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# Soil Fertility and Fertiliser Plans

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Agri-Environmental requirements and efficient management of manure in BALTIC Sea region countries  
15.-16.02.2016



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# Competence of the Agrochemical Department of the SPPS

- **Soil agrochemical research** (*further - SAR*)
- **Control of the fertilisation** *in all territory of Latvia* **and fertilisation documentation** *in Nitrate vulnerable zones (NVZ)*
- **Analyses of the soil and fertilisers**



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# National Legislation for Sustainable Soils Fertility and Fertilisation

- Law On Agriculture and Rural Development
- Cabinet Regulations No. 833 Adopted 5 October 2004 "Procedure for obtaining and compiling information on agricultural land fertility levels and trends"
- Cabinet Regulation No.834 Adopted 23 December 2014 "Regulations on protection of water and soil from nitrate pollution caused as a result of agricultural activity"



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# State Planning Regions

## Agricultural Land (Cultivate) 1 936 034 ha

*Rural Support Service, 01.01.2015*





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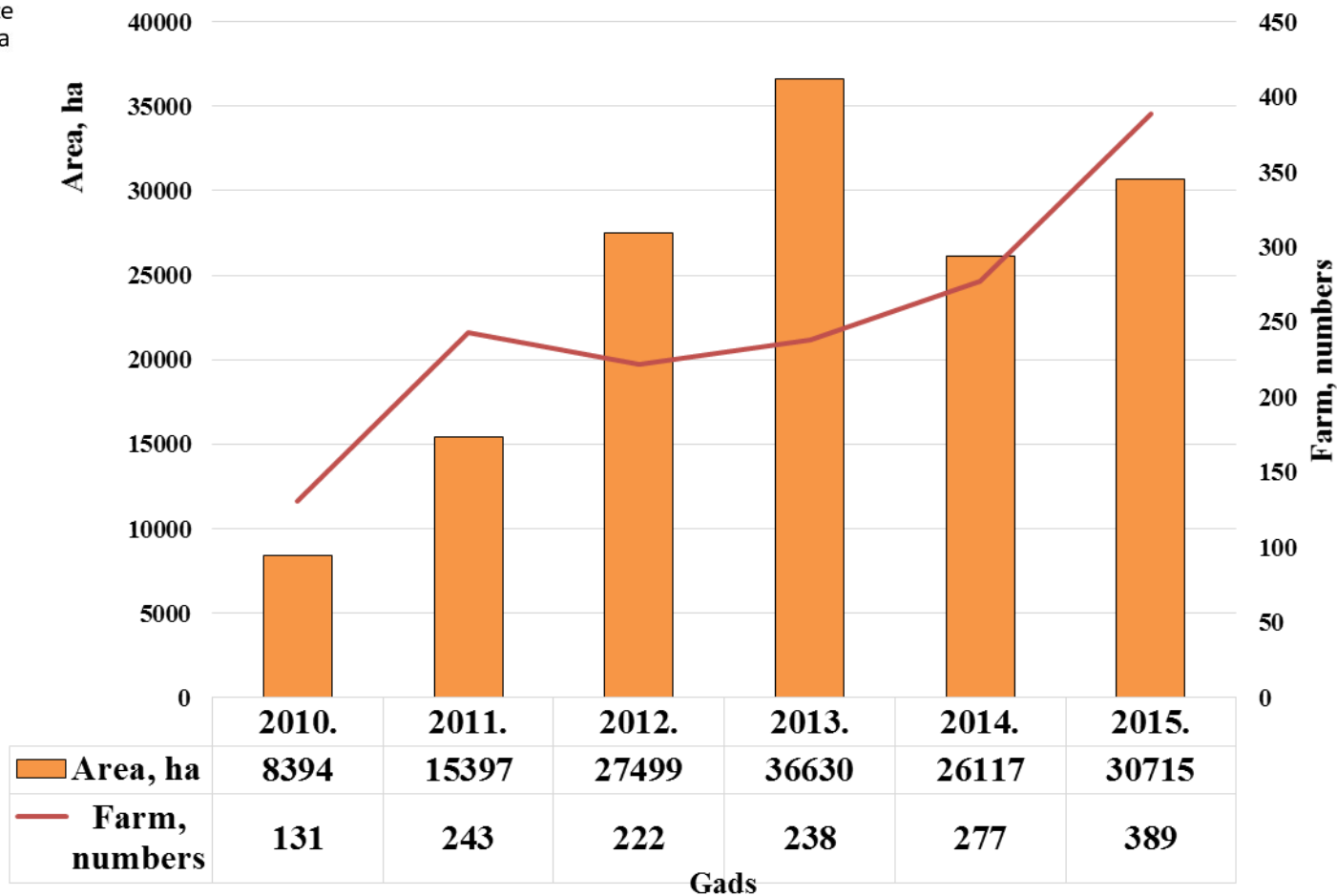
# Soil Agrochemical Research (*further – SAR*)

- A professional soil sampling with specific probes, according to soil type and particle size distribution indicated by the Latvian State Land Service soils maps
- Soil sample testing in an accredited laboratory under the Ministry of Agriculture recommended test methods
- The testing data are entered and stored at **SAR** database.
- Evaluation of test results in accordance with evaluation groups which have been developed by Latvian scientists and which have been approved by the Ministry of Agriculture
- **SAR** materials include chemical studies of soil maps, the preparation and issuance to the customer.



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# Dinamics of the Mapped area, ha



## Agrochemical Characteristics of the Agricultural Land in Latvia

### Organic Matter, ha %

Organic matter content, %	1995 <i>(VZD un „Ražība”)</i>	2014 <i>SPPS monitoring 5008 ha</i>
to 3,0	72 - 76	66
3,1 – 5,0	13 - 17	<u>23</u>
above 5,0	10	11

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## Agrochemical Characteristics of the Agricultural Land in Latvia

### Acidity, ha %

Acidity, pH <sub>KCl</sub>	1995 <i>(VZD un „Ražība”)</i>	2014 <i>SPPS monitoring 5008 ha</i>
<b>to 5,0</b> – strongly acidic and sour	<b>8 – 10</b>	<b>11</b>
<b>5,1 – 6,0</b> – weak and moderate acid	<b>26 – 34</b>	<b><u>41</u></b>
<b>above 6,1</b> - normal	<b>56 - 64</b>	<b>48</b>

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## Agrochemical Characteristics of the Agricultural Land in Latvia

### Phosphorus, ha %

Group	1995 (VZD un „Ražība”)	2014 <i>SPPS monitoring 5008 ha</i>
Very low and low	37	<u>56</u>
Average	33	27
High and very high	29 - 30	17

## Agrochemical Characteristics of the Agricultural Land in Latvia

### Potasium, hectare %

Group	1995 (VZD un „Ražība”)	2014 <i>SPPS monitoring 5008 ha</i>
Very low and low	18 – 21	<u>14</u>
Average	48 – 51	61
High and very high	30 - 31	<u>25</u>

## Conclusions

1. Latvian agricultural land has had a tendency of soil acidification
2. Agricultural land is generally poorly served by phosphorus
3. There is a tendency of decrease in potassium content
4. In view of the Latvian soil agrochemical conditions, greater emphasis should be on the right (time and kind of fertiliser application) and balanced use of phosphorus fertilisers instead of phosphorus limitation
5. To objectively compare different national soil agrochemical properties a question of common soil analysis methods is still in EU



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# Requirements for fertilisation of fertilisers

## In all Latvia

- the amount of manure worked into the ground in utilised agricultural areas does not exceed 170 kg of nitrogen per hectare per year;
- the fertiliser shall not be spread upon frozen, water saturated or snow-covered soil;
- the fertiliser shall not be spread at sites where it is prohibited in accordance with regulatory enactments regarding protective zones and regarding special protection areas; *(for example, in Surface Water Body Protection Zones - is prohibited in the 10-metre zone to use fertiliser material)*
- manured litter and digestates after its spreading upon arable land shall be worked into the ground within 24 hours, whereas liquid fertiliser and urines – within 12 hours;



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# Requirements for utilisation of fertilisers

## **In nitrate vulnerable zones (NVZ)**

- manure and digestate shall not be spread during the time period from 20 October to 15 March (for grasses – from 5 November to 15 March);
- nitrogen mineral fertilisers shall not be spread for winter crops during the time period from 15 October to 15 March (for other crops and grasses – from 15 September to 15 March);
- the maximum nitrogen norms, which have been established in the Cabinet Regulation No.834, should not be exceeded.



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# Competence the State Plant Protection Service (SPPS)

SPPS shall:

- monitor and control crop fertiliser plans in the NVZ in accordance with Cabinet Regulation No.834 ;
- maintain the State information system database (hereinafter – database) regarding the farms in the vulnerable territories;
- implement mineral nitrogen monitoring of soil



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## Farmers responsibilities in the NVZ

A person, who applies fertilisers over an area of 20 ha and more, as well as grows vegetables, fruit trees and berry bushes – over an area of 3 ha and more, shall prepare and implement a fertilisation plan, taking into account the following requirements:

- the field history shall be documented for each field;
- a fertilisation plan for cultivated plants shall be prepared for each field every year not later than by sowing or planting of cultivated plants, for permanent sowings and plantings – by the beginning of vegetation and a summary fertilisation plan for cultivated plants shall be prepared for the yield of current year;



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## Farmers responsibilities in the NVZ

- preparation of a plan for the fertilisation of cultivated plants shall be based on the data of SAR or analysis of soils **not older than five years;**
- the summary fertilisation plan for cultivated plants for the yield of current year shall be submitted to the SPPS not later than by 15 May;
- setting the crop need for nitrogen, take into account the planned yield and its quality, nitrogen runoff, soil organic matter content, use of coefficients from manure, stubble and green manure, as well as forecrop (legumes) after the impact, and data on the **content of nitrogen in the soil after the restoration of crop vegetation**





# MONITORING OF MINERAL NITROGEN IN SOILS OF LATVIA

Introduction





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# Introduction

Monitoring has been started in 2005

Monitoring has been carried out according to the measure “To ensure a system of fertilizing of cultivated plants that is harmless to environment” set out within the Action Programme for vulnerable zones in order to implement the requirements of EU Nitrate Directive.

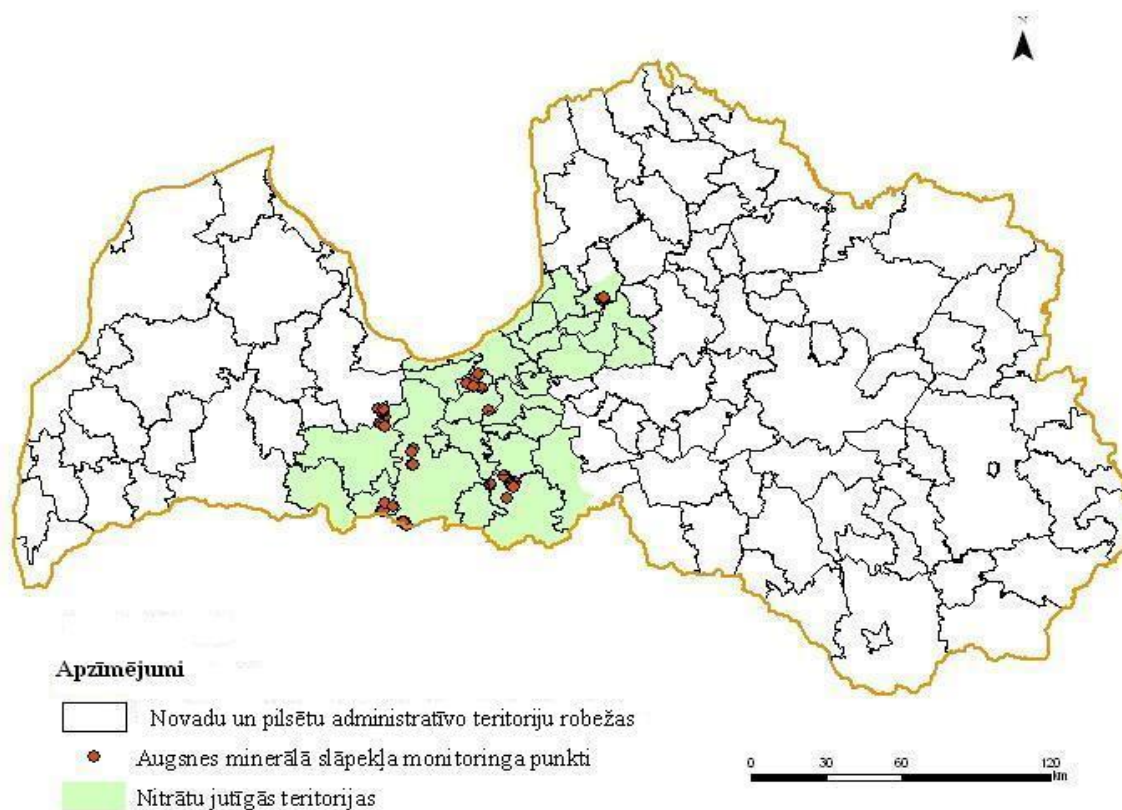
The aim - to provide agricultural producers with recommendations for correction of nitrogen fertilizer rates for winter cereals and water pollution decrease with nitrates.



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# Location of NVZ

## 26 administrative districts



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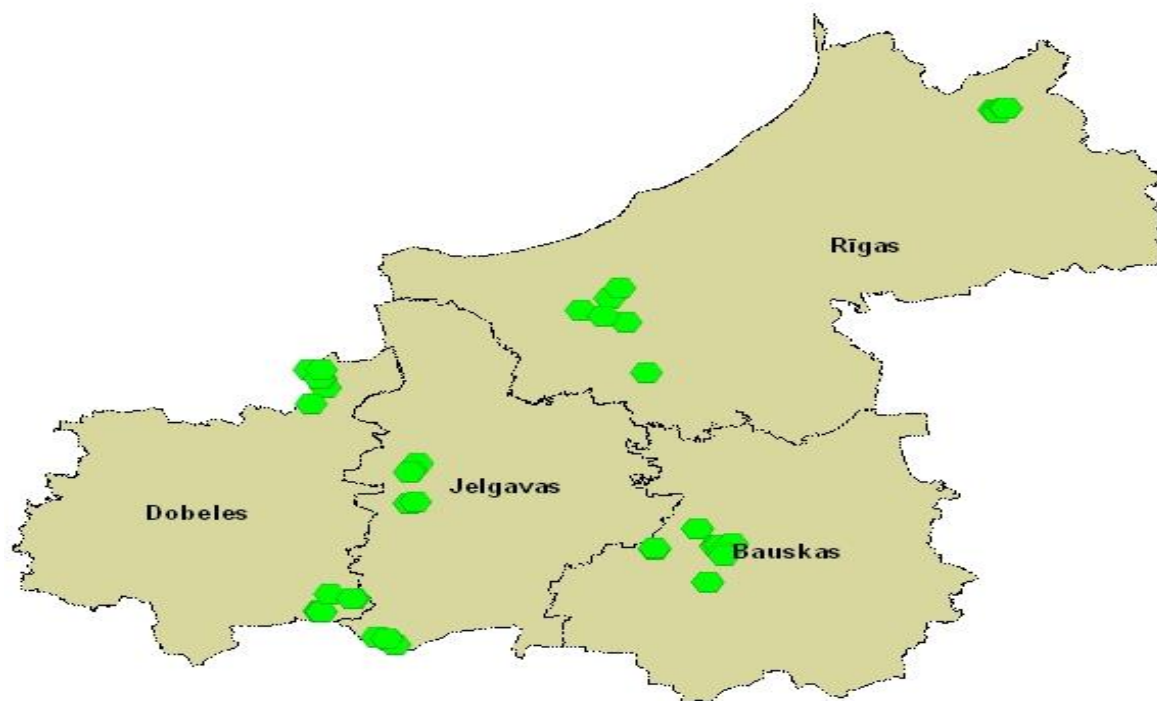
16.02.2016



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# Location of N monitoring points

48 places of study selected in the NVZ,  
representing the soils of 6 administrative  
districts





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# Materials

The coordinates have been determined by the global position system receiver

The type of the soil and the soil texture according to the soil maps of the State Land Service

The historical data of fields have been recorded concerning the cultivated crops, its productivity and fertilizing

The meteorological data from the meteorological stations, situated in the proximity of the places of study



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## Methods

The soil samples were taken twice a year, in early spring and late autumn, before winter from the soil layers of 0-30, 30-60 and 60-90 cm.

The combined soil sample consists of 8-9 samples in sampling places the total area of which constitutes 314 m<sup>2</sup> or 10 m radius from point where coordinates have been determined earlier.

The content of nitrates and ammonium nitrogen was determined in all the layers of the soil, according to the method set out by ISO/TS 14256-2.

Moisture content in soil was determined according to the method of ISO 11465.



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## Methods

Results are declared in milligrams per kg and kg per ha of field-moist soil and recalculated for oven dry soil taking into account the moisture content is different soils

The mineral nitrogen monitoring data base is made

On the ground of spring data of nitrogen amount in field-moist soil (kg per ha) the nitrogen additional fertilisation recommendations for winter cereals are given in study places



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# Recommendations for correction N fertilising norms

Year	N correction, kg/ha
2015	0
2014	+10/+15
2013	+ 20





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# Conclusions

1. Soil mineral nitrogen monitoring data obtained in spring showed the differences in mineral nitrogen content in soil in different years and places. It depends on soil texture, meteorological conditions in autumn-winter period and application of fertilisers, especially manure.
2. The nitrate nitrogen content in soils in autumn in soil layer 0-30 cm was mainly low or medium, but in deeper soil layers it was low in 67-98% of places. Those data let a conclusion be made that soils of Latvia are comparatively unpolluted by nitrates.
3. Now it is impossible to compare data obtained in Latvia with those of other countries due to different analytical methods used for determination of mineral nitrogen in soil.



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**Thank you for attention!**

