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Interreg Baltic Sea Region

EUROPEAN UNION

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# *«Digital methods for agricultural monitoring and nutrient load management».*

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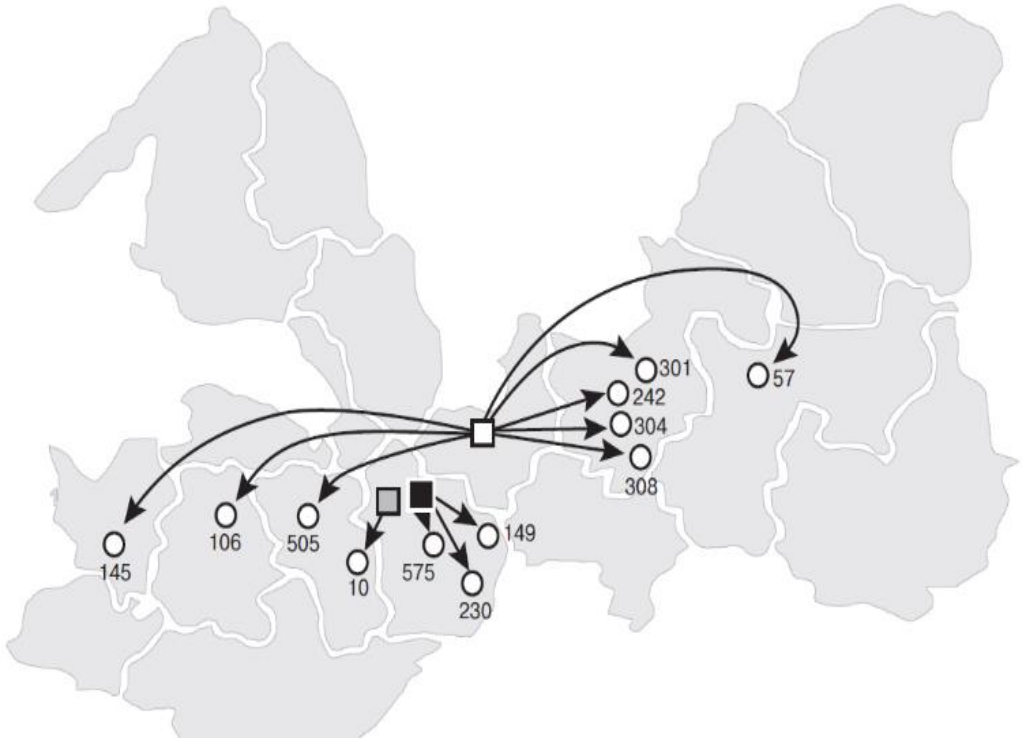
## *Introduction*

*Priority tasks of the joint environmental activity in the Baltic region include nutrient load monitoring and development of measures aimed at its reduction.*

*The main function of an interactive programme is monitoring of livestock/poultry waste management to coordinate use of organic fertilizers considering environmental and ecological data.*

*The programme is mainly aimed at information support for executive authorities and managers of agricultural enterprises in terms of environmental and production efficiency improvement within preparation and use of organic fertilisers in agriculture.*



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## *Description*

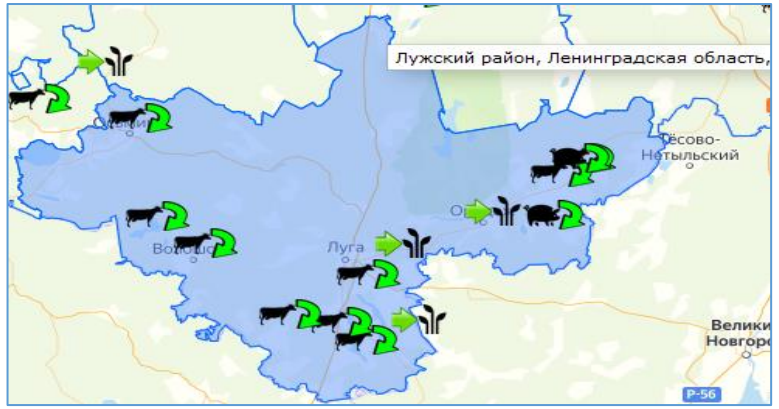
*The programme fulfills the following functions:*

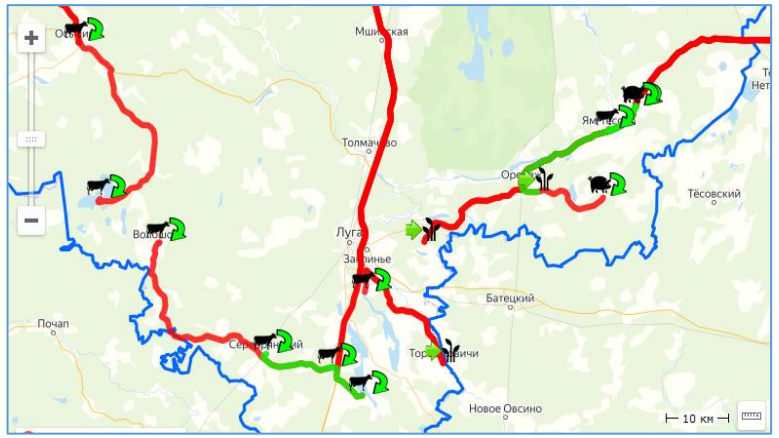
*1. keeping the database and displaying the current situation in relation to agricultural organisations on the map based on the following parameters:*

- *livestock (increase, decrease);*
- *enterprise's focus area;*
- *area of agricultural lands available for organic fertilisers;*
- *applied technological solutions related to manure/droppings processing into organic fertilisers;*
- *organic fertiliser performances and parameters;*

*2. logistics of obtained organic fertilizer use: organic fertilizer distribution between supplying enterprises (produce more fertilisers than they need for their own fields) and consuming ones (need more fertilisers than they can produce);*

*3. reporting documents' drafting.*



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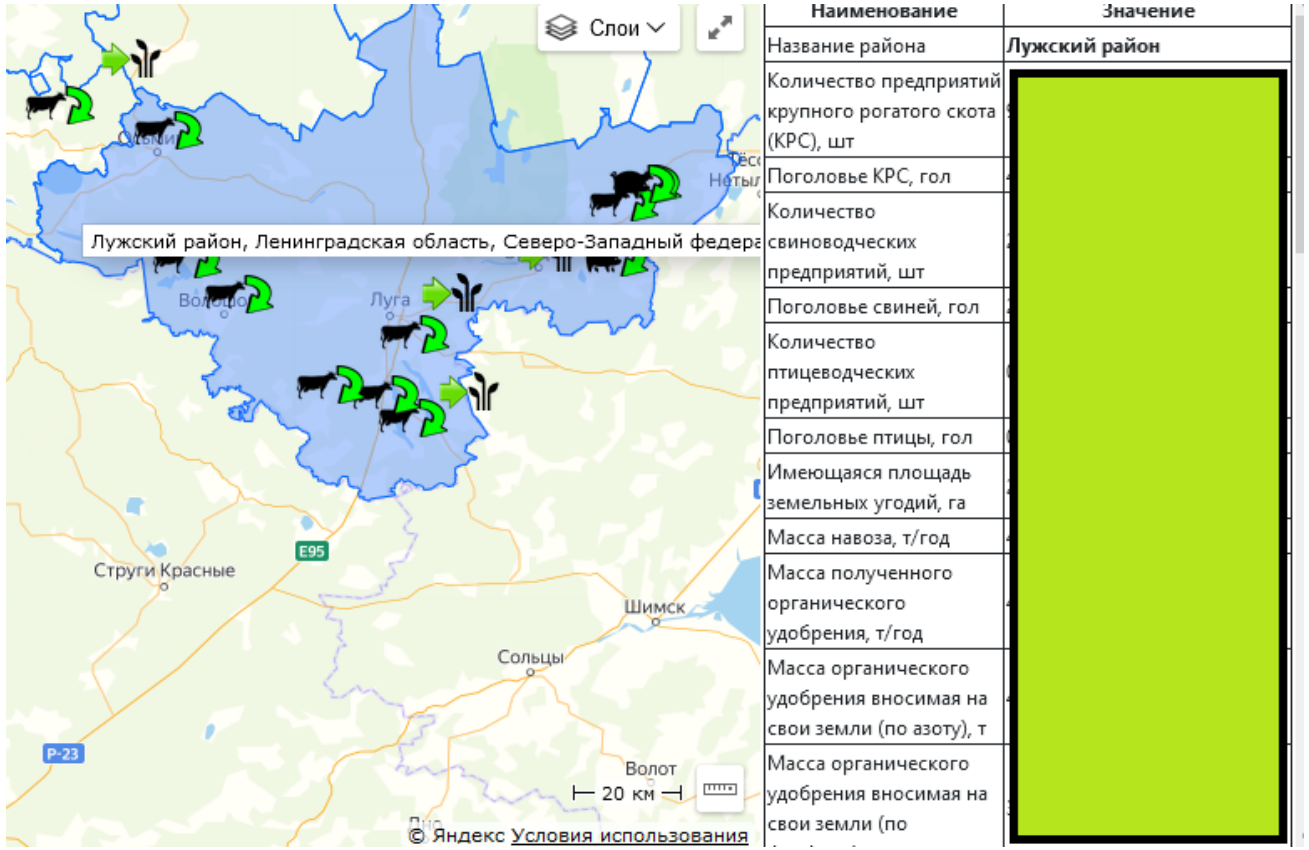
## *Description*

*The programme makes it possible to manage nutrients and to monitor the expected reduction of diffuse load provided by agricultural production in the Baltic Sea area. As a result, all produced organic fertilisers are distributed over agricultural lands which reduces the diffuse load in the Baltic Sea region.*

*Biogenic elements are managed depending on specific conditions by changing optimisation criteria in the fertiliser distribution logistics model.*

*Digital maps based on a selected geographic information system were used to position farms and to determine their relations in terms of organic fertilisers' distribution. Such approach combines programming resources with spatial visualisation and turns agricultural monitoring and biogenic load management into interactive processes.*



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*Has the measure a potential to deliver multiple ecosystem services*

*So far, we have developed a program for distribution of organic fertilizers for the Luzhskiy region that takes into account published data on soil properties.*

*Next steps:*

- *Update and monitor the current status of agrochemical composition of soils in this region*
- *Update and monitor the current status of technical facilities and manure storages*
- *Expand the program to other Baltic Sea Regions*
- *Use the developed tool to organize logistics for milk and finished products*

РОССИЙСКАЯ ФЕДЕРАЦИЯ

СВИДЕТЕЛЬСТВО

о государственной регистрации программы для ЭВМ

№ 2021617771

Программный комплекс интеллектуальной системы мониторинга и управления органическими отходами животноводства для обеспечения экологической безопасности и эффективного использования органических удобрений

Правообладатель: *Федеральное государственное бюджетное научное учреждение «Федеральный научный агроинженерный центр ВИМ» (ФГБНУ ФНАЦ ВИМ) (RU)*

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*Руководитель Федеральной службы по интеллектуальной собственности*

*Г.П. Ивлиев*

РОССИЙСКАЯ ФЕДЕРАЦИЯ

СВИДЕТЕЛЬСТВО

о государственной регистрации базы данных

№ 2021621008

База данных для интеллектуальной системы мониторинга и управления органическими отходами животноводства для обеспечения экологической безопасности и эффективного использования органического удобрения

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*Руководитель Федеральной службы по интеллектуальной собственности*

*Г.П. Ивлиев*

*Are there gaps in knowledge – functioning, efficiency, best localisation?*

*The digital maps based on a selected geographic information system are used to position the farms and to determine the inter-farm relationships in terms of organic fertilizer distribution. This way the programming resources are combined with spatial visualisation, and the agro-monitoring and nutrient load management are made interactive.*

*The mathematical model for limiting the nutrients introduction per one hectare of agricultural land was adopted as the basis to create a forecasting system and a logistic scheme for organic fertilizers distribution.*

*The limiting factor in the fertilizer application dose is total nitrogen (170 kg/ha) and total phosphorus (25 kg/ha). When one of the indicators reaches the limit value, the programme will give a signal. The indicator (total nitrogen or total phosphorus) the limit value of which is reached first is considered the most significant in the calculation of the organic fertilizer application dose.*

## *Effects, duration and maintenance*

*Promotes diffuse load reduction in the catchment area of the Baltic Sea region*

*As all organic fertilisers are distributed across agricultural lands considering the application rates for nitrogen and phosphorus:*

*- soil fertility increases;*

*- agricultural enterprises get planned yield;*

*- risk that nitrogen or phosphorus may get to waterbodies or groundwaters reduces;*

*- due application (and not storage) of organic fertilisers reduces pollutant emissions to atmosphere*

*- increased volumes of liquid organic fertilisers reduce risks of agricultural land water logging*

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