

# SOIL-BASED SOLUTIONS FOR COMBINED SUPPORT OF FOOD SECURITY, ENERGY EFFICIENCY AND ENVIRONMENTAL SAFETY IN THE RUSSIAN FEDERATION

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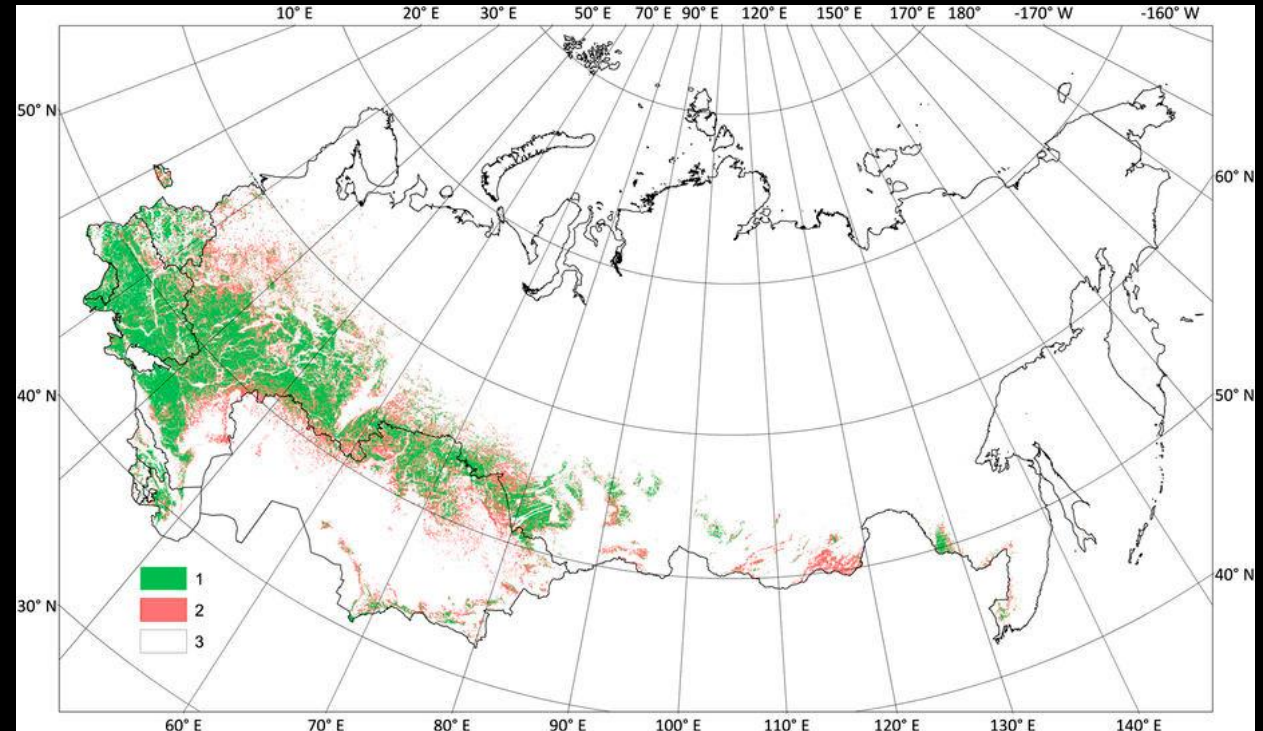
# CURRENT THREATS TO AGRICULTURAL DEVELOPMENT IN RUSSIA

- Russia made an impressive progress in agriculture during the last decade transforming from an importer of most food products to an important exporter of grain, meat and other agro commodities
- However, a shift in agricultural development also increases the pressure on agroecosystems, threatening water and soil quality
- These pressures are compounded by warming climate that brings droughts to the most productive areas in the south of Russia



# RUSSIAN AGRICULTURE UNDER CLIMATIC CHANGE

- Russia possesses 10% of arable land of the world (116.2 mln ha)
- Arable lands occupy 8% of the national territory
- About 40 mln ha are fallow lands
- The abandonment occurred mostly in cold or dry areas with poor soils



Arable land (1) and abandoned areas (2)  
in post-Soviet countries

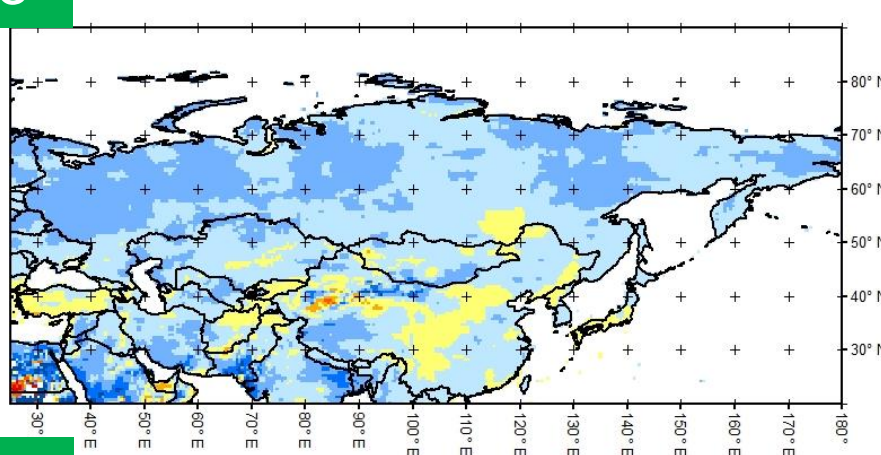
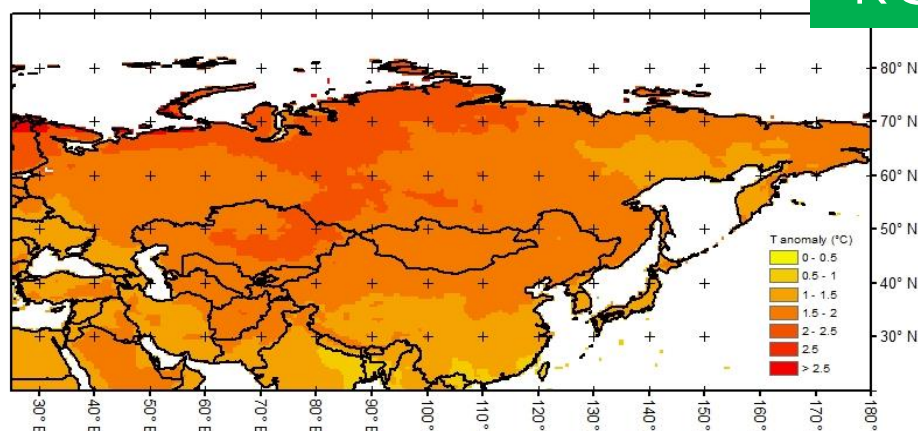


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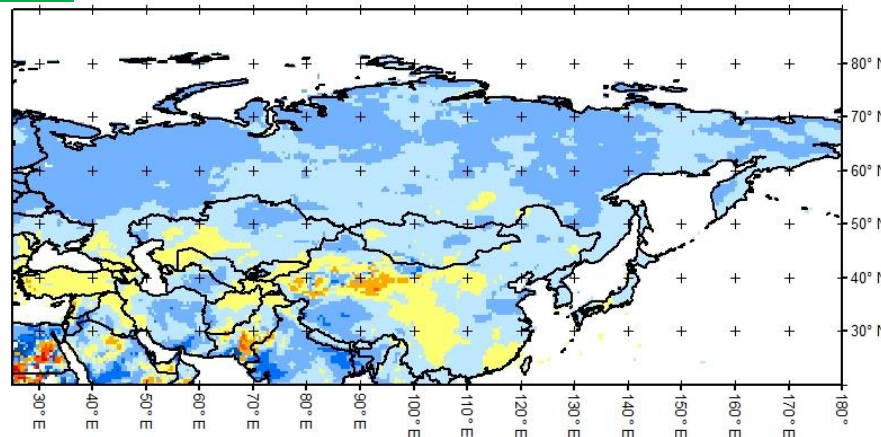
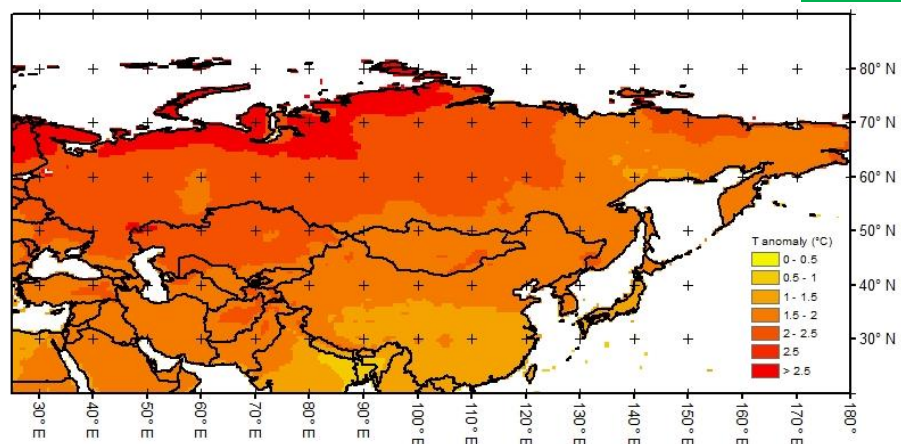
Anomaly of Mean Annual Temperature in the medium term 2006-2050 vs. 1961-2005

% change of Annual Precipitation Amount in the medium term 2006-2050 vs. 1961-2005

RCP 4.5



RCP 8.5



# RUSSIAN AGRICULTURE UNDER CLIMATIC CHANGE

- The yields decrease in the south due to the droughts but increase in the north. Together with essentially increased precipitation this resulted in set of record years for grain crops total harvest.
- However, despite these favorable circumstances the further sustainable development of Russian agriculture will be possible only with urgent improvement of its modern scientific basics including soil quality evaluation in the land-use agroecological monitoring systems for smart farming development.
- Climate-smart agricultural land-use design takes into attention the traditional and new crop varieties, intensive and sometimes organic farming systems with flexible agrotechnology application – best adapted to regional and local soil cover agroecological conditions.





# SOLUTIONS FOR AGRICULTURE

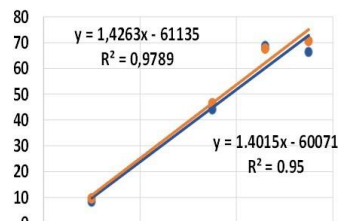
- The legal basis of the maintenance of soil quality are the Federal Laws “On land reclamation” (1996-2019), “On safe handling of pesticides and agrochemicals” (1997-2019), “On state regulation of ensuring the fertility of agricultural land” (2020) and regional laws
- The information and methodological basis for sustainable soil management to ensure food security and environmental safety in Russia is formed by the
  - framework agroecological models of the production process and land quality;
  - decision support systems for agroecological optimization of farming system design.



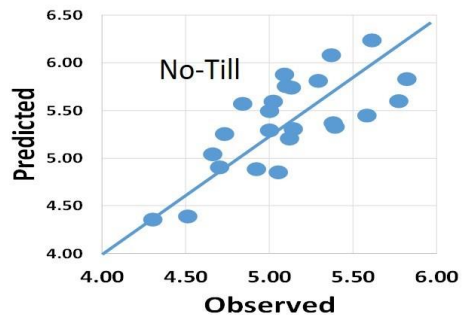
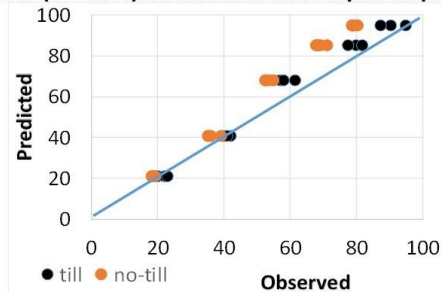
# SOLUTIONS FOR AGRICULTURE

The observed and predicted (by DSAAT) winter wheat growth rate and yield values in at the RSAU Field Experimental Station in 2017 (Pivchenko, Meshalkina, Vasenev, 2018)

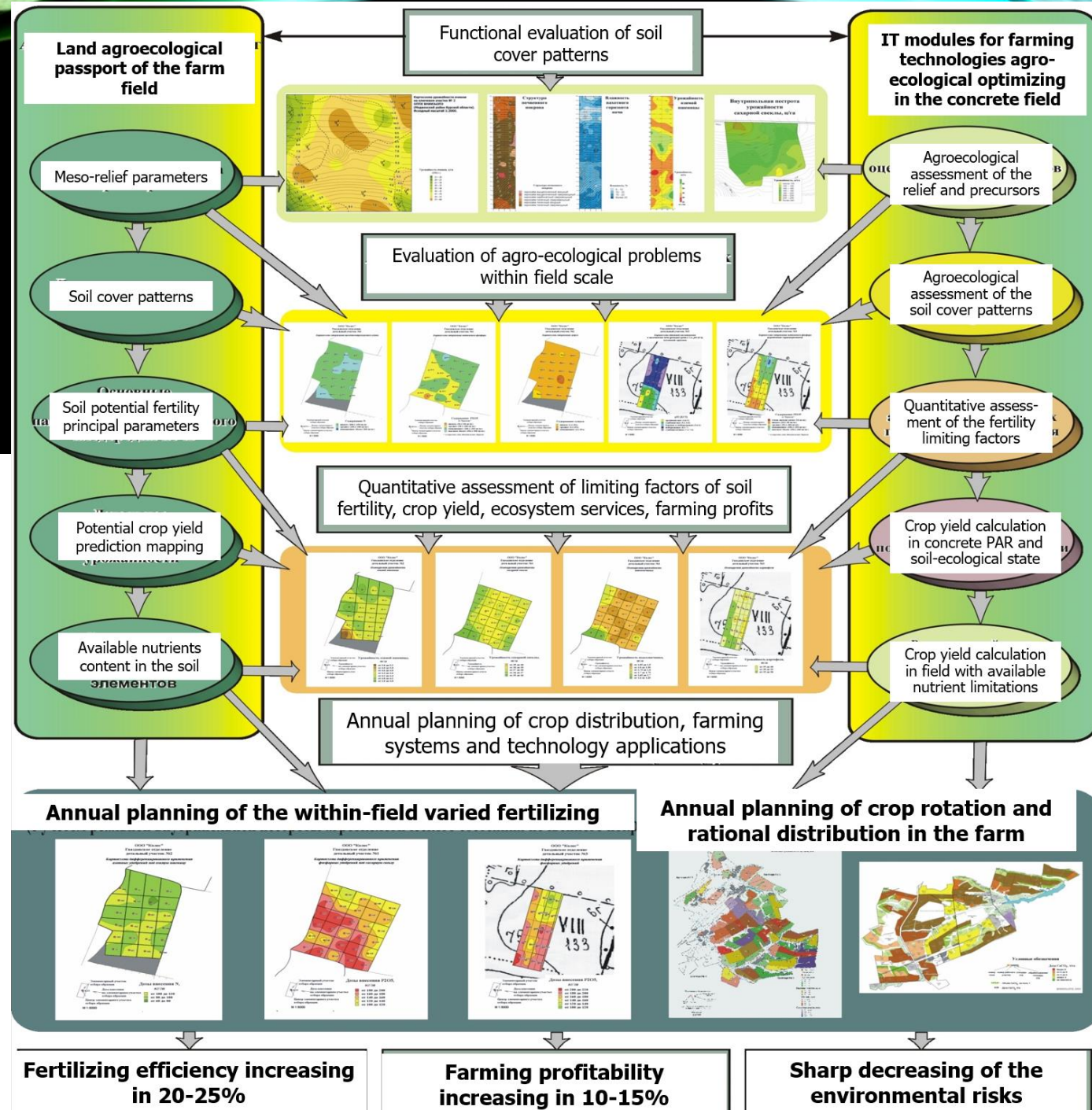
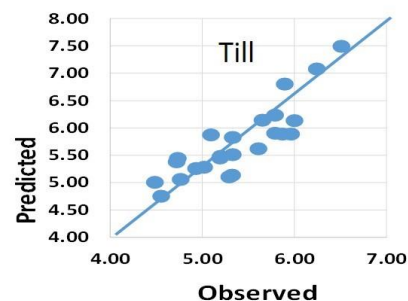
Model describing the growth of wheat plants from the beginning of intensive vegetation to flowering phase



Observed and predicted values of plant growth by DSSAT ( $R^2=0.94$ ) for different development phases



The observed and predicted yield values (t/ha)





# CASE STUDIES: RESPONSIBLE BUSINESS

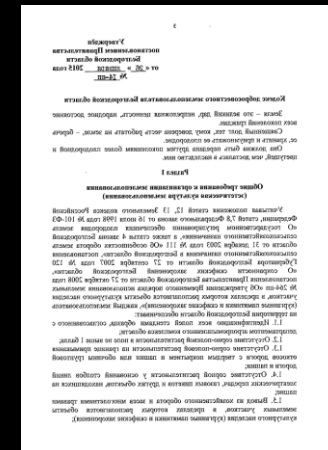
- PhosAgro is one of the world's leading companies responsible for global food security. We offer high-quality, environmentally friendly fertilizers, as well as services for their delivery and assistance in using them in the most effective way.
- PhosAgro is one of the few Russian companies that is part of the “avant-garde” of the UN GC - Global Compact LEAD
- \$ 1.2 million is a contribution to the development of the project “Implementation of Sustainable Soil Management through the Soil Doctors programme and the Global Soil Laboratory Network”





# CASE STUDIES: RESPONSIBLE GOVERNANCE

- The Governor of Belgorod region of Russian Federation Evgeniy Savchenko set up the strategic vector of the development of regional agriculture and society aimed at the creation of competitive production of food supplies with high added value
- One of the major acts is the Code of Responsible Land Use of Belgorod Oblast adopted by the Government decision no. 14-pp on January 26, 2015, in which the main requirements for soil conservation are clearly formulated
- The Red Data Book of Soils describing rare and unique soils of Belgorod oblast has been created and published.



The background features a solid black field. At the top, there is a decorative, wavy horizontal band with a color gradient. From left to right, the colors transition from a bright yellow, through orange and red, into a dark green, and finally into a light cyan or blue at the far right edge.

THANK YOU FOR YOUR ATTENTION