Monitoring

PLN is used as a monitoring method in vulnerable zones in the context of the Nitrates Directive. Each year at least 3% of the farms that have 20% or more of their UAA within a vulnerable zone are selected for monitoring by the Government. Measurements are made in 3 plots on the farm and compared with reference values.

Farmers whose farms are selected are notified of the sampling date not less than seven working days beforehand. The approved laboratory sends the results of the analyses to the farmer and to the Government within ten working days following sampling.

The farmer can arrange for an approved laboratory of his choice to sample one or more of the plots previously sampled within ten working days from receipt of the analysis results and by 20 December of the sampling year at the latest, for counter-analysis. The analysis results that are most favourable to the farmer are the ones used by the Government.

REFERENCE VALUES

The reference values are established from PLN measured at 35 farms monitored by the scientific partners (GxABT and UCL) of the advisory body, Nitrawal, since 2002. These farms are given advice on fertilisation and manage their plots in accordance with the PGDA scheme.

This method takes account of a number of factors that can affect the PLN value.

Factors	Advantages of Method
Crop	There are 8 classes: beet, cereals with nitrogen catch crop, cereals without nitrogen catch crop and chicory, maize, rape, potatoes, vegetables, grass.
Farmer's practices	The plots used to determine the reference values are plots cultivated
Cropping constraints	by farmers, not experimental plots under controlled conditions.
Weather conditions	The reference values take weather conditions into account and change from year to year.
Sampling date	The reference values change throughout the sampling period.
Type of soil	Soil diversity is taken into consideration bearing in mind that the reference PLN for each class of crop is established from 20 plots spread throughout Wallonia.

The reference value for a crop is calculated so that 75% of the PLN values measured on the reference farms are less than the benchmark. In other words, if 100 PLN values are used to establish the reference value, they are arranged in ascending order and the value adopted as the reference is the 75th.

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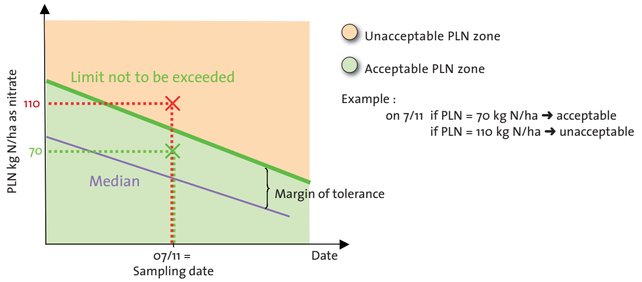
PLN : Potentially Leachable Nitrogen

Assessment

The limit not to be exceeded is the reference value, to which is added a margin of tolerance based on the variability of the measurement (see graph).

The margin of tolerance for the crops is plus or minus 20% of the median, but not less than 15 kg of nitric nitrogen per hectare. In grassland, on the other hand, it is 23.8 kg of nitric nitrogen per hectare.

A PLN value is acceptable if the measured value is below this limit, which is established afresh each year.



Three plots are selected on each farm monitored. The beet plots lifted before 15 October may be replaced by other plots chosen by the Government. The assessment is carried out as follows:

Number of unacceptable PLN	Assessment	Consequences
0 out of 3	Positive	None
1 out of 3	Positive	None
2 out of 3	Negative	Included in the observation programme
3 out of 3	Negative	Included in the observation programme

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PLN : Potentially Leachable Nitrogen

GOOD AGRICULTURAL PRACTICES

OBSERVATION PROGRAMME

The observation programme lasts for a minimum of two years. Three new PLN values are measured and assessed in each year of the programme. A positive assessment must be obtained in two consecutive years in order to stop taking part in the observation programme. If, on the other hand, a farmer has three negative assessments (consecutive or not) during the observation programme he must pay a fine. During the observation programme the farmer must contact one of the approved laboratories before 1st September of the assessment year to arrange for PLN analyses to be carried out. The cost of the analyses is payable by the farmer except for analyses conducted during the final year of participation in the programme.

Summary table of the various scenarii.

TESTING	OBSERVATION PROGRAMME				
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
			FINE		
				FINE	
					FINE
		END OF PARTICIPATION IN OBSERVATION PROGRAMME			
				END OF PARTICIPATION IN OBSERVATION PROGRAMME	
					END OF PARTICIPATION IN OBSERVATION PROGRAMME

Negative assessment: 2 out of 3 PLN values are unacceptable in a single year

Positive assessment: 2 out of 3 PLN values are acceptable in a single year

Your assessment is positive this year and:

1. You were already taking part in the observation programme
   - Last year's assessment was positive ➔ You no longer need to take part in the observation programme
   - Last year's assessment was negative ➔ You still need to take part in the observation programme
2. You were not yet taking part in the observation programme ➔ No further action

Your assessment is negative this year and:

1. You were already taking part in the observation programme
   - You had already received at least two negative assessments in the same observation programme ➔ You will have to pay a fine and you must continue to take part in the programme
   - You have not yet received two negative assessments in the same observation programme ➔ You will not have to pay a fine but you must continue to take part in the programme
2. You were not yet taking part in the observation programme ➔ You will be included in the observation programme

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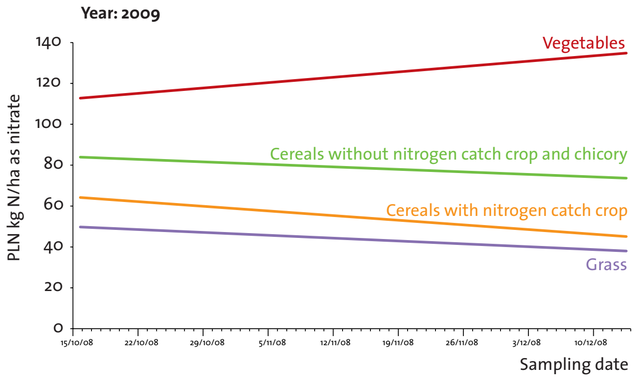
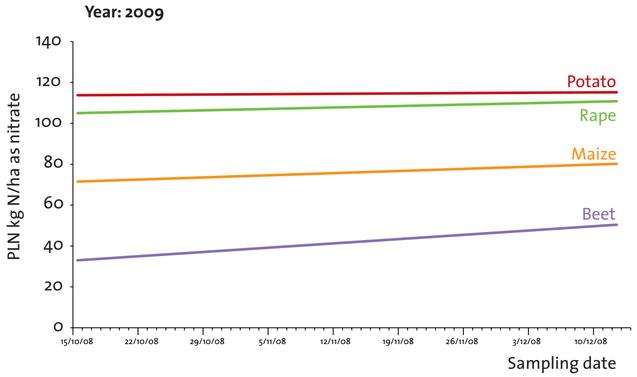
PLN : Potentially Leachable Nitrogen

Reference lines for the 8 classes





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PLN : Potentially Leachable Nitrogen

GOOD AGRICULTURAL PRACTICES

Fines

Conditions	Fine (per ha UAA declared under CAP)
You have had at least three negative assessments	120 €
But if - You asked Nitrawal to draw up a fertilizer plan as soon as you joined the observation programme; - The PLN values improve over time but still fail to meet the requirements.	40 €
But if - You asked Nitrawal to draw up a fertilizer plan as soon as you joined the observation programme; - The PLN values improve over time but still fail to meet the requirements; - The PLN for a higher-risk crop (maize, flax, rape, vegetables, potatoes) is acceptable.	20 €

Within a single observation programme, for each additional year for which the assessment is negative the fine is double the amount of the last fine.

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PLN : Potentially Leachable Nitrogen

GOOD AGRICULTURAL PRACTICES

PLN stands for 'potentially leachable nitrogen'. This is the quantity of nitrogen present in the soil in nitrate form (NO_3) measured by laboratory analysis. Soil sampling is carried out after the harvest, between 15 October and 30 November, to a depth of 90 cm in arable land and 30 cm in grassland. The PLN is expressed as kg of nitric nitrogen per hectare.

Aim of PLN measurement

Soil nitrate is highly soluble in water, which therefore readily mobilises and carries it. In winter, when rain filters down through the soil to replenish the water tables, it carries some of that nitrate with it. The nitrate is thus leached. PLN thus expresses the environmental risk associated with the plot: the higher the PLN value, the greater the risk of nitrate leaching.

Factors that determine the PLN value

Factor	Impact
Crop	No crop can remove all the nitrogen from the soil, but some plant species tend to leave a poorer soil profile after harvesting than others. There are several reasons for this: longer growth period, deeper or denser roots, later harvesting, less tillage at harvesting, etc.
Farmer's practices	**Managed fertilisation** allows fertilizer applications to be adapted to the plant's needs, thus limiting the amount of residual nutrients not taken up by the crop. **Managing the off-season period** is very important. A nitrogen catch crop planted in favourable conditions can remove up to 150 kg nitrogen per hectare. Care is necessary, though, as late planting can increase the soil nitrogen level. A nitrogen catch crop sown too late will not grow sufficiently to absorb the nitrogen produced by mineralisation of farmyard manure and humus after the end of the harvested crop's growth period.
Cropping constraints	Any disturbance to the crop causing loss of yield will reduce the plant's nitrogen uptake.
Weather conditions	Weather affects humus mineralisation. A warm, wet autumn favours mineralisation and thus, nitrate release.
Sampling date	The quantity of nitrate measured in the profile is not the same in October and in November, due to changing mineralisation conditions. Also, some of the nitrate may already have been leached or, on the contrary, taken up by a crop.
Type of soil	As well as weather conditions, mineralisation also depends on various soil characteristics: texture, structure, pH, humus content, etc.

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