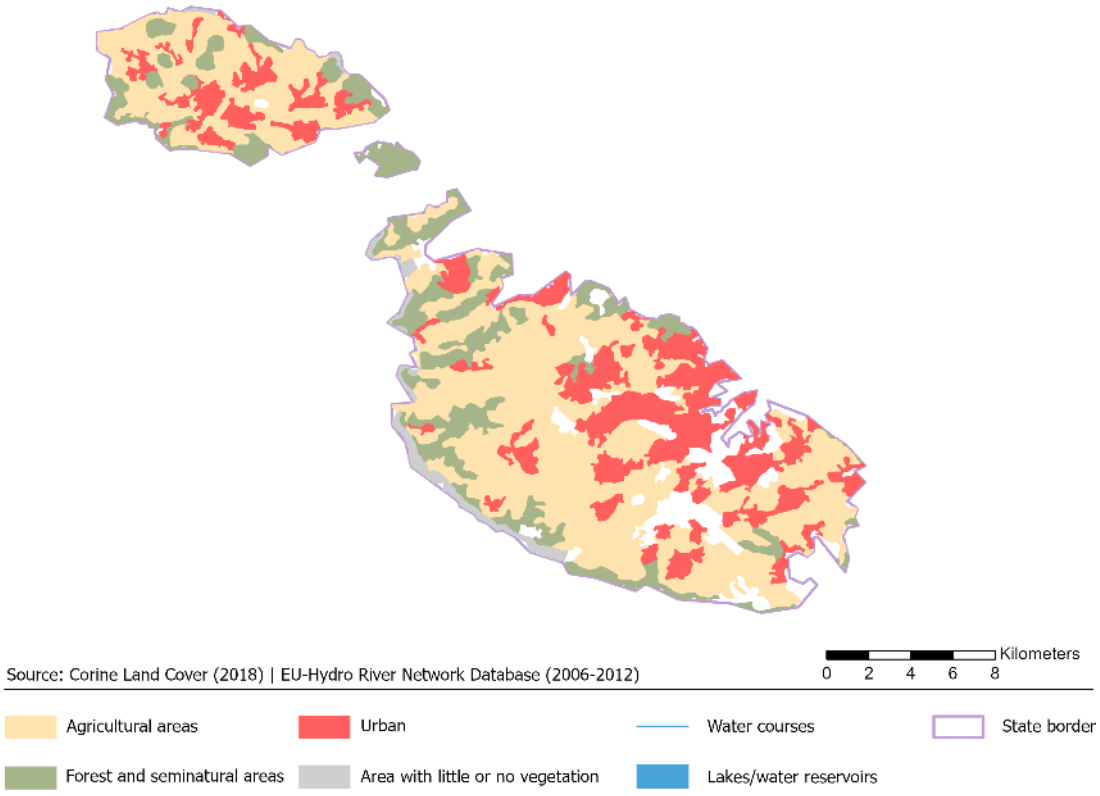
In Malta, animal production accounted for the largest portion of the agricultural sector's total output at 56.8% in the reporting period 2020-2023. Crop production followed with 37.1%, and other outputs made up 6.2%. ([8]) The share of agricultural land used for organic farming increased from 0.4% in the reporting period 2016-2019 to 0.7% in the reporting period 2020-2023. ([9])

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 agriculture 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 Malta along with watercourses and lakes/water reservoirs.

Figure 2 – Land use distribution in Malta




([8]) Source: Eurostat (aact_eaa01)
([9]) Source: Eurostat (ef_m_org)

The utilised agricultural area (UAA) in Malta covered 8.9 thousand hectares in 2023, making up 28.4% of the country's total land area. Arable land accounts for 81.6% of UAA, followed by permanent crops at 11.7% and kitchen gardens at 6.6 %. ([10])

Table 1 – Evolution of the utilised agricultural area

| | 2010 | 2013 | 2016 | 2020 | 2023 |
|---|---|---|---|---|---|
| utilised agricultural area (1000 ha) | 11.5 | 10.9 | 11.2 | 9.8 | 8.9 |
| arable land (1000 ha) | 9.1 | 8.6 | 9.1 | 7.8 | 7.3 |
| permanent grassland (1000 ha) | NA | 0.0 | 0.0 | 0.0 | 0.0 |
| permanent crops (1000 ha) | 1.3 | 1.3 | 1.3 | 1.0 | 1.0 |
| kitchen gardens (1000 ha) | 1.1 | 1.0 | 0.8 | 1.1 | 0.6 |

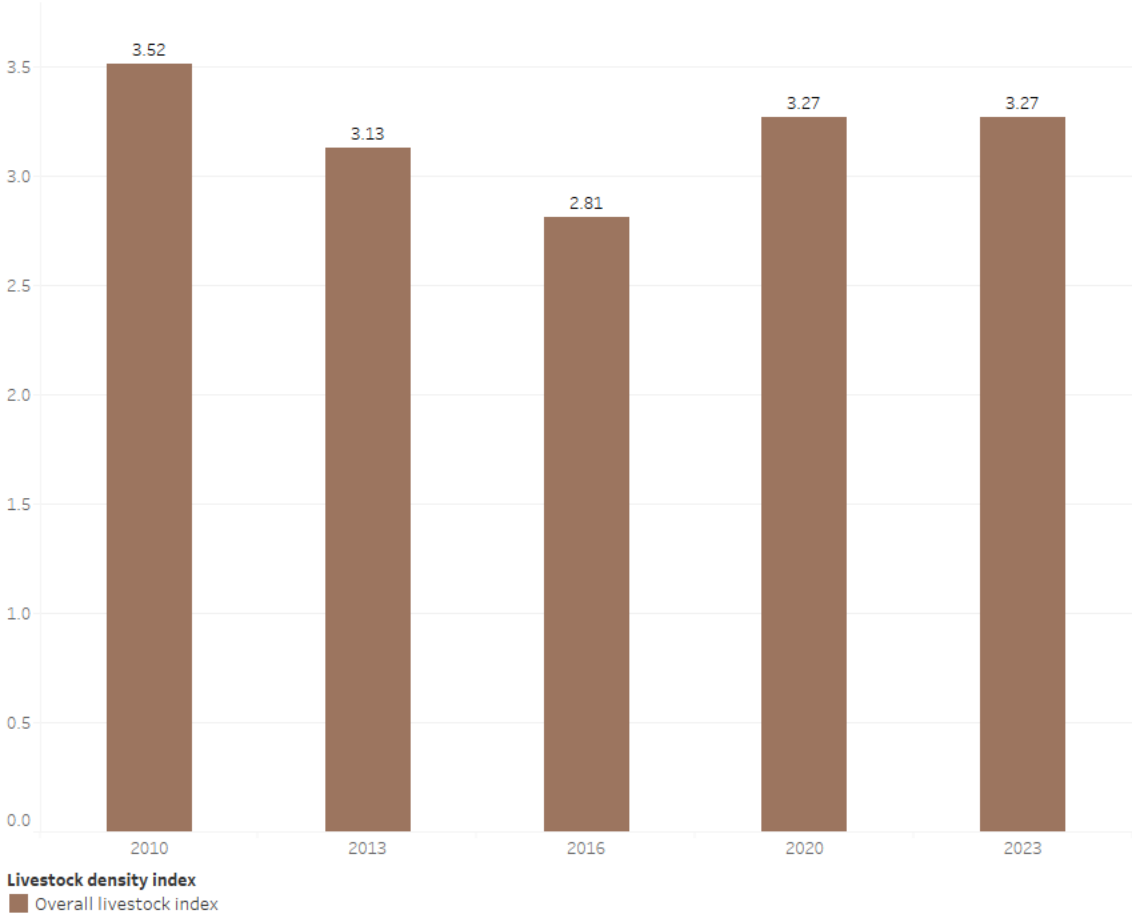
Source: Eurostat (ef_lus_main)

([10]) Based on not rounded values of Eurostat's dataset (ef_lus_main).

## 2.2. Livestock density

In Malta the livestock density was 3.27 livestock units per hectare (LSU/ha) of UAA in 2023. It was decreasing until 2016 but has since increased again.

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



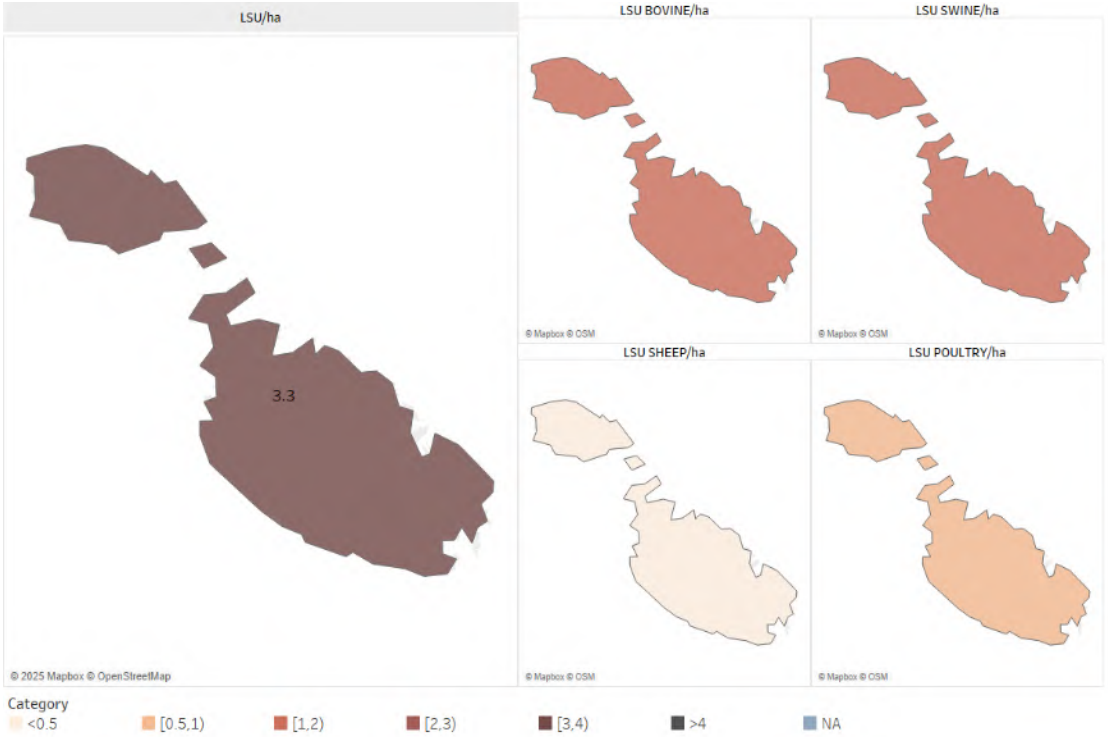

Source: Eurostat (ef_fsi_lskds)

Table 2 – Evolution of the livestock numbers by animal type

| | 2007 | 2010 | 2013 | 2016 | 2020 | 2023 |
|---|---|---|---|---|---|---|
| live bovines (Million heads) | 0.02 | 0.01 | 0.02 | 0.01 | 0.01 | 0.01 |
| of which dairy cows (Million heads) | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| live pigs (Million heads) | 0.08 | 0.07 | 0.05 | 0.04 | 0.04 | 0.04 |
| live poultry (Million heads) | NA | 0.98 | 0.91 | 0.78 | 0.89 | NA |
| live sheep (Million heads) | NA | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| live goats (Million heads) | 0.01 | 0.01 | 0.00 | 0.00 | 0.01 | 0.01 |

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 ([11])




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

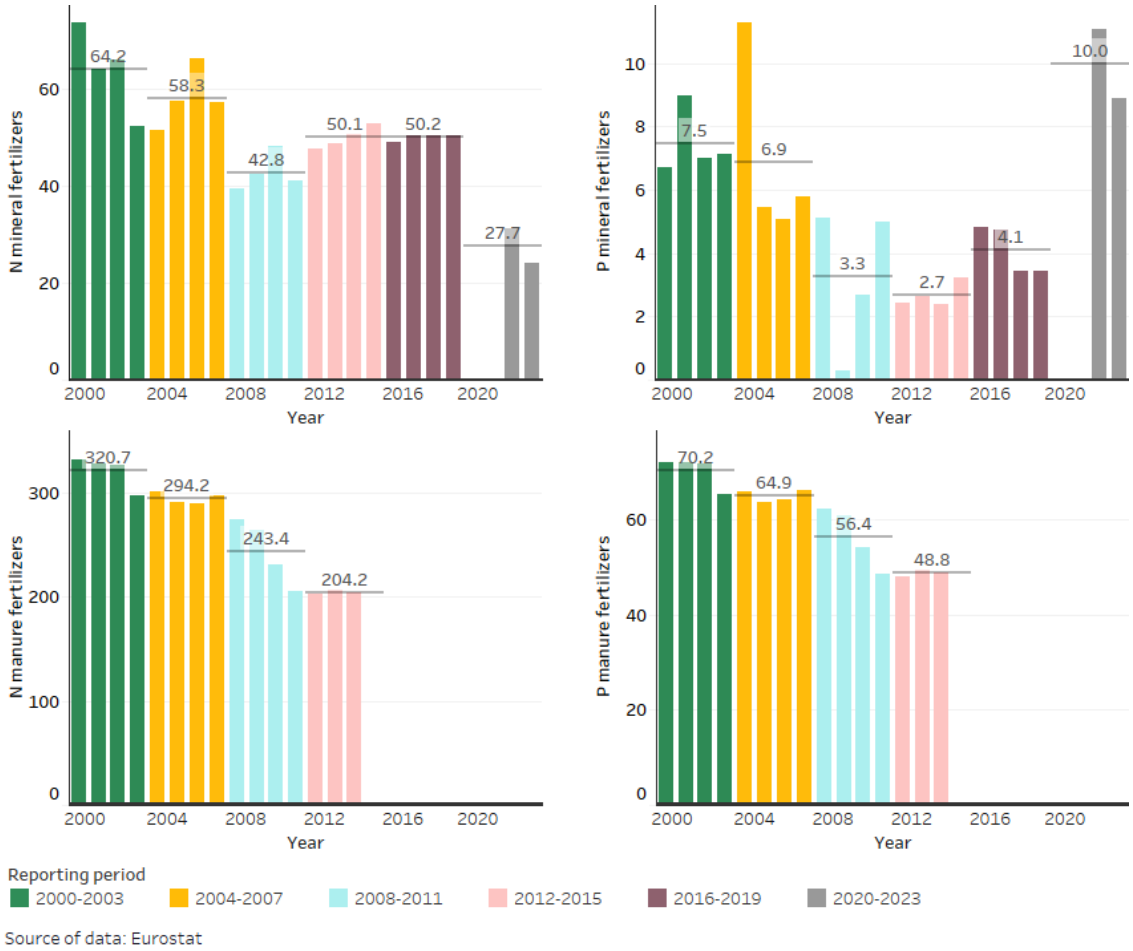
([11]) Latest available data.

## 2.3. Nitrogen and phosphorus fertiliser use

In Malta, the use of **nitrogen (N) fertilisers** was 27.7 kg/ha UAA for mineral fertilisers and 204.2 kg/ha UAA for manure fertilisers in 2012-2014 ([12]). The use of mineral fertilisers has decreased by 22.5 kg/ha UAA since the last reporting period. No data on use of manure fertilisers were reported to Eurostat since 2015.

The use of **phosphorus (P) fertilisers** was 10 kg/ha UAA for mineral fertilisers in 2022-2023 and 48.8 kg/ha UAA for manure fertilisers in 2012-2014 ([13]). The use of mineral fertilisers increased by 5.9 kg/ha UAA since the last reporting period. No data on use of manure fertilisers were reported to Eurostat since 2015.

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




Source of data: Eurostat

([12]) According to the most recent values estimated by Eurostat.
([13]) According to the most recent values estimated by Eurostat.

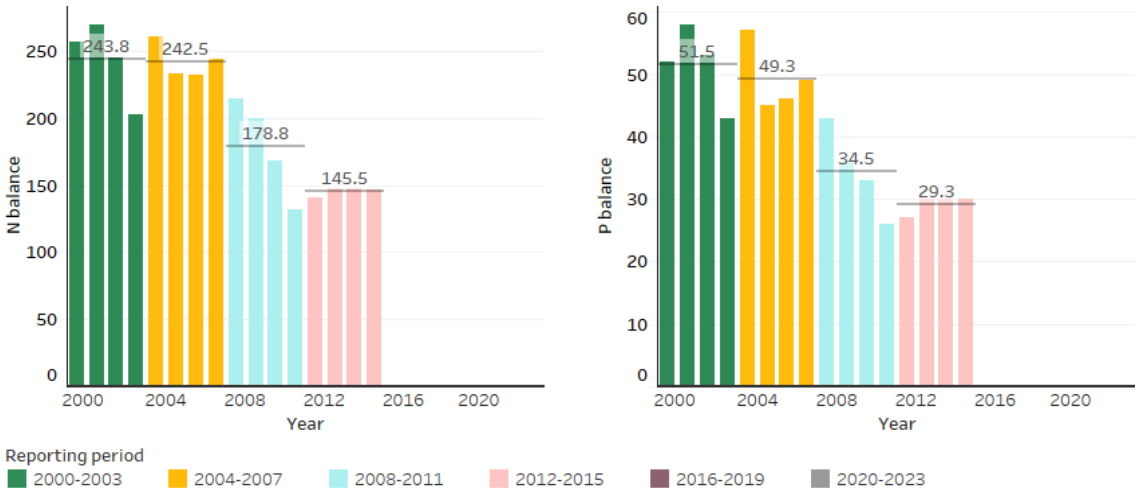
## 2.4. Nitrogen and phosphorus balance

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 pressure from agriculture. A high surplus (positive balance) indicates a risk of emissions into water and air.

In Malta, the **gross nitrogen (N) balance** was 145.5 kg/ha UAA in 2012-2015 ([15]). No data were reported to Eurostat since 2016.

The gross **phosphorus (P) balance** was 29.3 kg/ha UAA in 2012-2015 ([16]) No data were reported to Eurostat since 2016.

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




Source of data: Eurostat

## 2.5. Nitrogen discharge to the environment

Malta didn't provide numerical information on the nitrogen discharge from agriculture to the environment.

([14]) Gross nutrient balance (aei_pr_gnb)
([15]) According to the most recent values estimated by Eurostat.
([16]) According to the most recent values estimated by Eurostat.

# 3. NITRATE VULNERABLE ZONES

Malta has designated as a nitrate vulnerable zone its whole territory where it applies an action programme with mandatory measures since 2003 ([17]).

([17]) As a result, and for practical terms, Malta is included in the 'whole territory approach' category.

# 4. NITRATES IN GROUNDWATER

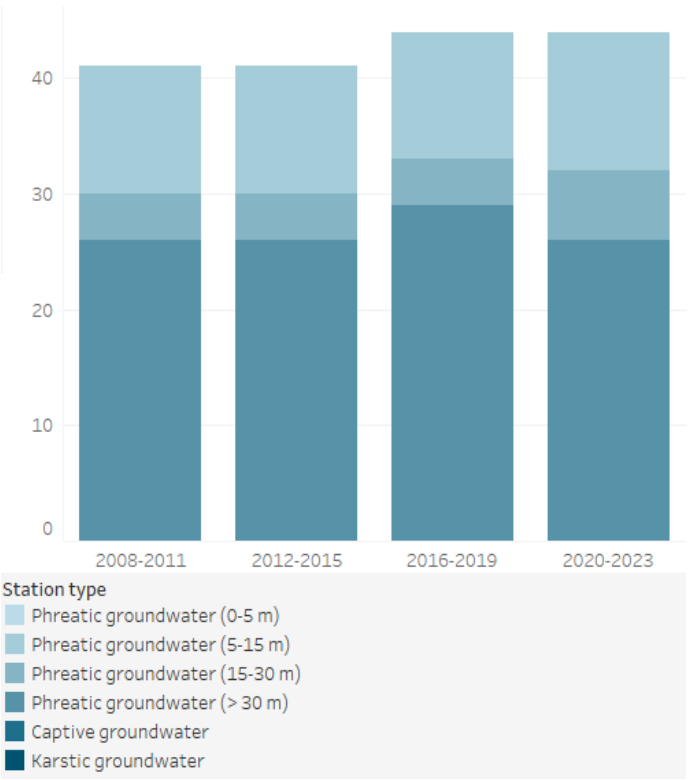
## 4.1. Monitoring of nitrate concentrations in groundwater

Monitoring of groundwater falls under the responsibility of the Energy and Water Agency (EWA), as part of the Ministry for the Environment, Energy, and Public Cleanliness (MEEC). Monitoring stations are sampled every six months.

During the reporting period 2020-2023 nitrate concentrations were reported at 44 groundwater monitoring points. The station density was 139.5 stations per 1 000 $km^2$.

The overall number of monitoring points remained stable compared to the previous reporting period. There were, however, small changes in the share of station types with three more stations for phreatic groundwaters (5-30m) and three less stations in phreatic groundwaters (>30m). Four monitoring sites were replaced due to accessibility issues or concerns regarding the structural integrity of the monitoring sources. Data from these sites were included in the report, as they were available at the beginning of the reporting period. However, these sites will no longer be considered in future reporting. 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)



In this reporting period, changes in nitrate concentrations compared to the previous monitoring period (trends) were assessed for 40 monitoring points, accounting for 90.9% of all points with measurements. The share of monitoring points with trends decreased compared to the previous reporting period, which was 93.2% in reporting period 2016-2019. 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 ([18])

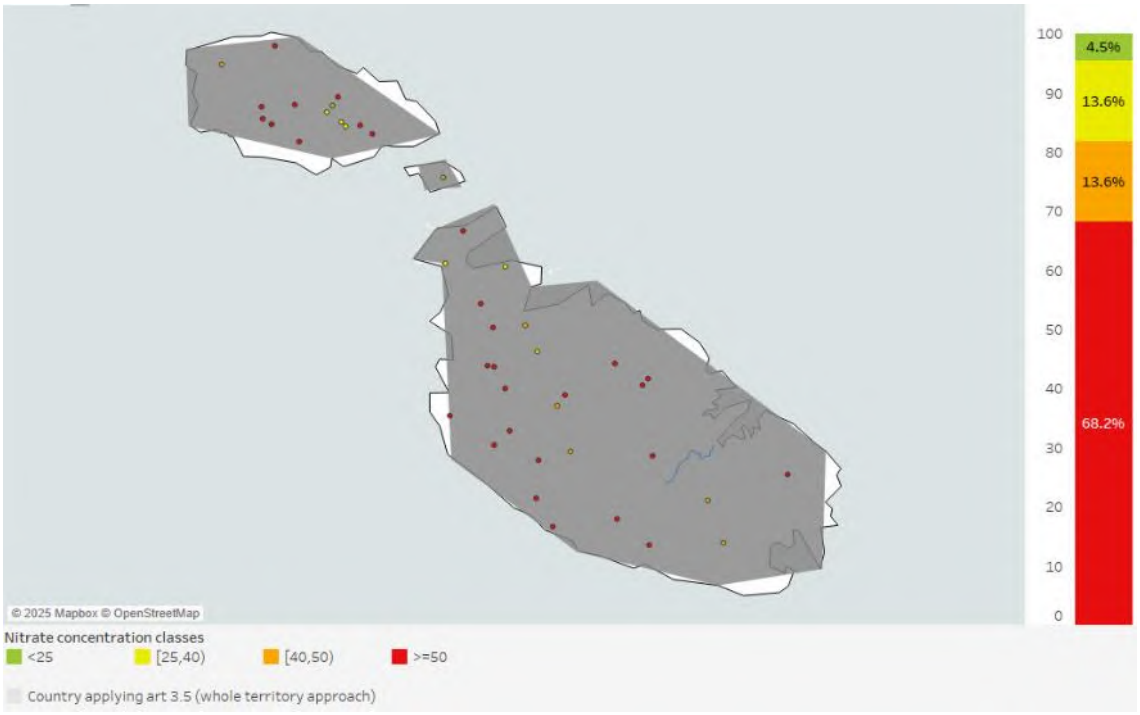
| | Stations with measurements | | | | Stations with trends | | | |
|---|---|---|---|---|---|---|---|---|
| Station type | 2008-2011 | 2012-2015 | 2016-2019 | 2020-2023 | 2008-2011 | 2012-2015 | 2016-2019 | 2020-2023 |
| Phreatic groundwater (0-5 m) | | | | | | | | |
| Phreatic groundwater (5-15 m) | 11 | 11 | 11 | 12 | | 11 | 9 | 8 |
| Phreatic groundwater (15-30 m) | 4 | 4 | 4 | 6 | | 4 | 4 | 6 |
| Phreatic groundwater (> 30 m) | 26 | 26 | 29 | 26 | | 26 | 28 | 26 |
| Captive groundwater | | | | | | | | |
| Karstic groundwater | | | | | | | | |
| Not specified | | | | | | | | |
| Total | 41 | 41 | 44 | 44 | | 41 | 41 | 40 |

([18]) Malta reported that monitoring was discontinued in 10 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 Malta, 68.2% of groundwater monitoring points showed average nitrate concentrations equal to or above the drinking water threshold of 50 mg/l, whereas 13.6% had concentrations between 40-49.99 mg/l, 13.6% showed concentrations between 25-39.99 mg/ and 4.5% below 25 mg/l. The figure below shows a spatial distribution of the average 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: Higher values are plotted at the top.

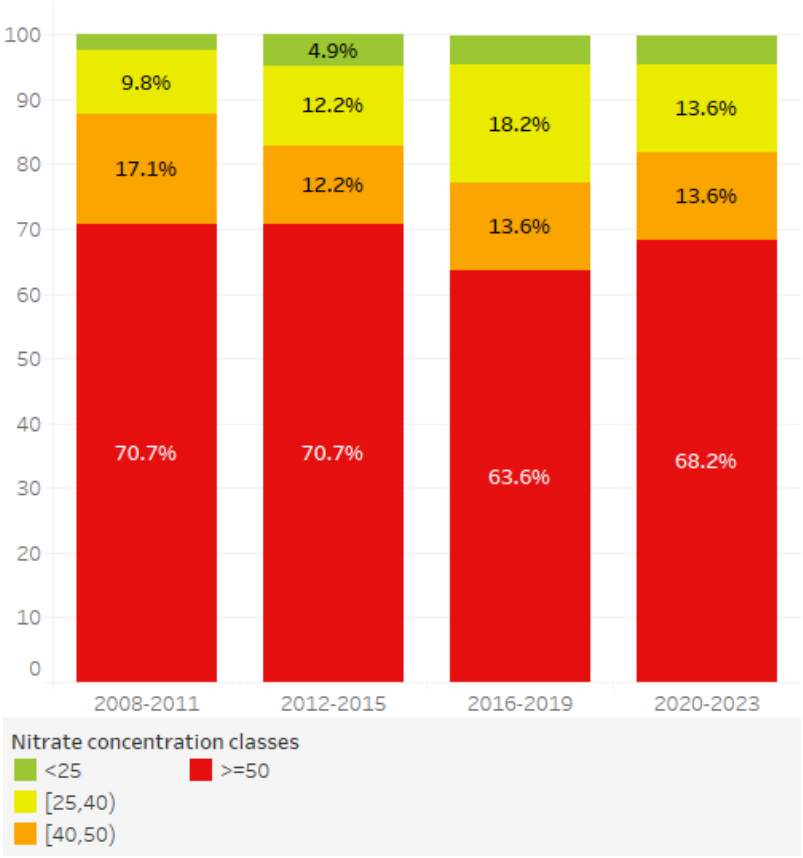
The station type category with the highest share of points with nitrate concentrations equal to or above the drinking water threshold of 50 mg/l was phreatic groundwaters at depth 5-15m with a share of 83.3%, as shown in the table below.

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) | | | | | | |
| Phreatic groundwater (5-15 m) | 12 | 27.3% | | 8.3% | 8.3% | 83.3% |
| Phreatic groundwater (15-30 m) | 6 | 13.6% | 16.7% | 16.7% | | 66.7% |
| Phreatic groundwater (> 30 m) | 26 | 59.1% | 3.8% | 15.4% | 19.2% | 61.5% |
| Captive groundwater | | | | | | |
| Karstic groundwater | | | | | | |
| Total | 44 | 100.0% | 4.5% | 13.6% | 13.6% | 68.2% |

Compared to the previous reporting period, the share of monitoring points with concentration ≥ 50 mg/l increased from 63.6% to 68.2%. 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 ([19]) in the current and previous reporting periods

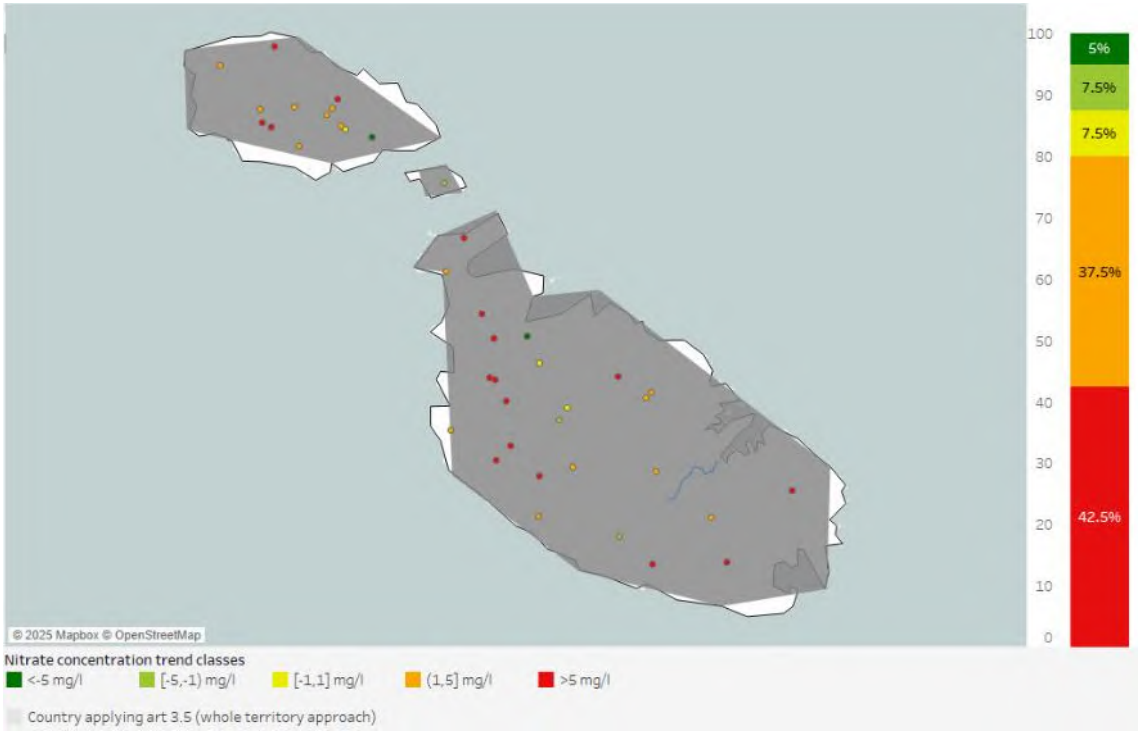



([19]) Average of annual mean values over the reporting period.

## 4.3. Trends in nitrate concentrations in groundwater

Compared to the last reporting period, there has been a decrease of nitrate concentrations in 12.5% of monitoring points and an increase in 80.0%. For the remaining 7.5% 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 it is above 5 mg/l.

Figure 10 – Map of trends in average annual mean nitrate concentrations ([20]) in groundwater between the periods 2016-2019 and 2020-2023 and share of monitoring points by trend class




Note: Higher values are plotted at the top.

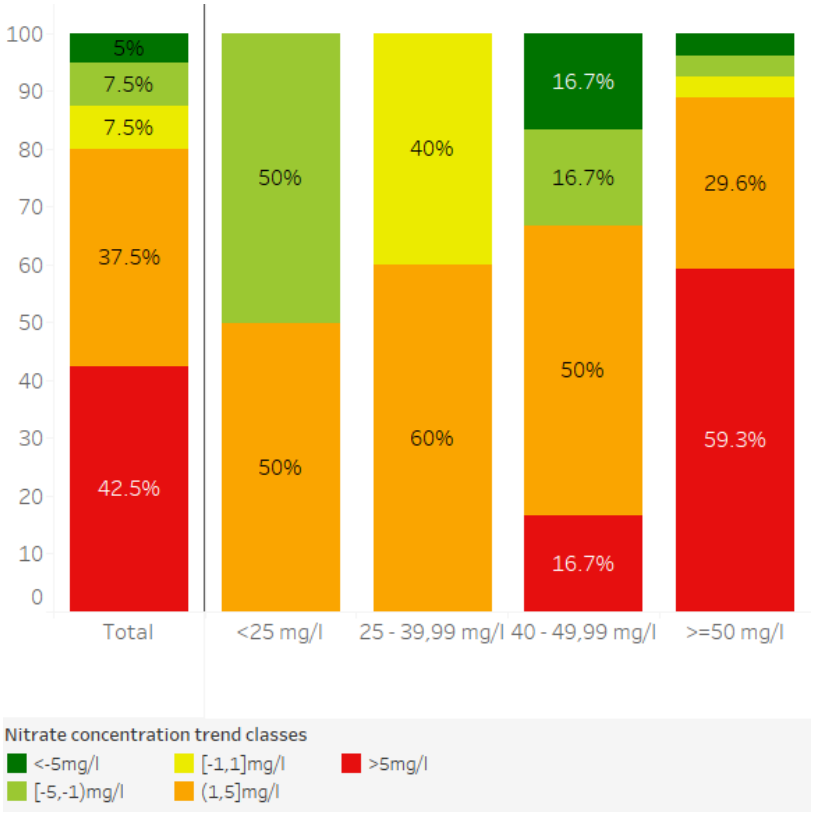
Table 5 – Share of groundwater monitoring points by trend class (mg/l) between the periods 2016-2019 and 2020-2023, categorised by station type

| | Total Number of Stations | % Total Number of Stations | <-5 | [-5,-1) | [-1,1] | (1,5] | >5 |
|---|---|---|---|---|---|---|---|
| Phreatic groundwater (0-5 m) | | | | | | | |
| Phreatic groundwater (5-15 m) | 8 | 20.0% | 12.5% | | | 12.5% | 75% |
| Phreatic groundwater (15-30 m) | 6 | 15.0% | | 16.7% | | 33.3% | 50% |
| Phreatic groundwater (>30 m) | 26 | 65.0% | 3.8% | 7.7% | 11.5% | 46.2% | 30.8% |
| Captive groundwater | | | | | | | |
| Karstic groundwater | | | | | | | |
| Total | 40 | 100.0% | 5% | 7.5% | 7.5% | 37.5% | 42.5% |

([20]) 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 (equal to or above 50 mg/l), there has been an increase of nitrate concentration for 88.9% and a decrease for 7.4% 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.

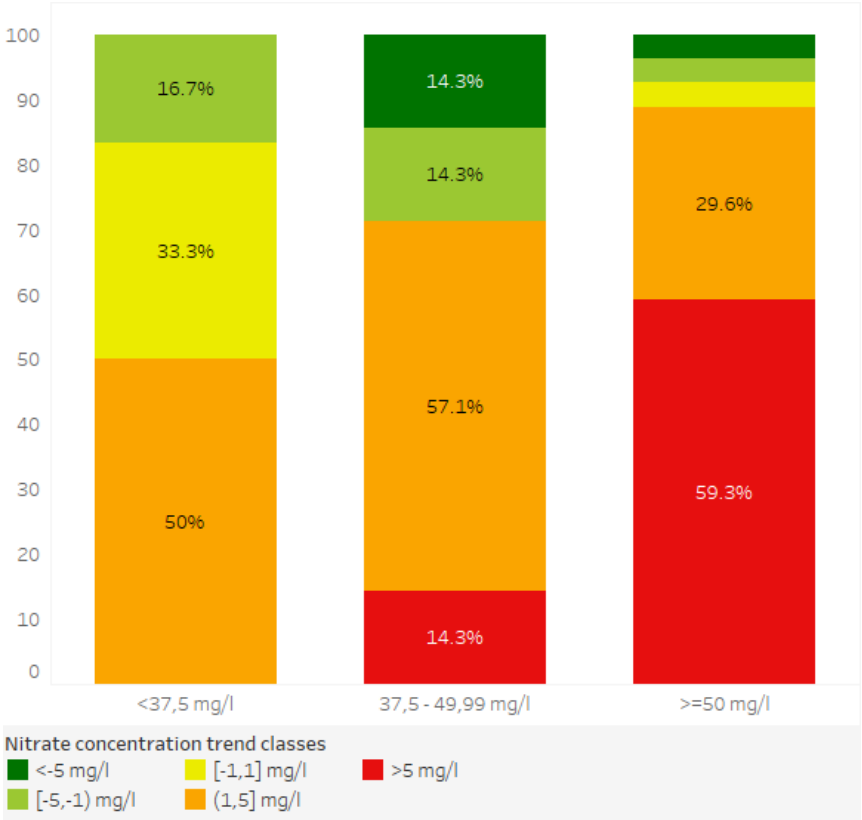
Figure 11 – Share of groundwater monitoring points by classes of trend between the periods 2016-2019 and 2020-2023, across different nitrate concentration classes (<24.99 mg/l, 25-39.99 mg/l, 40-49.99 mg/l and ≥50mg/l) ([21])




([21]) 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 an increase of nitrate concentration for 71.4% and a decrease for 28.6% 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) ([22])




([22]) 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 lower share of monitoring points with decreasing nitrate concentrations (12.5% in the current reporting period compared to 68.3% in the previous reporting period) and a higher share of monitoring points with increasing nitrate concentrations (80.0% compared to 19.5%). 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 ([23]) in the current and previous reporting periods


([23]) Change in average annual mean nitrate concentrations compared 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 Malta there are 35 groundwater nitrate pollution hotspots.

The share of groundwater nitrate pollution hotspots at NUTS2 level represents 79.5% in Malta.

Figure 14 – Groundwater nitrate pollution hotspots


| | inside NVZ | outside NVZ | Total |
|---|---|---|---|
| Groundwater [37.5,50) with incr. trend | 5 | | 5 |
| >=50 | 30 | | 30 |
| Total | 35 | | 35 |

# 5. NITRATES IN SURFACE WATERS

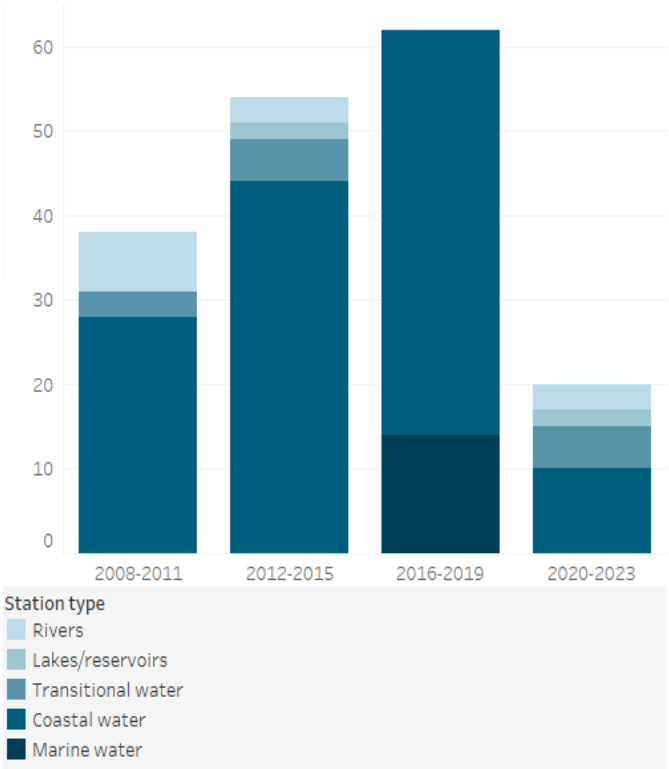
## 5.1. Monitoring of nitrate concentrations in surface waters

The surface water monitoring network is managed by the Environment and Resources Authority, as part of the Ministry for the Environment, Energy, and Public Cleanliness (MEEC). The surface water monitoring results provide a one-year review (2021) of nitrate concentrations in coastal waters, and a two-year review (2021- 2022 and 2022-2023) of nitrate concentrations in inland surface and transitional waters.

During the reporting period 2020-2023 nitrate concentrations were reported at 20 surface water monitoring points. Among these, 15.0% were in rivers, 10.0% were in lakes or reservoirs, and 75.0% were in saline waters ([24]). The freshwater monitoring points density was 15.9 stations per 1 000 $km^2$.

The overall number of monitoring points decreased by 42 (67.7%) compared to the previous reporting period. This was driven by a reduction in saline surface water points in coastal and marine water, which were the only station types reported in 2016-2019. The graph below presents the changes in the monitoring network over the last four reporting periods.

Figure 15 – Evolution of surface water monitoring network (monitoring points with measurements of nitrates)




([24]) Malta's inland surface waters consist of very small streams, watercourses, or standing waters. Malta refers to rivers as watercourses and lakes as standing waters or freshwater pools.

In this reporting period, changes in nitrate concentrations compared to the previous monitoring period (trends) were assessed for 9 monitoring points, accounting for 45.0% of all points with measurements. The share of monitoring points with trends increased compared to the previous reporting period (35.5% in reporting period 2016-2019). 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 ([25])

| | 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 | 7 | 3 | | 3 | | | | |
| Lakes/reservoirs | | 2 | | 2 | | | | |
| Transitional water | 3 | 5 | | 5 | | | | |
| Coastal water | 28 | 44 | 48 | 10 | | | 22 | 9 |
| Marine water | | | 14 | | | | | |
| Total | 38 | 54 | 62 | 20 | | | 22 | 9 |

([25]) Malta reported that monitoring was discontinued in 53 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 Malta, 100% of monitoring points in rivers showed average nitrate concentrations equal to or above the drinking water threshold of 50 mg/l.

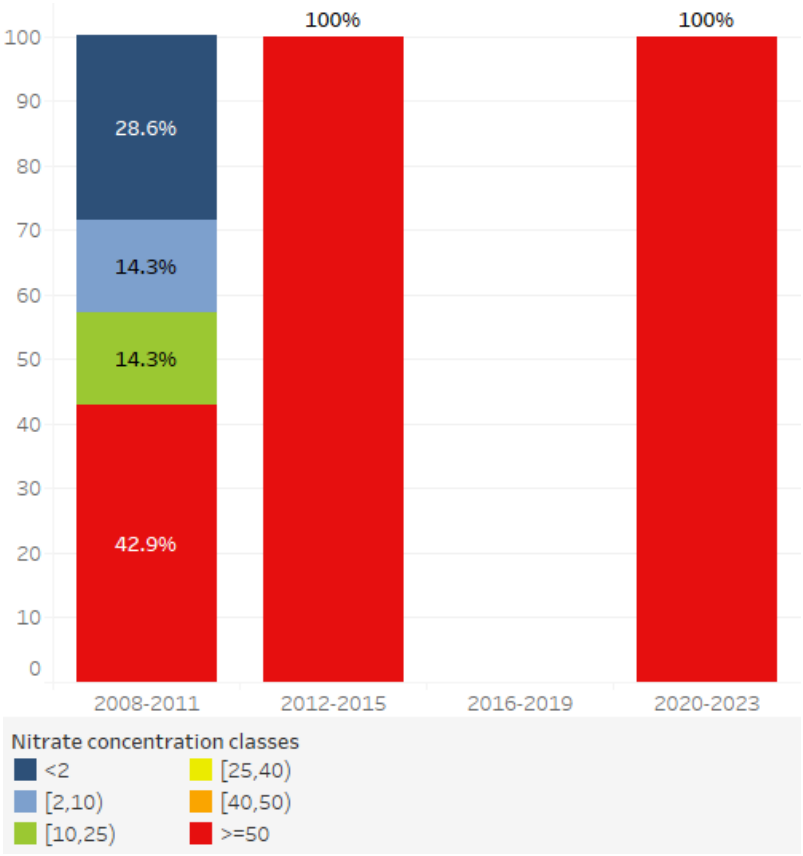
It is relevant to look at the distribution in nitrate concentration classes below 25 mg/l for surface water as there can be a risk of eutrophication in lower concentration classes.

Figure 16 – Map of average annual mean nitrate concentrations in rivers and share of monitoring points by concentration class in the reporting period 2020-2023


Note: Higher values are plotted at the top.

A comparison of monitoring points in rivers with concentrations ≥ 50 mg/l with the previous reporting period is not possible due to changes in the monitoring network. There were no concentrations reported for rivers in 2016-2019. In 2012-2015 and in the current reporting period the share was 100% in the class ≥50 mg/l.

Figure 17 – Share of monitoring points in rivers by class of nitrate concentration ([26]) in the current and previous reporting periods



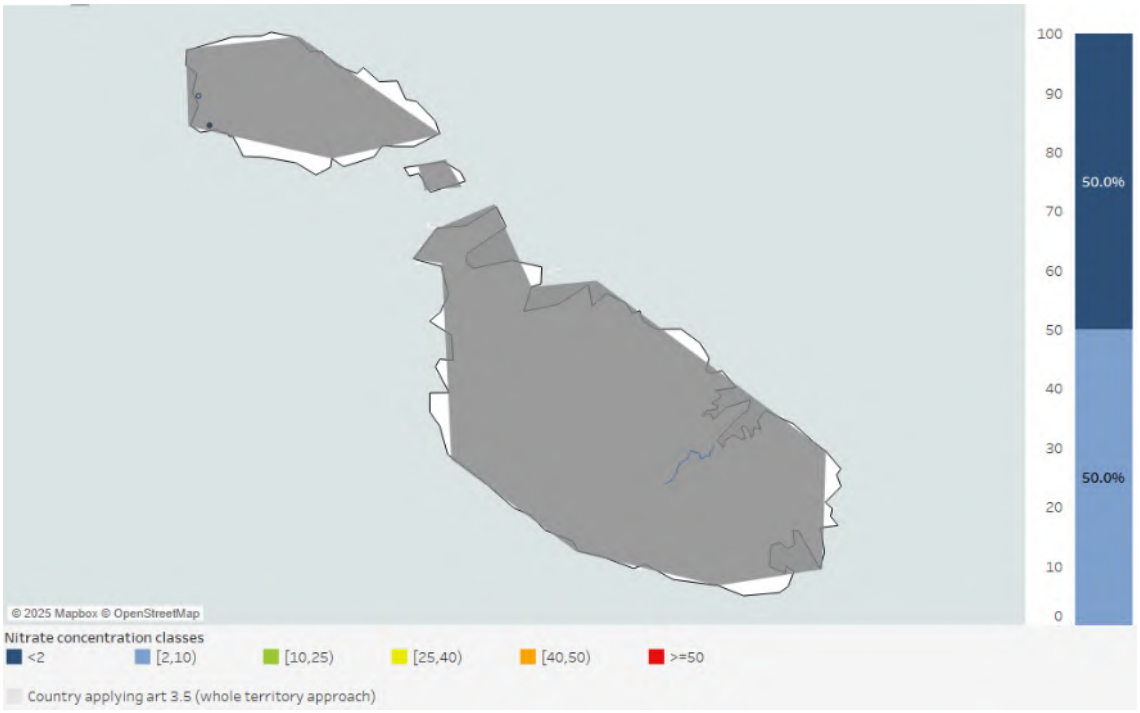

([26]) Average of annual mean values over the reporting period.

## Lakes/water reservoirs

In Malta, none of the freshwater monitoring points in lakes/water reservoirs showed average nitrate concentrations equal to or above the drinking water threshold of 50 mg/l, and at or above 10mg/l, whereas 50.0% had concentrations between 2-9.99 mg/l and 50.0% 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 18 – Map of average annual mean nitrate concentrations in lakes/water reservoirs and share of monitoring points by concentration class in the reporting period 2020-2023



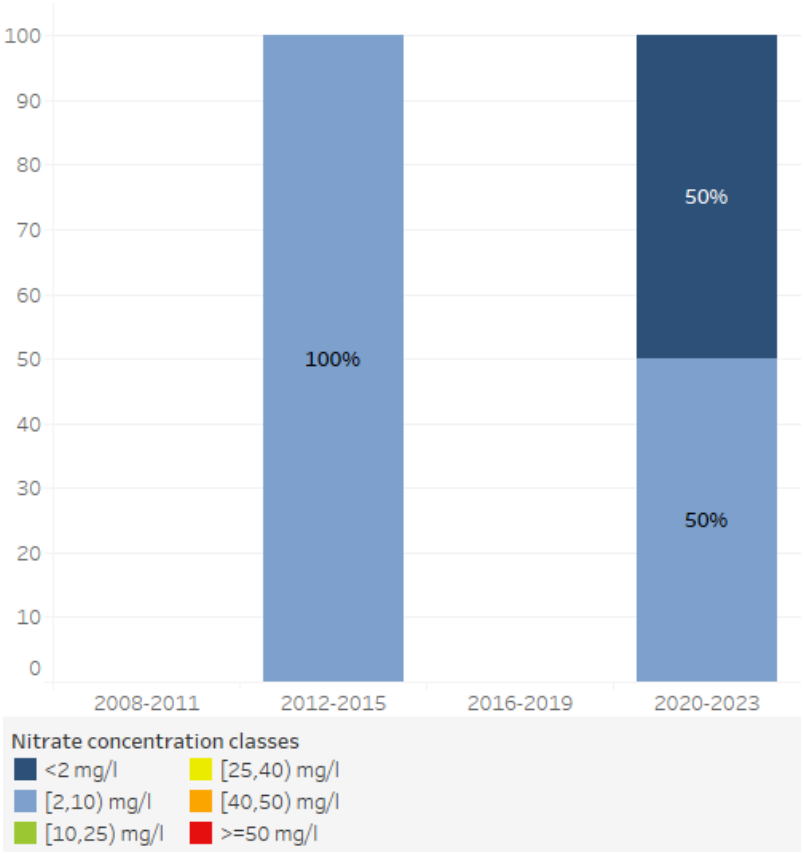

Note: Higher values are plotted at the top.

Table 7 – Share of freshwater monitoring points by nitrate concentration class (mg/l) in reporting period 2020-2023, categorised by station type

| | Number of stations | % of Total | <2 | [2,10) | [10,25) | [25,40) | [40,50) | >=50 |
|---|---|---|---|---|---|---|---|---|
| Rivers | 3 | 60.0% | | | | | | 100.0% |
| Lakes/reservoirs | 2 | 40.0% | 50.0% | 50.0% | | | | |
| Total | 5 | 100.0% | 20.0% | 20.0% | | | | 60.0% |

A comparison of monitoring points in rivers with concentrations ≥ 50 mg/l with the previous reporting period is not possible due to changes in the monitoring network. The graph below presents the shares of monitoring points per classes of nitrate concentration in the last four reporting periods There were no concentrations reported for lakes/water reservoirs in 2016-2019. In the current reporting period, the share in the class ≥ 50 mg/l was 0%.

Figure 19 – Share of monitoring points in lakes/water reservoirs by class of nitrate concentration ([27]) in the current and previous reporting periods




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

## Saline waters ([28])

No points in saline waters monitoring points showed average nitrate concentrations ≥ 10 mg/l, 20% showed concentrations between 2-9.99 mg/l and 13.3% between 0.5-2 mg/l and 66.7% below 0.5 mg/l.

It is relevant to look in detail at very low nitrate concentrations, also below 0.5 mg/l and between 0.5 mg/l and 2 mg/l, because saline waters tend to have very low concentrations and some saline waters can become eutrophic even at concentrations below 2 mg/l.

Figure 20 – Map of average annual mean nitrate concentrations in saline waters and share of monitoring points by concentration class in reporting period 2020-2023


Note: Higher values are plotted at the top.

It is also relevant to look separately at transitional waters as they typically show higher nitrate concentrations. In Malta, 60% of transitional water monitoring points showed average annual mean nitrate concentrations between 2-9.99 mg/l and 40% between 0.5-2 mg/l.

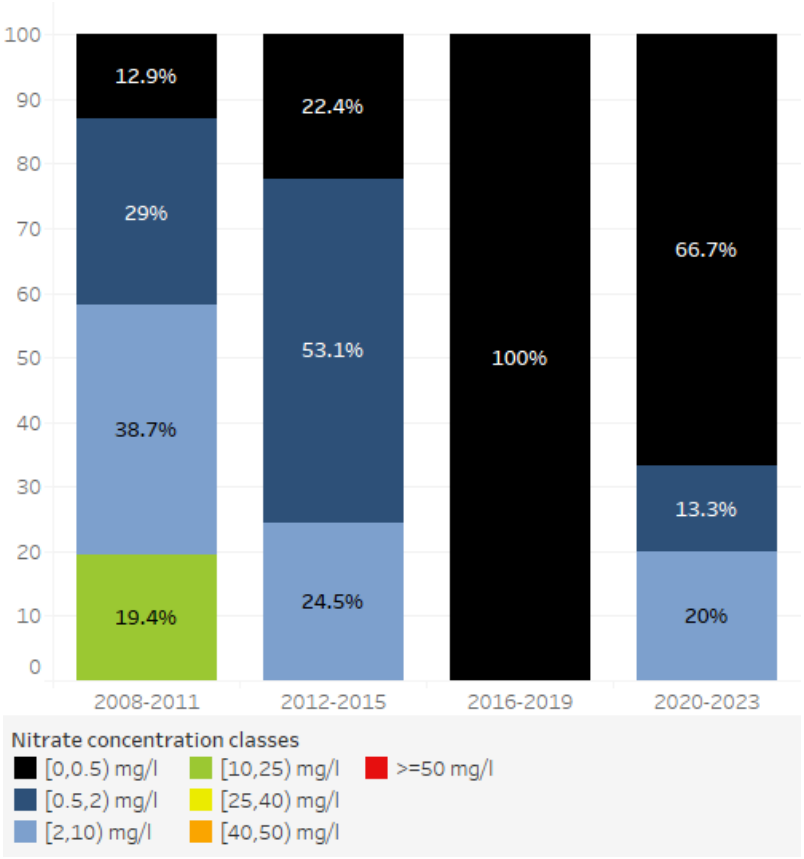
Table 8 – Share of saline water monitoring points by nitrate concentration class (mg/l) in the reporting period 2020-2023, categorised by station type

| | Number of stations | % of Total | <0.5 | [0.5,2) | [2,10) | [10,25) | [25,40) | [40,50) | >=50 |
|---|---|---|---|---|---|---|---|---|---|
| Transitional water | 5 | 33.3% | | 40.0% | 60.0% | | | | |
| Coastal water | 10 | 66.7% | 100.0% | | | | | | |
| Marine water | | | | | | | | | |
| Total | 15 | 100.0% | 66.7% | 13.3% | 20.0% | | | | |

([28]) This includes coastal, marine and transitional waters.

The graph below presents the shares of monitoring points per classes of nitrate concentration in the last four reporting periods.

Figure 21 – Share of monitoring points in saline waters by class of nitrate concentration ([29]) in the current and previous reporting periods




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

## 5.3. Trends in nitrate concentrations in surface waters

### Rivers

No trends were reported for nitrate concentrations in rivers.

### Lakes and water reservoirs

No trends were reported for nitrate concentrations in lakes/water reservoirs.

### Saline waters

Compared to the last reporting period, for all monitoring stations there was no significant change. The increase or decrease can be categorised as weak if it is between 0.2 and 1 mg/l, and as strong if it is above 1 mg/l.

Figure 22 – Map of trends in average annual mean nitrate concentrations in saline waters between periods 2016-2019 and 2020-2023 and share of monitoring points by trend class

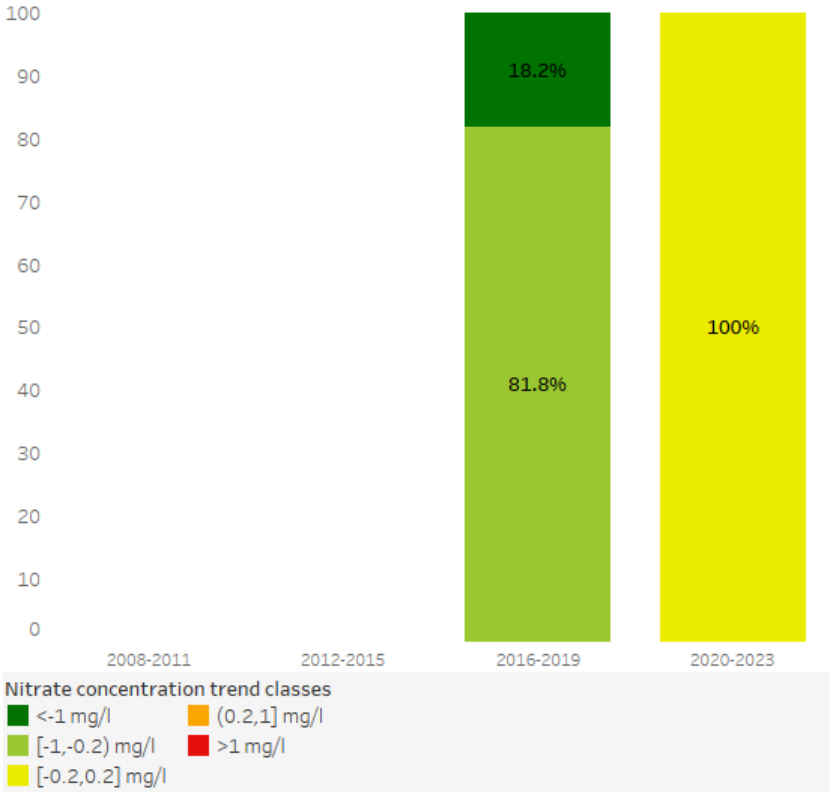

Note: Higher values are plotted at the top.

Table 9 – Share of saline water 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 | <-1 | [-1,-0.2) | [-0.2,0.2] | (0.2,1] | >1 |
|---|---|---|---|---|---|---|---|
| Transitional water | | | | | | | |
| Coastal water | 9 | 100.0% | | | 100% | | |
| Marine water | | | | | | | |
| Total | 9 | 100.0% | | | 100% | | |

Compared to the previous reporting period, there is lower share of monitoring points with decrease of nitrate concentrations (0% in the current reporting period compared to 100% in the previous reporting period) while the share of monitoring points with increase of nitrate concentrations remained stable at 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 23 – Share of monitoring points in saline waters by classes of nitrate concentrations ([30]) in the current and previous reporting periods

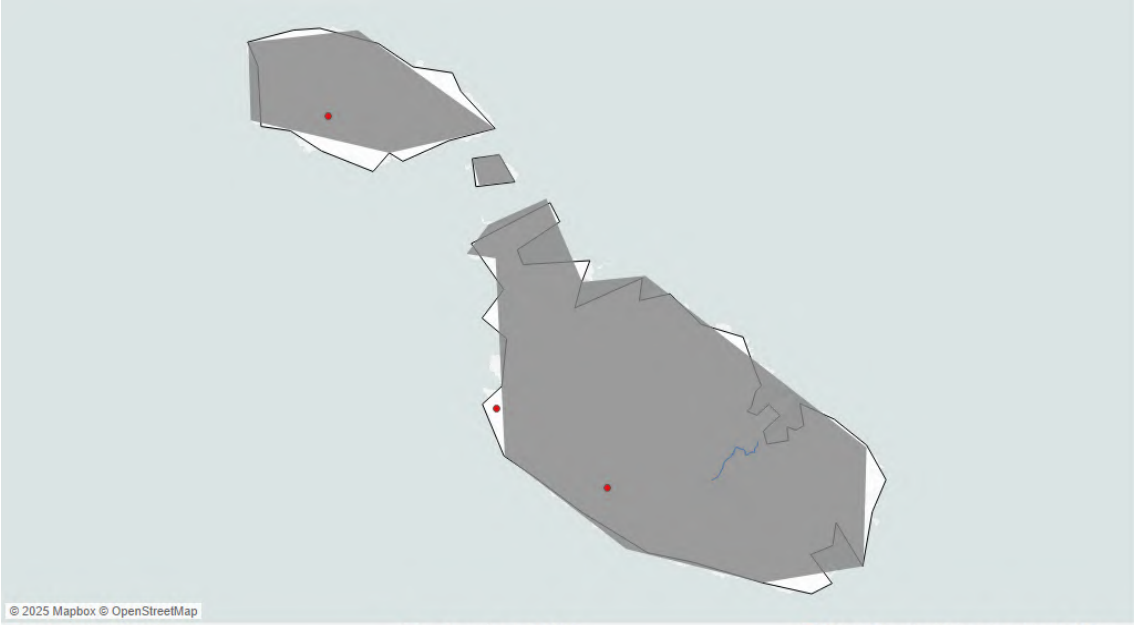



([30]) Change in average annual mean nitrate concentrations compared to the previous reporting period.

## 5.4. Nitrate pollution hotspots in surface waters

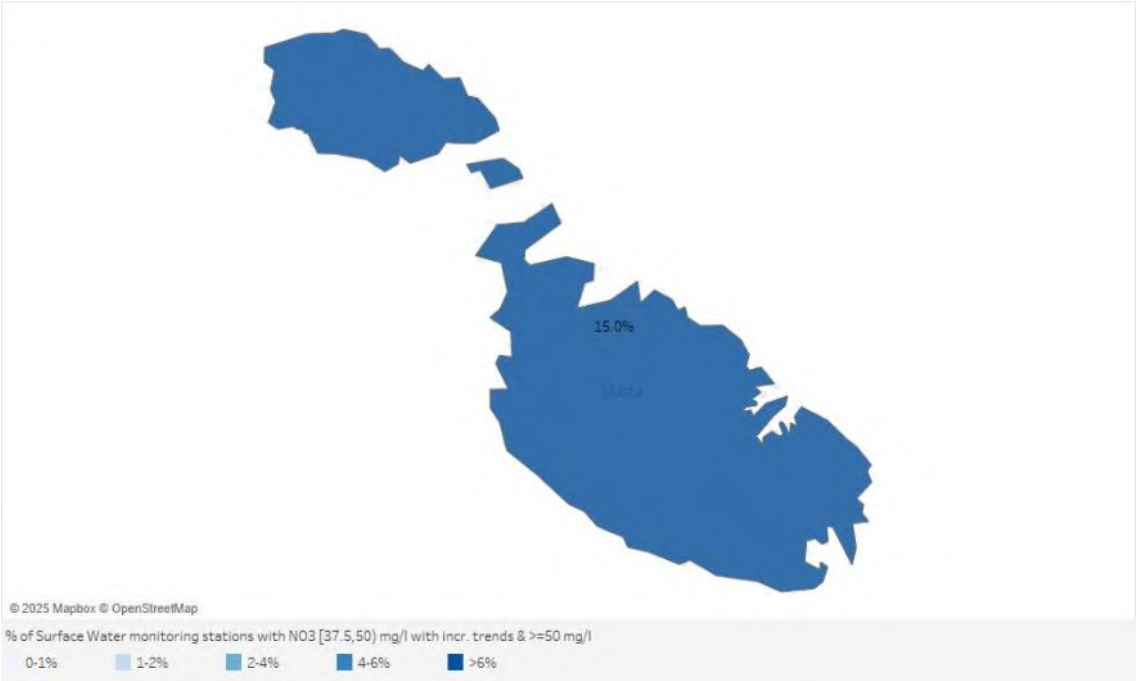
A nitrate pollution hotspot is defined here as a monitoring point where the average annual nitrate concentration is ≥ 50 mg/l or between 37.5 and 49.99 mg/l with an increasing trend. There are 3 surface water nitrate pollution hotspots.
The share of surface water nitrate pollution hotspots at NUTS2 level represents 15% in Malta.

Figure 24 – Surface water nitrate pollution hotspots




| | | inside NVZ | outside NVZ | Total |
|---|---|---|---|---|
| Rivers | [37.5,50) with incr. trend | | | |
| | >=50 | 3 | | 3 |
| Lakes/reservoirs | [37.5,50) with incr. trend | | | |
| | >=50 | | | |
| Total | | 3 | | 3 |

Figure 25 – Share of surface water nitrate pollution hotspots at NUTS2 level



# 6. EUTROPHICATION OF SURFACE WATERS

## 6.1. Monitoring of trophic status in surface waters

The monitoring network is managed by the Environment and Resources Authority, as part of the Ministry for the Environment, Energy, and Public Cleanliness (MEEC). The measurement period for eutrophication assessment covered 2021-2023. Trend analysis for the trophic status was only possible for coastal waters in this reporting period.

During the reporting period 2020-2023 trophic status was reported at 20 monitoring points. Among these, 15.0% were in rivers, 10.0% were in lakes or reservoirs, and 75.0% were in saline waters. The freshwater station density of monitoring points, where trophic status was assessed equals to 15.9 stations per 1 000 km$^2$.

The overall number of freshwater monitoring points increased by 5 from previously, and number of saline water monitoring points decreased by 47 (75.8%) compared to the previous reporting period.

Figure 26 – Evolution in surface water monitoring network (number of points with trophic status reported)

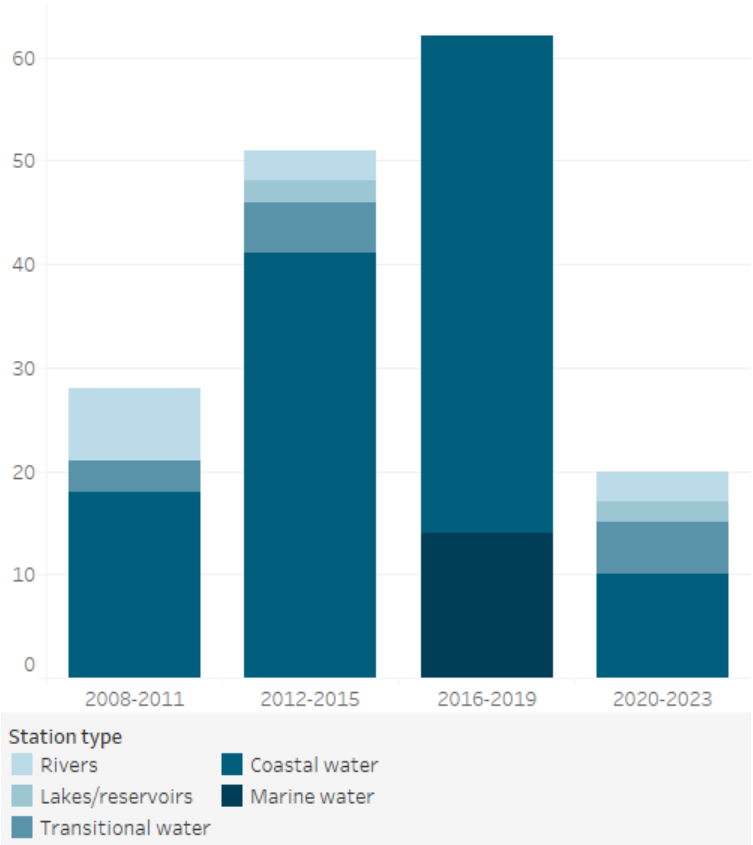


Table 10 – Number of monitoring points reporting trophic status by station type ([31])

| | Stations With Trophic Status | | | |
|---|---|---|---|---|
| Station type | 2008-2011 | 2012-2015 | 2016-2019 | 2020-2023 |
| Rivers | 7 | 3 | | 3 |
| Lakes/reservoirs | | 2 | | 2 |
| Transitional water | 3 | 5 | | 5 |
| Coastal water | 18 | 41 | 48 | 10 |
| Marine water | | | 14 | |
| Total | 28 | 51 | 62 | 20 |

## 6.2. Methodology for the assessment of trophic status

Since Malta has not yet adopted nutrient standards corresponding to ecological status boundaries under the Water Framework Directive (WFD) processes, the trophic index method (TRIX) was used for assessing Mediterranean coastal waters. The TRIX index combines four key variables to evaluate ecological status: Chlorophyll a, dissolved inorganic nitrogen, total phosphorus, and the absolute percentage deviation of oxygen from oxygen saturation values.

As indicated in Malta's 3rd River Basin Management Plan (RBMP), different methodologies were employed to assess macroinvertebrate communities in inland surface and transitional waters. The STAR Intercalibration Common Metrix Index (STAR-ICMi) was applied for watercourses, the QUAELS index was used for freshwater pools, and the multivariate AZTI's Marine Biotic Index (M-AMBI) was utilized for transitional waters.

Malta reported that the parameters and limit values used in the eutrophication assessment for the Nitrates Directive align with those of the Water Framework Directive.

([31]) Malta reported that monitoring was discontinued in 53 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

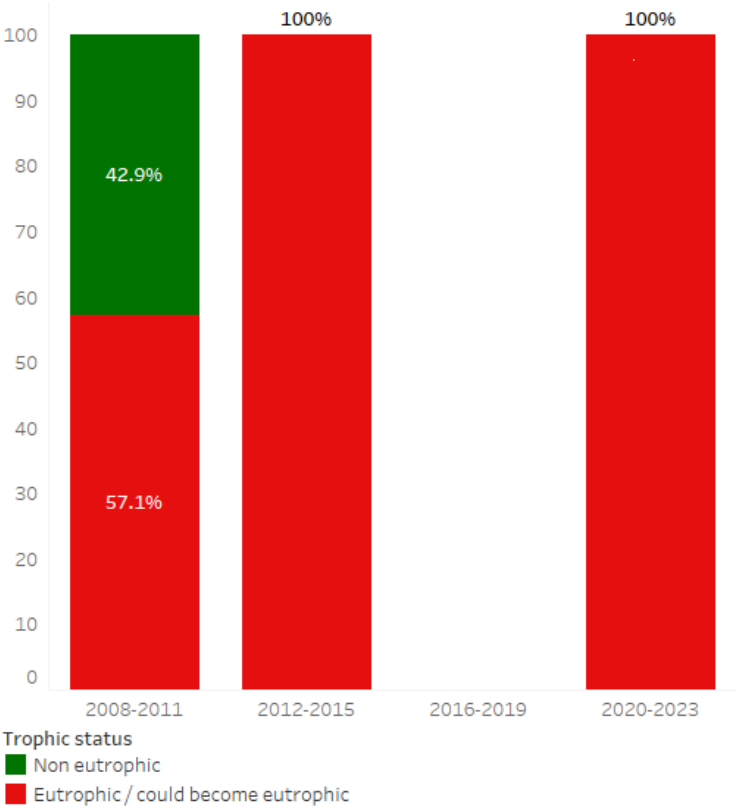
100% of monitoring points in rivers were eutrophic/could become eutrophic. The figure below shows the shares in respective classes in a graph and spatial distribution in the map.

Figure 27 – Map of trophic status in rivers and share of monitoring points by trophic class in the reporting period 2020-2023


Note: Eutrophic/could become eutrophic points are plotted at the top.

A comparison of monitoring points in rivers with trophic status eutrophic/could become eutrophic with the previous reporting period is not possible because no stations were reported in 2016-2019. The graph below presents the shares of monitoring points according to their trophic status in the last four reporting periods.

Figure 28 – Share of monitoring points in rivers by class of trophic status in the current and previous reporting periods



## Lakes and water reservoirs

50.0% of monitoring points in lakes/water reservoirs were eutrophic/could become eutrophic. The figure below shows the shares in respective classes in a graph and spatial distribution in the map.

Figure 29 – Map of trophic status in lakes/water reservoirs and share of monitoring points by trophic class in the reporting period 2020-2023

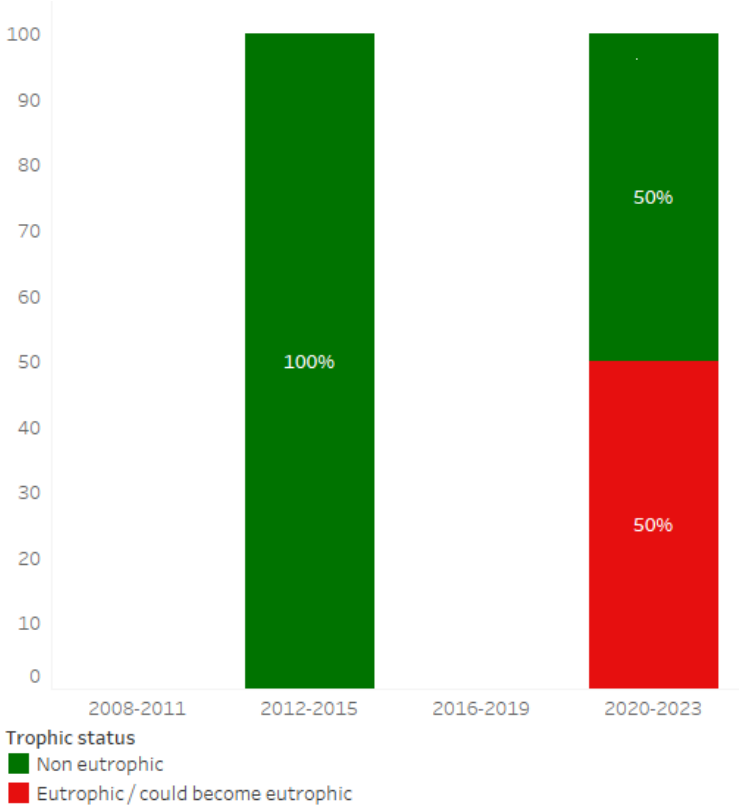

Note: Eutrophic/could become eutrophic points are plotted at the top.

Table 11 – Share of freshwater monitoring points by class of trophic status, categorised by station type

| Station type | Number of Stations | % of Total | Non-eutrophic | Eutrophic/could become eutrophic |
|---|---|---|---|---|
| Rivers | 3 | 60.0% | | 100.0% |
| Lakes/reservoirs | 2 | 40.0% | 50.0% | 50.0% |
| Total | 5 | 100.0% | 20.0% | 80.0% |

A comparison of monitoring points in lakes/reservoirs with trophic status eutrophic/could become eutrophic with the previous reporting period is not possible because no stations were reported in 2016-2019. The graph below presents the shares of monitoring points according to their trophic status in the last four reporting periods. In 2012-2015 the share of eutrophic/could become eutrophic was at 0%. In 2020-2023 it has increased to 50.0%.

Figure 30 – Share of monitoring points in lakes/water reservoirs by class of trophic status in the current and previous reporting periods



## Saline waters

0% of saline water monitoring points were eutrophic/could become eutrophic. The figure below shows the shares in respective classes in a graph and spatial distribution in the map.

Figure 31 – Map of trophic status in saline waters and share of monitoring points by trophic class in the reporting period 2020-2023


Note: Eutrophic/could become eutrophic points are plotted at the top.

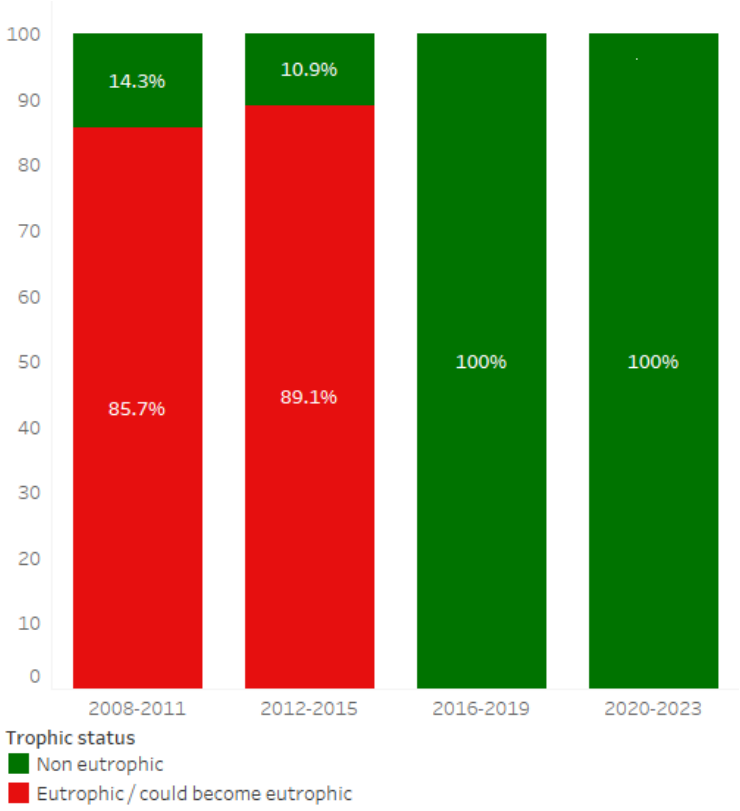
It is relevant to look separately at different types of saline waters (transitional, coastal and marine). In Malta, 0% of transitional water and 0% of coastal water monitoring points were eutrophic/could become eutrophic, as shown in the table below.

Table 12 – Share of saline water monitoring points by class of trophic status, categorised by station type

| Station type | Number of Stations | % of Total | Non-eutrophic | Eutrophic/could become eutrophic |
|---|---|---|---|---|
| Transitional water | 5 | 33.3% | 100.0% | |
| Coastal water | 10 | 66.7% | 100.0% | |
| Marine water | | | | |
| Total | 15 | 100.0% | 100.0% | |

Compared to the previous reporting period, the share of eutrophic/could become eutrophic monitoring points in saline waters remained stable at 0%. The graph below presents the shares of monitoring points according to their trophic status in the last four reporting periods. In 2008-2011 and 2012-2015 the share of eutrophic/could become eutrophic was at 85.7% and 89.1% respectively.

Figure 32 – Share of monitoring points in saline waters by class of trophic status in the current and previous reporting periods

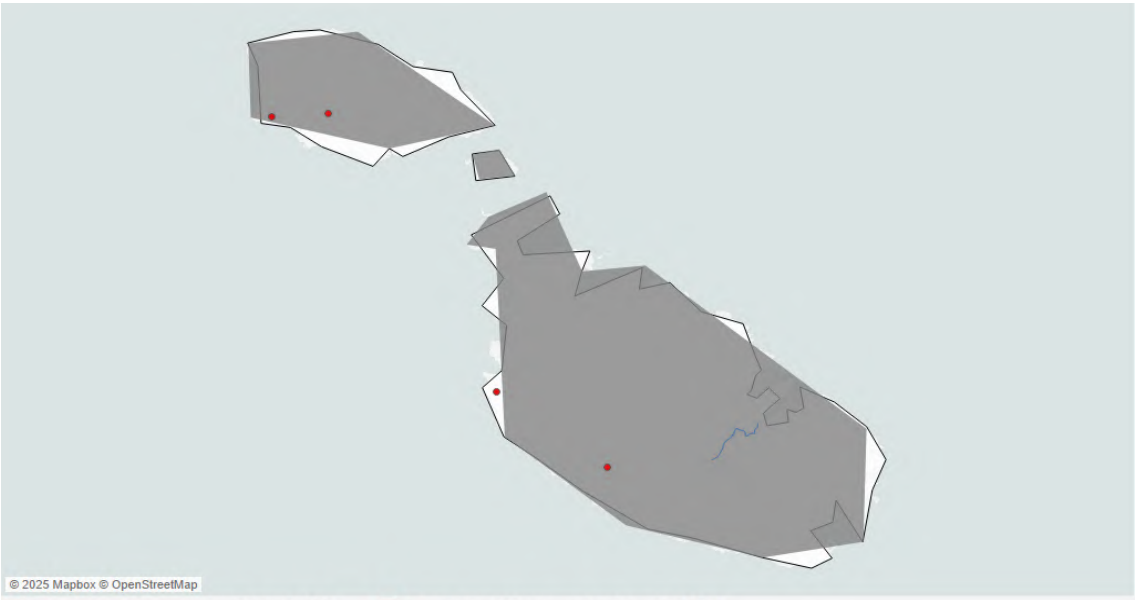


## 6.4. Eutrophication hotspots in surface waters

A eutrophication hotspot in surface waters is defined here as a monitoring point with the trophic status evaluated as “eutrophic” or “could become eutrophic”. Overall, there are 4 surface water monitoring points which were reported eutrophic/could become eutrophic.

The share of eutrophic/could become eutrophic monitoring points at NUTS2 level represent 20% in Malta.

Figure 33 – Eutrophic/could become eutrophic monitoring points




| | inside NVZ | Total |
|---|---|---|
| Rivers | 3 | 3 |
| Lakes | 1 | 1 |
| Total | 4 | 4 |

# 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 code of good agriculture practice for Malta (CGAP) was developed through a Twinning Light Project between Malta and Germany in 2003 (MT 2001/IB/AGRI/01/TL). The CGAP was adopted in 2004 and covers all aspects of agricultural production. The CGAP is primarily implemented through rural development measures, set out in Malta's Rural Development Plan (RDP), and, since 2023, in Malta's CAP strategic plan.

The measures in the CGAP concerned with the implementation of the Nitrates Directive were first set out in 2004 in the first national nitrates action programme for Malta. The second action programme for Malta was reflected in the national legislation through the "Nitrates Action Programme Regulations S.L. 549.66" adopted in 2011. This action programme was last amended in 2018 (Legal Notice 104 of 2018). During the reporting period 2020-2023, the action programme was laid down in Maltese legislation through S.L 549.66.

The whole territory of Malta was designated as a nitrate vulnerable zone in 2004, meaning that all farmers in Malta must apply the programme's requirements.

In the reporting period 2020-2023, no amendments were made to the action programme. Revisions of the action programme and of the CGAP were ongoing at the time of drafting this report.

A consolidated overview of the action programme currently in force is provided in a separate document ([32]).

## 7.2. Controls

On-site controls of the implementation of measures by farmers are carried out by the Maltese Directorate of Agriculture. Throughout the reporting period 2020-2023, 4.6% of the farmers were visited each year.

The highest occurrence of cases of non-compliance is related to record keeping (5.6%). Other cases of non-compliance concern the lack of the cesspit certificate (10.6%) and application of organic fertilisers during the fertiliser prohibition period (3.9%). The main difficulty in implementation is related to the limitation of the spreading periods, which may result in difficulties with the storage of manure.

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

# 8. WATER QUALITY OUTLOOK

No forecasting models have been used to predict water quality trends. However, studies show groundwater in Malta's Mean Sea Level aquifers has a residence time of over 40 years, meaning current management measures may take decades to show effects. Watercourses are considered most vulnerable to agricultural nitrate pollution. This assumption will be reviewed in updates to the nitrates action programme and CGAP.

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