

Waterdrive National Pathways Russia

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Pathway 1.	Strengthening the monitoring systems
Pathway 2.	Improving water management and spatial planning through digital methods and means
Pathway 3.	Strengthening advisory activity for business and rising awareness of local public authorities and population
Pathway 4.	New and more effective financing mechanisms

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The National Pathways for Russia are represented on this slide:

Pathway 1. Strengthening the monitoring systems.

Pathway 2. Improving water management and spatial planning through digital methods and means.

Pathway 3. Strengthening advisory activity for business and rising awareness of local public authorities and population.

Pathway 4. New and more effective financing mechanisms.

In this document (presentation), there is an attempt to reveal the content of the proposals and specific actions in each direction.

Pathway 1. Strengthening the monitoring systems

- Differentiated monitoring system
- Public organizations can monitor the state of local water bodies
- Equipping with the necessary equipment and knowledge



Photo: Eduard Vasilev

The following measures are the most simple and effective for strengthening water monitoring:

Differentiated monitoring system, which can start from the local level (settlement, district, region).

Public organizations can monitor the conditions of local water bodies, realizing that they have the necessary tools and competencies to control the situation. It can be a municipal order to demonstrate to the public and business that there is external control over the situation in the area.

Equipping public organizations with the necessary equipment and knowledge will improve the quality of observations.

Pathway 1. Strengthening the monitoring systems

- Modernization of water measuring hydrological posts
- Development of ground and remote monitoring facilities

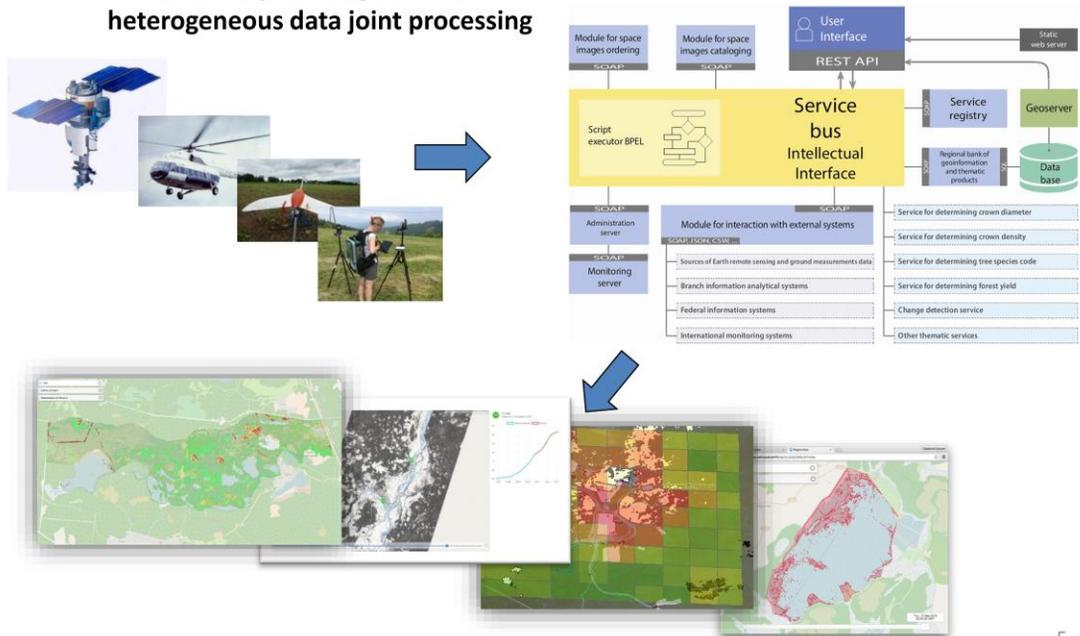


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Another necessary action should be the modernization of **water measuring hydrological posts**. It is necessary to create a modern observation system that would increase the level of safety of the population and improve the quality of hydrological information provided to consumers using new technologies for collecting observational data to improve the determination of the level of river pollution and forecasting indicators of the hydrological regime of rivers.

Another measure - **Development of ground and remote monitoring facilities.**

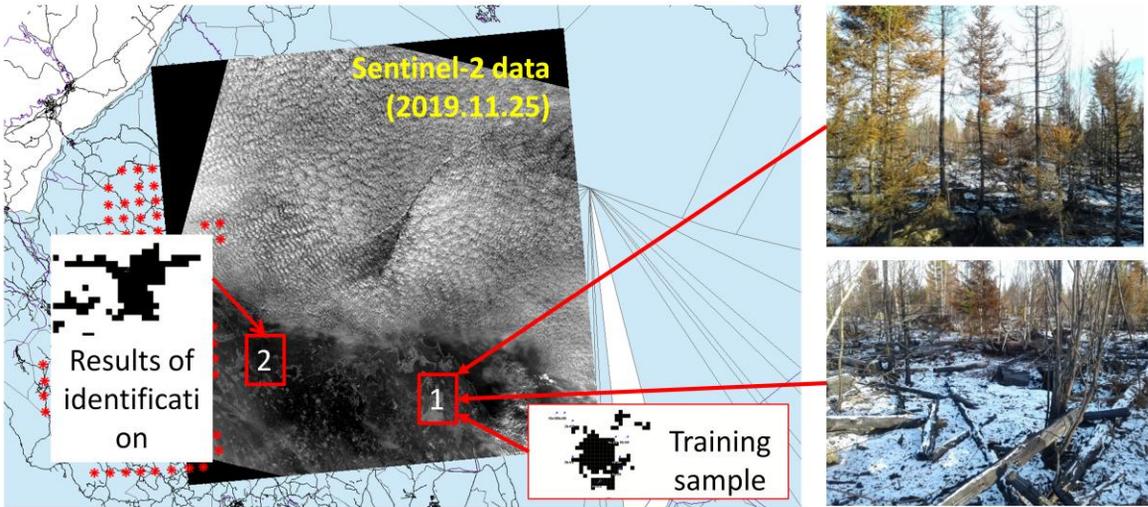
Services providing based on heterogeneous data joint processing



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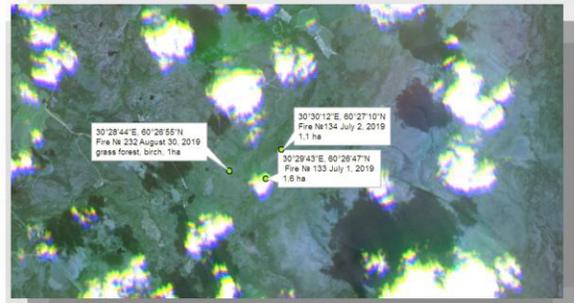
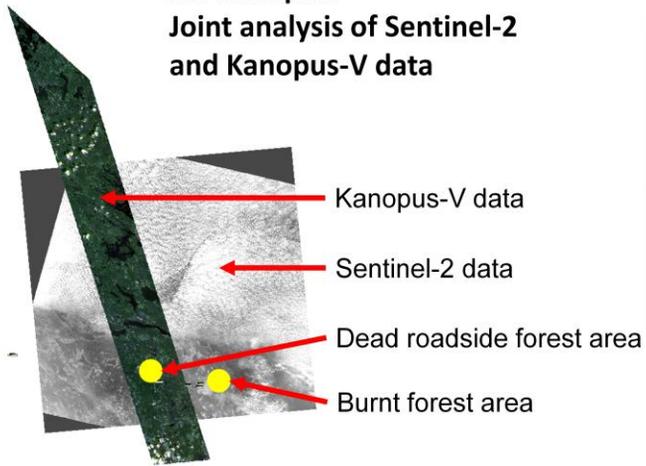
The basic approach to the development of monitoring tools is the integrated use of various data - both ground-based and remote sensing data, and their joint processing. The main goal is to ensure maximum reliability of monitoring. Remote data can be obtained from various sources - aeronautical and satellite. Satellite data can also be of different types - from different satellite systems and different bands (optical and radar).

**An example:
Automated plant community identification**



An example of the combined use of satellite and ground data to automate the identification of vegetation is shown in this slide.

**An example:
Joint analysis of Sentinel-2
and Kanopus-V data**



Burnt forest area on available Kanopus-V data (21.08.2020): low level of information content due to weather conditions and sensing mode (number of spectral bands)

Application of Kanopus-V data



Visualization and refinement of Sentinel-2 data processing results

An example of joint use of European and Russian satellite data is shown in this slide.

Pathway 2. Improving water management and spatial planning through digital methods and means

- Development of models and information-analytical systems for predicting of situations in specific territories for operational and scenario calculation of the consequences of planned water management measures



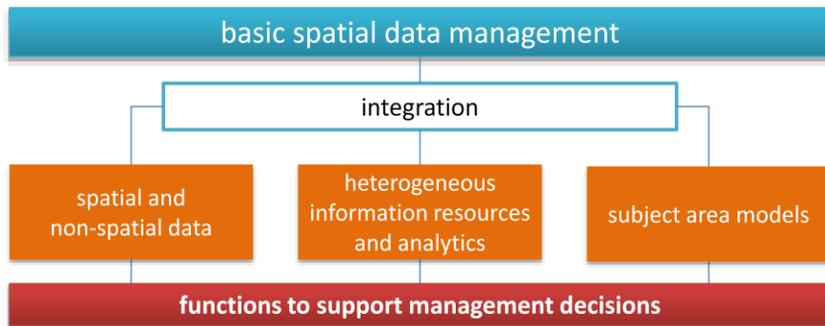
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National pathway number 2 - Improving water management and spatial planning through digital means and methods.

Here we propose to pay serious attention to the following area of work:

Development of models and information-analytical systems for predicting the situations in specific territories for operational and scenario calculation of the consequences of planned water management measures.

Main approach for monitoring, forecasting and decision support system development

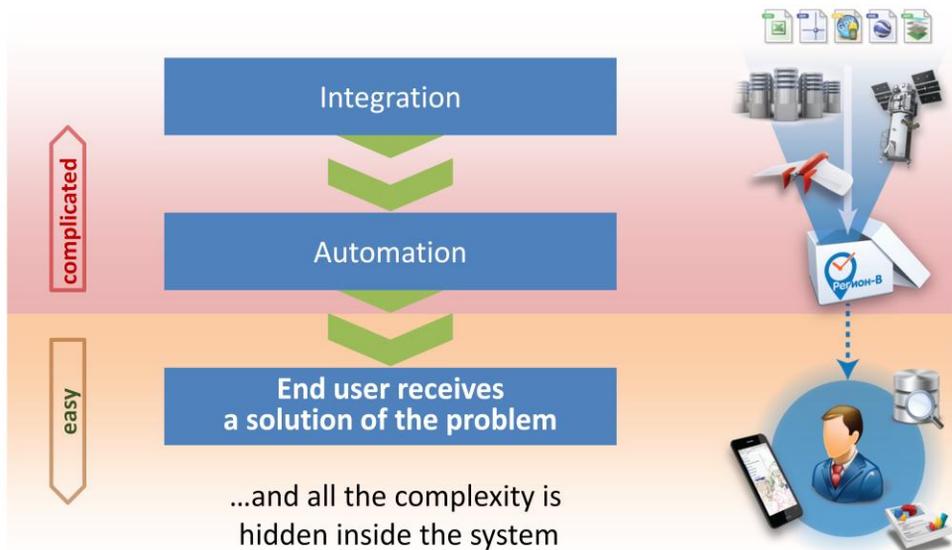


The single integration platform allows for a high level of automation

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The main principle of creating information systems for forecasting and decision support is to ensure the integration on a single platform of information from various sources, and models for forecasting.

Basic Principles



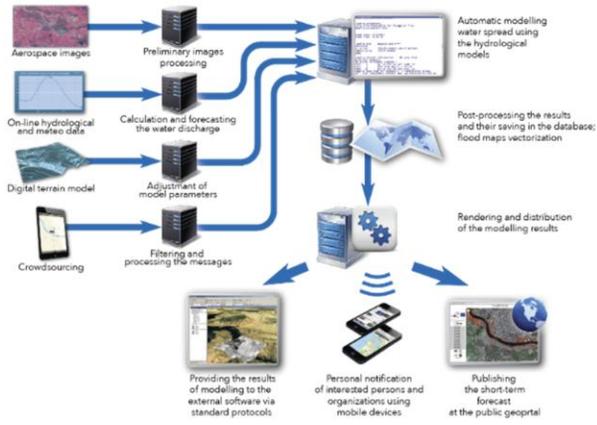
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This approach allows achieving a high level of data processing and making the system convenient and simple for the user. The user works with a friendly interface, and all the complexity is hidden inside the system.

Proposed solution: Basic concept

Short-term river floods forecasting

- forecast 12-72 hours ahead with high accuracy
- integrated use of available heterogeneous data (from gauges stations, meteo recourses, satellite, etc) including online mode
- use of a variety of hydrological and hydrodynamic models with their automatic selection and parameter setting

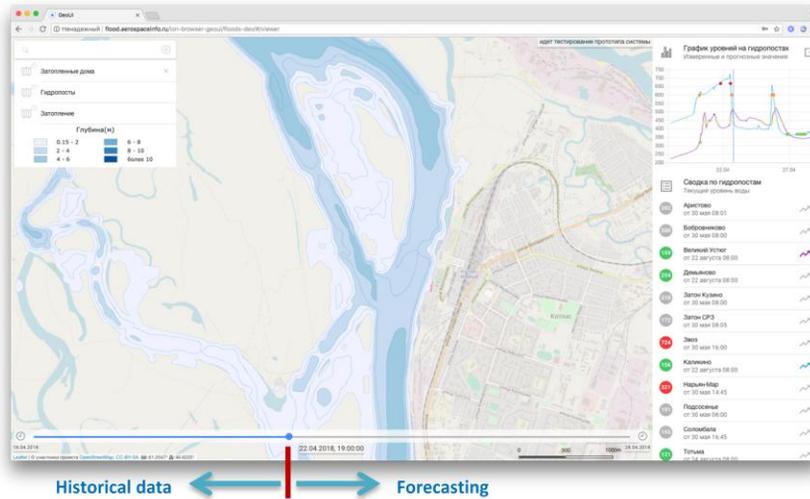


Short-term floods forecasting includes the results of aerospace monitoring and long-range runoff formation

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An example of the implementation of this approach is the operational flood forecasting system. It has already been presented at the meeting on Work Package 3. The system works fully automatically and provides support for the user's work in online mode, in scenario mode, and in decision support mode.

Automatic year-round monitoring and forecasting mode



The system provides hourly flood forecasts for the following 24 hours.

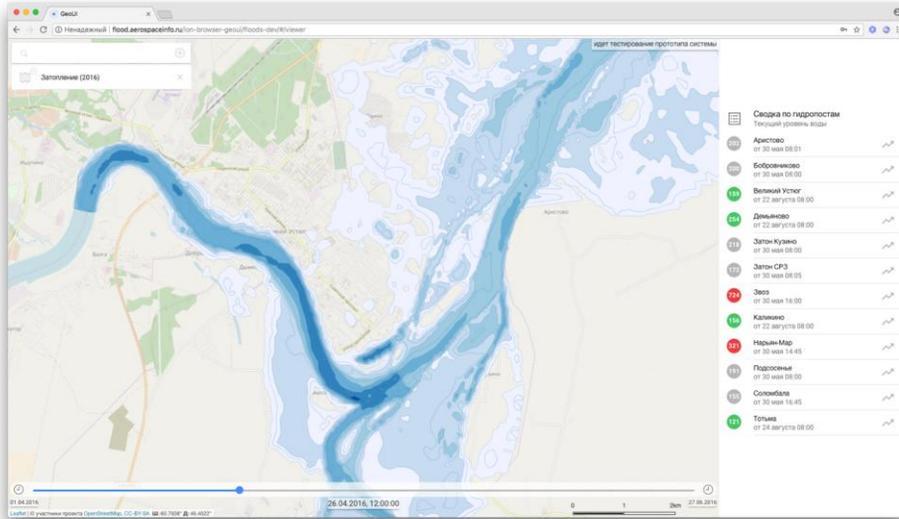
By moving the timeline slider, user can get outlines of flooded areas. Depths within contours are shown in different colors: from 15 cm and more with a step of 1 m.

All complexity is hidden from the user

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In online mode, the user can move the timeline slider and see the development of the situation from the past, through the present, into the future.

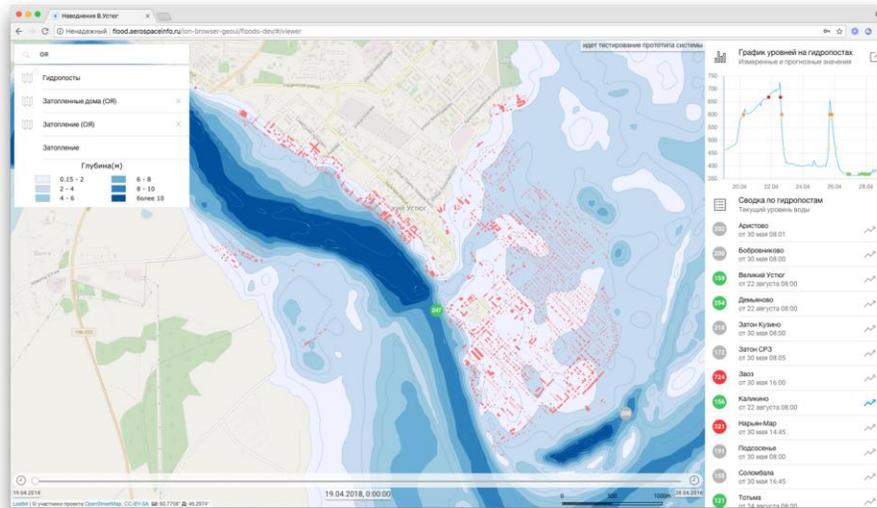
Scenario mode: Maximum water level, 2016



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In scenario mode, you can set the required initial data and obtain a flood scenario.

Decision support mode: Objects identification in the flood area



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In decision support mode, the user receives the composition of the buildings in the flood zone and the damage assessment.

Pathway 2. Improving water management and spatial planning through digital means and methods

- Digital public maps with monitoring data and socio-economic indicators
 - Visualization of digital socio-economic and monitoring data
 - Expansion of the functionality of existing electronic maps

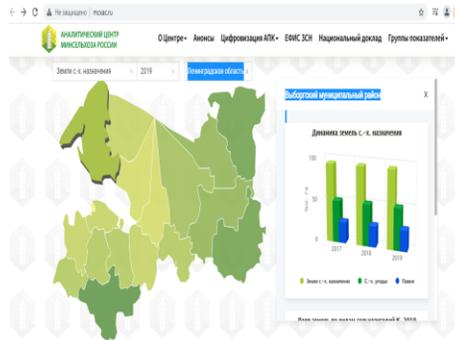


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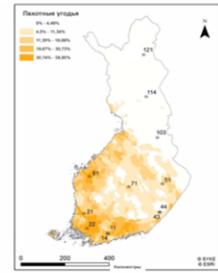
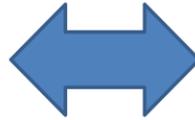
Another focus of the National Pathway number 2 is the use of digital services to publish various data, in particular **digital maps with monitoring data and socio-economic indicators**.

Pathway 2. Improving water management and spatial planning through digital means and methods

- Visualization of digital socio-economic and monitoring data



Map of agricultural land and purposes by districts of the Leningrad region



Tattari et al. 2017.

13.5.2021 | 10

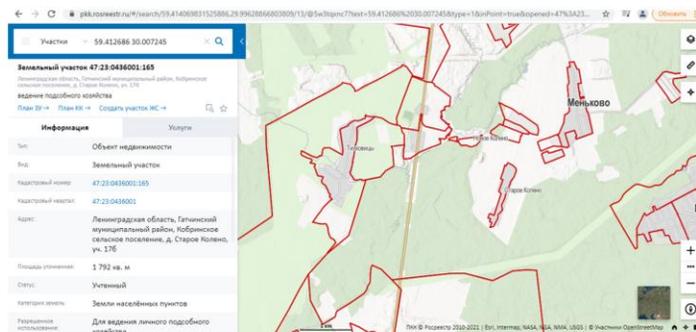
Map of the intensity of nutrient removal from arable land in Finland

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A necessary part of it is a *visualization of digital socio-economic data and monitoring data using interactive maps for rural areas*. The transition from the use of simple statistical data to the results of agrochemical and hydrometeorological surveys with accurate territorial identification, with the size of land plots used by farmers, agricultural enterprises for agricultural production and the volume of gross production, will make it possible to compare changes on the ground with the impact on the environment.

Pathway 2. Improving water management and spatial planning through digital means and methods

- Expansion of the functionality of existing electronic maps



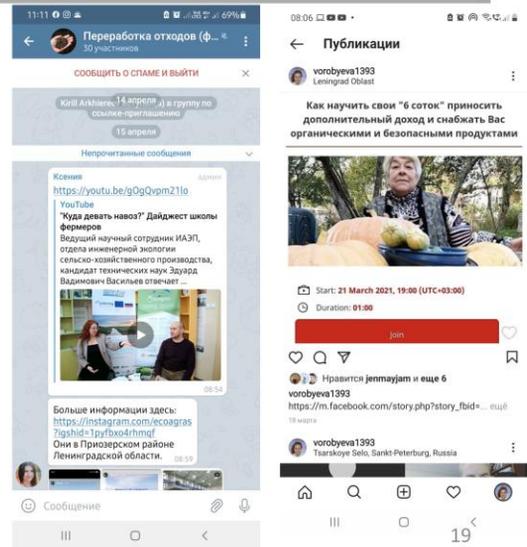
Public cadastral map of the Russian Federation

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Another necessary thing is an *expansion of the functionality of existing State electronic maps*, for example, a public cadastral map. It can be used to endow municipal authorities with a wide range of rights and powers in the field of environmental legislation, protection of environmental and awareness of its quality.

Pathway 3. Strengthening advisory activity for business and rising awareness of local public authorities and population

- Raising public and local government awareness of potential environmental risks.
- Providing consultations for farmers in order to solve specific problems of environmental protection and protection of water bodies.



National Pathway number 3 - Strengthening advisory activity for business and rising awareness of local public authorities and population.

Here suggested the following changes:

Raising public and local government awareness of potential environmental risks.
 Providing consultations for farmers in order to solve specific problems of environmental protection and protection of water bodies.

This will reduce the likelihood of unintentional damage to the environment and increase the number of implemented environmental protection measures.

Pathway 3. Strengthening advisory activity for business and rising awareness of local public authorities and population

An example of interaction between a research institute and farmers. Recommendations for farmers prepared. Consultations are held in the format of the online "School of Farmers".



nyrasantz LUGASALTZ Waterdrive

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ЕВРОПЕЙСКИЙ СОЮЗ
EUROPEAN UNION

НАЦИОНАЛЬНЫЙ ЦЕНТР
НАУЧНО-ТЕХНИЧЕСКОГО
КОМПЛЕКСНОГО ПОДДЕРЖАНИЯ
РАЗВИТИЯ
РОССИЙСКОЙ ФЕДЕРАЦИИ

РЕКОМЕНДАЦИИ
ПО ЭКОЛОГИЧЕСКИ БЕЗОПАСНОМУ
ИСПОЛЬЗОВАНИЮ НАВОЗА И ПОМЕТА
ДЛЯ ФЕРМЕРСКИХ ХОЗЯЙСТВ



This slide illustratively shows the work in the above-named directions.

Pathway 3. Strengthening advisory activity for business and rising awareness of local public authorities and population

- Creation of specialized information (geoinformation) systems and services providing access to the results of monitoring and forecasting through geoportals

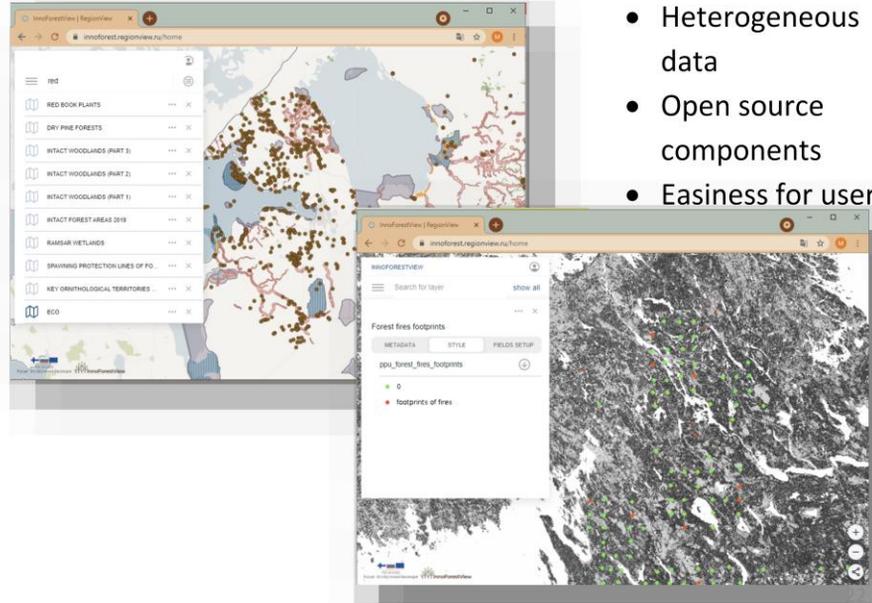


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A geo-information portal can be a very useful tool for raising awareness among target groups. Therefore, we propose the **creation of specialized geoinformation systems and services with access to the results of monitoring and forecasting through geoportals.**

Information system development:

loading and publishing of heterogeneous data – both ground and remote sensing data (drag@drop, layer management, etc)



Main features:

- Heterogeneous data
- Open source components
- Easiness for users

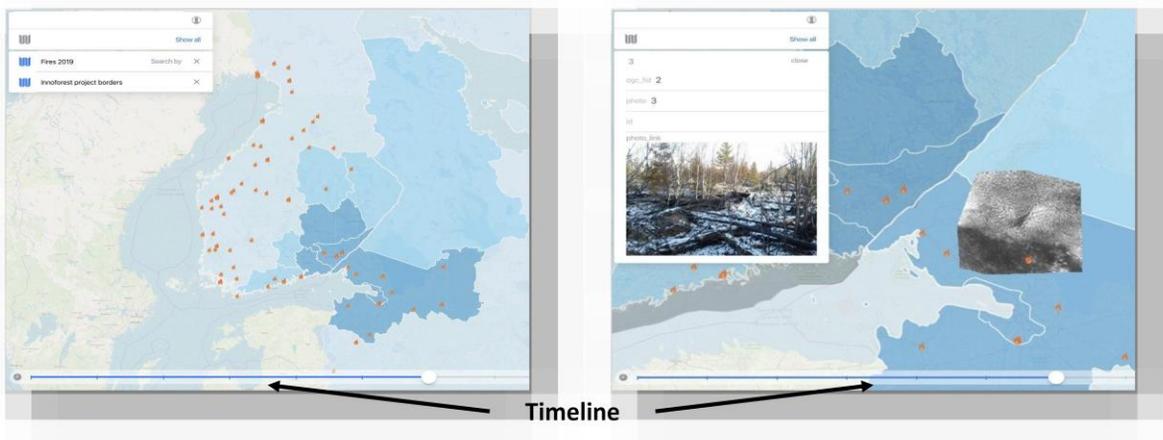
Currently, within the framework of the Waterdrive project, an information system is being created to accommodate data from the Russian partners. Its basic principles are also openness and user friendliness. When developing the system, basic tools are implemented for loading data, managing layers, etc.

Information system development:

Multitemporal analysis of data

An example - Data from Fire Information for Resource Management System (FIRMS):

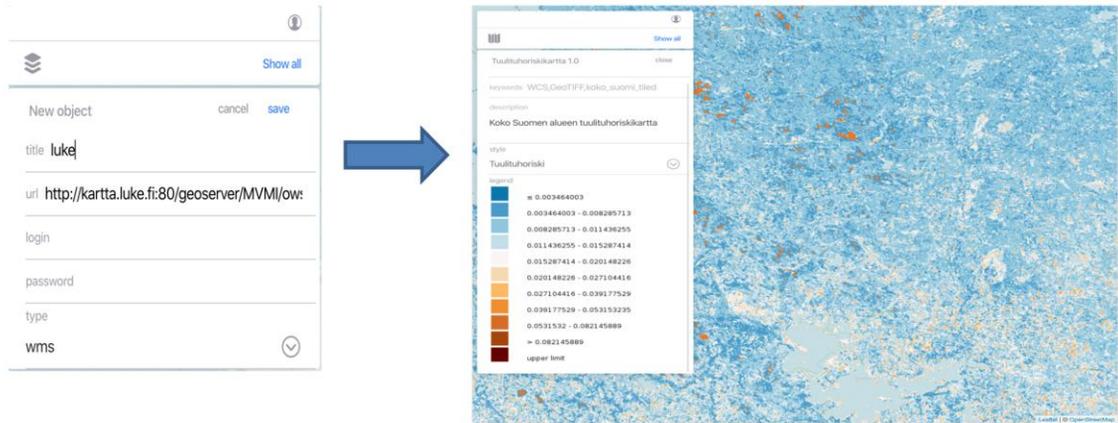
<https://firms.modaps.eosdis.nasa.gov/>



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In addition, multi-temporal data analysis tools are important.

Information system development: data exchange with third-party systems



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As well as important the tools for exchanging data with third-party information systems.

Pathway 4. New and more effective financing mechanisms

- Environmental rating and differentiated green subsidies support.
- Payment systems for achieving a certain result in reducing pollution.
- Mechanism for co-financing environmental projects (federal + financing by local authorities, businesses and residents).



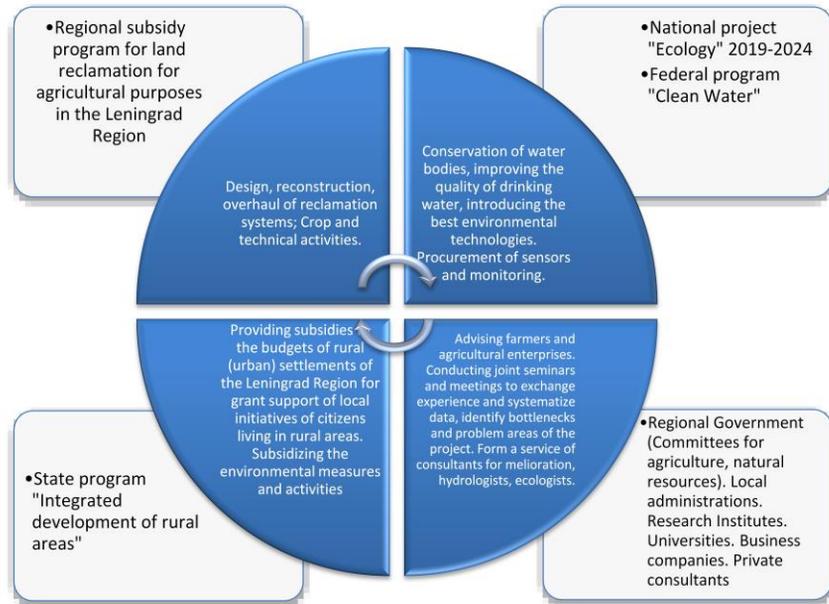
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National Pathway number 4 - New and more effective financing mechanisms.

Proposed changes:

- **Creation of an environmental rating of territories and operating agricultural producers** based on data from various sources and reliably measured indicators. This approach will allow a differentiated approach to those who harm the environment and those who preserve it by investing in environmental measures and technologies (for example, increased environmental payments and taxation, on the other hand, “green” subsidies and benefits). Redistribution of collected payments from the first to the second is possible.
- The development of this direction can be a **system of support for farmers based on the achieved result** after the implementation of environmental protection measures. Organization of a system of payments for achieving a certain result in reducing pollution will allow farmers and agricultural organizations to consider the issue of ecology from a different angle and can become a motivating aspect in their activities and help to form an environmentally responsible approach to production.
- **Creation of a mechanism for co-financing environmental projects** in rural areas would increase responsibility and stimulate effective interaction between authorities at different levels, agricultural business, farmers and local residents in the implementation of environmental protection measures for water management.

Combining the use of funds (subsidies) of the federal and regional budgets allocated to municipalities within the framework of various programs for the implementation of environmental measures in rural areas



This slide shows an approximate scheme of a possible combination of sources of financing for environmental activities in rural areas, which can be the basis for creating a more effective mechanism for co-financing various farmers environmental projects.



Waterdrive



This was an overview of the current proposals for detailing Russian National Pathways to improve rural water management.