RESEARCH, INNOVATIONS and education

AREA, STRATEGIC GOALS AND HIGHLIGHTS OF 2024



IMPROVEMENT OF PRODUCTION PROCESSES

Improvement of production processes to ensure high quality and eco-friendliness of our products, including a process for the development of new products that respects safety and the environment throughout its life cycle

- Efforts are underway to develop solutions for mining and processing diatomite with a view to producing our own vanadium sulphuric acid catalyst
- We continue to boost in-house power generation by capturing heat from chemical reactions in sulphuric acid production
- · A project is underway to treat mining water from the Kirovsky and Rasvumchorrsky mines
- In collaboration with the Kolsky Research Centre of the Russian Academy of Sciences, we are advancing research on ore beneficiation and improving the efficiency of recovering valuable components into mineral concentrates



2 DIGITAL TRANSFORMATION OF PRODUCTION-RELATED BUSINESS PROCESSES

Strengthening the Company's technological sovereignty and expanding the capabilities of its IT infrastructure. Development of artificial intelligence solutions will not only enhance production efficiency, but will also make work more comfortable and safer for employees

- We continued implementing a domestic automated enterprise management system and automated process control system
- With more than 180 robots already in operation, we are scaling up their use and integrating them into key business processes
- · The Company migrated its internal communications to eXpress, a Russian corporate platform

¹ AEMS stands for automated enterprise management system. ² APCS stands for automated process control system

ческое	ТЕХНОЛОГИЧЕСКО ЛИДЕРСТВО	Target	2 ZERO	
	НАЦИОНАЛЬНЫЕ проекты россии	2.4		

3 IMPROVEMENT OF THE PRODUCT MIX

Promotion of sustainable farming practices, development of new fertilizer grades for increased availability of best practices in farming

We conducted in-depth testing to study the carbon footprint of traditional mineral fertilizers and their biologised alternatives





4 APPLICATION IMPROVEMENT

Soil safety, biodiversity conservation, fertility growth and lower GHG emissions in agricultural production and throughout the product's life cycle from mine to plate

- We tested carbon dioxide sequestration in forage grasses the Company's fertilizers, including locally cultivated forag varieties
- We received the results of tests conducted to study the ca footprint of mineral fertilizers and their biologised alternati The tests showed a reduction in carbon footprint by 8-359
- We launched a pilot to establish an interregional testing n for evaluating the carbon footprint of the Company's fertilizers



5 COOPERATION WITH UNIVERSITIES AND RUSSIAN AND INTERNATIONAL R&D CENTRES

Implementation of a comprehensive phased programme to support sustainable agricultural practices and support young scholars in running sustainable development projects

The BRICS International School for Sustainable Agriculture was launched, bringing together 60 students from six BRICS nations

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Appendices

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• We patented a technology for producing biologised fertilizers, securing two patents for innovative methods of manufacturing biologised We developed prototypes of protected feed grade urea, offering a safe and efficient source of non-protein nitrogen for cattle

using ge crop		We conducted a production trial using biologised adaptive plant nutrition systems and a biological preservative for forage conservation
arbon tives. %	•	The Company continues to grow its digital learning programme for Russian and foreign farmers, Pro Agro Lectorium
ietwork izers	•	We launched the RECSOIL project in Russia in partnership with Lomonosov Moscow State University and UN FAO

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2024 AWARDS

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In December 2024, PhosAgro Group won the competition ComNews Awards.Best Solutions for Digital Economy.

In November 2024 PhosAgro's electronic HR document management system received an honour at CNews Awards 2024.

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PhosAgro's ProAgro Lectorium e-learning platform for foreign farmers received a welldeserved praise and won at the **BRICS Solutions Awards2024**, an international competition held as part of the BRICS **Business Forum.**

хііі торжественная церемоння награждення COMNEWS — Аучшие решення A W A R D S 2024 Аля цифровой экономики	
ДИПЛОМ ПОБЕДИТЕЛЯ	
Номинация Лучшее решение по роботизации	
Импортозамещение платформы роботизации	
АПАТИТ (ФосАгро)	
Генеральный директор / Главный редактор КомНьюс Груп Леонид Коник	

STRATEGY

The Company's innovations in fertilizer production are a sustainable development driver in agriculture and make a meaningful contribution to strengthening cooperation for food security.

PhosAgro Group seeks to ensure efficient and safe agricultural production and develops innovative fertilizers while also working hard to minimise the environmental impact of mineral fertilizer application and

production. In doing so, the Company relies on Russian and international experience and leading research and production practices.

Our Strategy to 2025 envisages efforts to increase the share of innovative products, develop technology and production, and ramp up potential for cooperation with stakeholders and partners in the area of innovation and research.

In 2023, the Company developed the Import Substitution Strategy and the Import Substitution Programme, ensuring systematic migration to domestic software platforms and the implementation of key infrastructure projects.

MANAGEMENT APPROACH

GRI 3-3

Our innovation, product development, and research and education management system is seamlessly integrated into the overall management framework covering all Company processes.

PhosAgro Group runs the Samoilov Scientific Research Institute for Fertilizers and Insectofungicides (NIUIF), Russia's only institute specialising in this area.

In 2024, NIUIE celebrated its 105th anniversary

PhosAgro Innovation Centre was established in 2018 to create cuttingedge products and technologies in partnership with research institutions in Russia and abroad. The NIUIF and PhosAgro Innovation Centre bring together world-class researchers, engineers, and experts from various areas to address the most complex operational issues as well as applied and fundamental research problems.

Apatit's IT Department established a division for developing artificial intelligence solutions to drive the integration of advanced AI technologies into the Company's key business processes. The team is focused on three core areas: machine learning, video analytics, and generative AI. The computing capabilities are supported by a GPUpowered server cluster housed by the Company's corporate data centres.

Strategic

The Group actively cooperates with the Ministry of Agriculture, the Russian Academy of Sciences, federal research centres, universities, innovation funds, and international R&D organisations (University of Belgrade and Brazil's Federal University of Lavras), along with recognised international organisations with a view to providing broad support to humanitarian and research-intensive projects.

Research and education fall within the remit of the Technical Development Department and are discussed at the meetings of the Strategy and Sustainable Development Committee of the Board of Directors. These matters are subject to an annual review by the Board of Directors.

STAKEHOLDER ENGAGEMENT

The Company's operations span the entire production cycle from mining apatite-nepheline ore and processing it into mineral fertilizers to their end use by consumers.

Combined with our efforts to develop advanced and efficient plant nutrition systems, this creates a wide network of stakeholders which we seek to engage with on a priority basis. In its scientific and educational pursuits, the Company collaborates with such stakeholders as scientific institutions, university research teams, the global community and international organisations. To drive innovations and the latest information technologies, we work closely with the Company's departments and divisions, all production units across the Group's branches, and PhosAgro's employees and counterparties. Our key stakeholders also include regional authorities, nongovernmental organisations, schoolchildren, their parents and educators.

We are committed to fostering partnerships with the scientific community, international organisations and universities through joint working groups and collaborative projects aimed at driving innovations, enhancing the reputation of Russian science, and unlocking its full potential.

RISKS AND OPPORTUNITIES

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Among other things, the following strategic risks affect our research and educational objectives



RISKS SPECIFIC TO THE COMPANY'S OPERATIONS INCLUDE:

 \checkmark non-compliance of products' manufacturing process and their use with carbon footprint standards and other environmental requirements;

\checkmark

insufficient environmental friendliness of production processes;

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non-alignment of plant nutrition systems with specific farming conditions:

\checkmark

lack of awareness about the Company's products and services, coupled with the level of expertise prevailing among agricultural professionals both in Russia and abroad.



The Group develops corrective measures as necessary and unlocks opportunities, including import substitution, to mitigate those risks. Below you can find more information about what we do on this front.

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Development of proprietary technologies and import substitution solutions

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Introduction of new fertilizers with enhanced environmental safety, improved biological availability, and adaptability to the climate change

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Opportunities related to the development of partnerships in science, education, and awareness raising

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At the same time, in addressing climate change, related soil degradation processes and the growing world population, the Company recognises its role as a responsible producer that contributes to global food security. PhosAgro is actively engaged in: 1. developing sustainable products and

- nutrition systems;
- 2. promoting responsible agricultural practices;
- 3. combating climate change across value chains.

To achieve these goals, we leverage our accumulated expertise and innovative potential, while also working closely with partners in the fields of science and business.

For more information, see the Strategic Risks section on page



2024 METRICS AND HIGHLIGHTS

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Investments in R&D activities and development of new products, RUB mln





IMPROVEMENT OF PRODUCTION PROCESSES. SOLUTIONS AND PROJECTS BY NIULF

Improvement of ore extraction and processing

The Company is developing key technical solutions for mining and processing diatomite with a view to producing its own vanadium sulphuric acid catalyst. In 2024, we developed as-built documentation for the design and construction of the vanadium sulphuric acid catalyst plant.

In collaboration with the Kolsky Research Centre of the Russian Academy of Sciences, we continue to explore ore beneficiation and ways to increase production volumes. The Company is developing a roadmap for making products from low-grade and off-balance ores, tailings of ANBP-1, 2 and 3, and slurry discharges. In 2024, we collected samples and transferred them to the Kolsky Research Centre so that it could develop the concentrate for further research into production options.

The project to develop the reserves of the Rasvumchorr Plateau deposit through underground mining is now subject to design supervision and construction control, with the diversification of coolants at the main ventilation and hot-air heating unit (use of liquefied natural gas at the Rasvumchorrsky mine) designed to improve energy efficiency and reduce pollutant and GHG emissions.

Production efficiency improvements and introduction of elements of circular economy

Improving the efficiency of using resources, including water, and increasing the energy efficiency of production processes are crucial tasks for the Company.



To enable the mining of a block pillar under the Saami pit, we continue to divert the Gakman and Loparskaya rivers.

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In 2024, we developed engineering documentation and ensured design supervision for the construction projects at Apatit's Balakovo branch. These new facilities are intended to boost in-house power generation by capturing heat from chemical reactions in sulphuric acid production.

With the loads of process systems increased following the upgrade of wet-process phosphoric acid production units in Cherepovets, Volkhov and Balakovo, we reduced our specific power consumption.

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To improve the quality of discharged water, we embarked on a comprehensive reagent selection exercise in 2024, while also developing engineering documentation for the project to treat mining water from the Kirovsky and **Rasvumchorrsky mines.**

The NIUIF team completed a broad range of tasks related to increasing performance, including the development of draft technical specifications and the validation of measurement methods for food grade and technical grade purified phosphoric acid and feed phosphates, and state registration of the Company's new fertilizer grades.

One of the standout projects involves the development of technical solutions to extend the maintenance intervals

for sulphuric acid systems to three vears. In 2024, we developed key technical solutions for the tail gas treatment unit designed to reduce sulphur dioxide content in emissions from sulphuric acid systems.

Another important strategic task completed in 2024 was the development of key technical solutions for the liquid sulphur dioxide production unit.

Other import substitution projects completed in 2024:



substitution of the RPA software robot development system with the domestic RPA PIX Robotics solution;

to replace Cisco;



start of migration from Microsoft to Russian software, including Astra Linux OS, R7 office suite and the domestic directory service.

2 DIGITAL TRANSFORMATION OF PRODUCTION-RELATED **BUSINESS PROCESSES**

Implementation of a domestic automated enterprise management system and automated process control system

PhosAgro Group is a member of the Chemistry and Pharmaceuticals industrial competency centre (ICC). In this capacity, it acts as the anchor customer for the projects to introduce a domestic automated enterprise management system and automated process control system. These projects are co-funded by the state through the Skolkovo Foundation and are being implemented at the Cherepovets production site.

In 2024, the development of the automated enterprise management system was completed, and now it is being piloted. The new enterprise management system offers comprehensive data collection tools and data visualisation across the entire range of processes, calculates technical and economic indicators, and generates production reports. The platform architecture is based exclusively on domestic solutions. The project involved the creation of more than 800 mnemonic diagrams and collection of over 60,000 indicators from 33 sources. To populate the system with data, experts from PhosAgro's Engineering Centre

developed special software solutions to automatically transfer calculations and mnemonic diagrams from the old system to the new one. The platform's scaling to other production sites is slated for 2025–2026 following a test run and performance analysis.

The second project aims to develop an automated process control system and implement it at continuous chemical production sites. Launched in late 2022, the project focuses on replacing imported software and hardware with domestic products.

The automated enterprise management and process control systems are of crucial importance for chemical production, as they are indispensable for today's management approaches and high level of process automation. Migration to domestic software ensures not only technological independence, but also the stability of production processes.

Import substitution project to replace PhosAgro's robotisation platform

The Company presented a project on the import substitution of its business process robotisation platform, which covers all of the Group's companies. The project to introduce a domestic

platform was launched back in 2023. The application of robotics led to a 34% reduction in the time it takes to prepare corporate reports. Thanks to the project, the Company migrated some 50% of its business processes to the Russian platform. The development approach was standardised through the introduction of a coding agreement, best practices, version control systems and code compliance checks. This helps shorten implementation time, reduce maintenance costs, and improve business transparency.

launch of a project to implement Global ERP, a Russian ERP system¹, as a replacement for

INNOVATIVE DIGITAL PROJECTS² COMPLETED IN 2024:



ECTLM (Unified Centre for Transport Logistics Management) visualisation system, which serves as a digital dispatcher for railway transport management



Mobile voice patrol, which enables track walkers to use voice recognition for filling out complex checklists

Kirovsk branch

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PhosAgro's electronic HR document management system

Apatit's electronic HR document management system (EPDMS) powered by WSS Docs started operating in a pilot mode in April 2024. As a result, the key

HR documents that are essential for employees' daily work or are generated as part of other processes were fully digitised.

With the new system, employees can produce HR documents from a desktop, a shared workstation or a mobile app. The process was

streamlined to just a few steps: all the employee has to do is fill out a few fields in WSS Docs, and then the required document will be generated automatically. WSS Docs also supports electronic signature keys, which are issued, renewed and revoked by PhosAgro's Certification Authority.

Research Institute of Agriculture (URIA,

a branch of Samara Federal Research

3 IMPROVEMENT OF THE PRODUCT MIX, SOLUTIONS FROM THE INNOVATION CENTRE

PhosAgro Group's product mix comprised over 58 grades of fertilizers of all types in 2024. The Company's Strategy focuses on developing products that address the evolving challenges faced by farmers, including solutions mitigating the impact of climate change. PhosAgro Group is currently preparing an updated version of its Development Strategy to 2030, which will encompass the production of:

- micronutrient fertilizers and NP/ NPK blends with micronutrients and mesoelements;
- water-soluble fertilizers:
- · feed additives and feed phosphates;
- biological and biologised fertilizers;
- biological crop protection agents;
- growth enhancers.

The primary focus of all of these solutions is biologisation of agriculture, improvements in the quality of

of specialised niche products, which will bolster crop yields and improve product quality, while also mitigating the climatic and environment impact.

agricultural products, reduction of the

in intensive farming, and introduction

environmental impact of chemicals

Development of new fertilizers

Development of biologised fertilizers

In 2024, PhosAgro Group continued its research into the impact of biologisation on GHG emissions from fertilizers. In partnership with the Russian State Agrarian University – Moscow Timiryazev Agricultural Academy, the Caspian Federal Agrarian Research Centre of the Russian Academy of Sciences (CFARC of RAS) and Ulyanovsk

Centre of the RAS), the Company ran in-depth trials to study nitrogen emissions resulting from the use of both traditional mineral fertilizers and their biologised alternatives. The trials took place in the Astrakhan Region on irrigated lands typical for arid areas of risky farming, which are especially vulnerable to climate change and associated stress factors for plants and soils. Additional trials were carried out in the Ulyanovsk Region on chernozem soils with average national crop yield levels and without irrigation. The trials clearly demonstrated that biologised fertilizers contributed to an overall increase in biomass and a notable boost in marketable crop yield.



Fertilizers	Nitrogen dosage,	CFARC of RA	S (irrigation)	URIA (no irrigation)	
	kg of nutrient / ha	Grain, t/ha	Straw, t/ha	Grain, t/ha	Straw, t/ha
Spring wheat					
Control (no fertilizer)	0	2.04	3.07	2.58	1.97
Urea N 46.2	30	3.48	5.22	3.13	2.43
	120	6.02	8.23	3.16	2.45
Bio-urea bio-N 46.2	30	4.87	6,98	3.20	2.51
	120	6.58	9.22	3.23	2.49
NPK(S) 10:26:26(1)	12	4.23	6.21	3.33	2.59
	46	4.27	5.81	3.54	2.77
Bio-NPK(S) 10:26:26(1)	12	5.12	7.35	3.05	2.36
	46	4.34	5.94	3.33	2.59
Field peas					
Control (no fertilizer)	0	0.82	1.11	2.57	1.99
Urea N 46.2	30	4.20	5.85	2.96	2.33
	60	5.46	7.46	2.89	2.26
Bio-urea bio-N 46.2	30	5.56	7.62	3.04	2.39
	60	5.62	7.30	3.14	2.48
NPK(S) 10:26:26 (1)	12	3.93	5.64	3.16	2.50
	46	1.97	2.76	3.06	2.41
Bio-NPK(S) 10:26:26 (1)	12	5.20	7.28	3.25	2.58
	46	2.26	3.16	3.14	2.48

The trials demonstrated that using the Company's biologised products (compared to traditional fertilizers) led to higher crop yields at the same application rate. Notably, these products also stimulated greater straw biomass production. When incorporated into the soil, this additional biomass can contribute to soil carbon accumulation.

In 2025, the Company plans to conduct second-year interregional trials on similar crops. These trials will help expand and enrich the data array, offering deeper insights into how environmental and climatic factors influence nitrogen emissions from fertilizers applied at fields. They will also support the development of a mathematical model to predict and assess N₂O emissions.

¹ Intergovernmental Panel on Climate Change.

The results of testing biologised and non-biologised fertilizers under different climatic conditions

Currently, carbon footprint calculations rely on standardised emission factors and the IPCC¹ methodology, according to which the rate of fertilizer-related nitrous oxide (N₂O) emissions is

estimated at 1% of the calculated nitrogen content in a specific fertilizer grade. However, the Company's field experiments suggest that actual emissions may be lower. The emission rate depends on factors such as the dosage of nitrogen-based fertilizers, fertilizer form, composition of the nutrition system, crop type, soil characteristics and climate conditions (see the table N-N₂O emission factor for different fertilizers).

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N-N₂O emission factor for different fertilizers¹

Option	Emission factor: N-N ₂ O, %
Urea N 46.2 (grade B, granulated)	0.74
Nitrogen-based fertilizer bio-urea bio-N 46.2	0.65
NP 12-52	0.71
bio-NP 12-52	0.63
NP 18-46	0.68
bio-NP 18-46	0.55
NPK (S) 15:15:15 (10)	0.59
Bio-NPK(S) 15:15:15(10)	0.56
NPK(S) 10:26:26 (1)	0.62
Bio-NPK(S) 10:26:26(1)	0.56
NPK(S) 8:20:30 (2)	0.57
Bio-NPK(S) 8:20:30(2)	0.52

An important task planned for 2025 will consist in integrating the results of biologised fertilizer trials and the data on nitrous oxide emissions into PhosAgro's Agro Calculator. This metric will be synergised with other parameters to help calculate customised plant nutrition systems. With the Agro Calculator, users will be able to evaluate the carbon footprint of agricultural products and streamline relevant nutrition strategies to minimise emissions, which is of particular importance for products exported to markets with GHG border tariffs.

The Company plans to launch fullscale production of biologised mineral fertilizers in 2025, with the first batch scheduled for release in 2026. The product line will include N, NP and NPK fertilizers, allowing for smooth integration of a biological component into the existing nutrition system through replacement of the traditional counterpart with a view to ensuring seamless transition to biologised farming. The technology enables the application of high concentrations of biologically active strains that are resilient to concentrated inorganic salts.



In 2024, we patented a technology for producing biologised fertilizers, securing two patents for innovative methods of manufacturing biologised NP fertilizers. Patents for the production of nitrogen-based and NPK fertilizers are expected in 2025.

Manufacturing and sales of new products

Developed by PhosAgro's Innovation Centre, ApaSil is designed for seed pre-treatment and foliar application on a wide range of agricultural crops and ornamental plants. Field trials in different regions and on different crops have shown that this product helps plants cope with the stresses associated with drought and diseases.



In 2024, we supplied to agricultural producers 13.980 tonnes (vs 5.1 tonnes in 2023) of the ApaSil adaptogen, a product developed by PhosAgro's **Innovation Centre.**

Between 2019 and 2024, PhosAgro's Innovation Centre conducted a comprehensive analysis to identify biological solutions suitable for Russian agriculture. Based on this research, the Group will expand its product range in 2025 with biological agents developed by partner companies such as Innopraktika, Bisolbi Plus, Biona Group, and Flora-Si. The products will be sold through a network of 16 official regional distributors.



In 2024, the Company obtained a patent for the production of ApaSil, with registration in the FSU countries expected to start in 2025.

New products supporting agricultural biologisation

Product name	Purpose
ApaSil	Adaptogen
Metabacterin	Biological fungici
Fermasil	Dry silage inocula
Enzymesporin	Probiotic feed ad
Extrasol	Biological growth
BisolbiSan	Biofungicide
Energia-M	Combined growt
Effect Bio, SC	Stubble decompo
Azofix, ZH (peas, lentils)	Inoculant
Azofix, ZH (chickpeas)	Inoculant
BioConsort Start	Amino acids for s
BioConsort Vegetation	Amino acids with
Probactil	Liquid silage inoc
Subtisporin	Liquid probiotic f

Development of feed additives

In 2024, PhosAgro Innovation Centre and the Mendeleyev University of Chemical Technology developed prototypes of protected feed grade urea, offering a safe and efficient

Production trials of Enzymesporin probiotic feed additive on calves in 2024

ltem	Population at the beginning of the experiment, AUs	Survival, %	Average live weight at the beginning of the experiment, kg	Average live weight on the 40th day, kg	Live weight ratio in relation to benchmark, %
Benchmark	5	100	33.0	45.8	100
Monocalcium phosphate + Enzymesporin	5	100	34.2	49.8	108.7

Furthermore, NIUIF upgraded methods to control feed phosphate production and improve product

quality. The project focused on enhancing the consumer properties (reducing the caking and dusting of

Strategic report

¹ At an application rate equivalent to 50 kg of nitrogen per hectare for soft spring wheat (Pamyati Konovalova variety) grown on soddy medium-podzolic

light-loam soil

² When applied jointly with monocalcium phosphate.

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source of non-protein nitrogen for cattle. Jointly with the Skryabin Moscow State Academy of Veterinary Medicine and Biotechnology, we conducted production trials of the Enzymesporin² feed additive,

which increased the live weight of calves by 8.7%. The products will be manufactured using our unique proprietary technology, and in 2025 we plan to patent and develop the technology to produce this additive.

In 2025, we plan to join efforts with the Skryabin Moscow State Academy of Veterinary Medicine and Biotechnology to test new feed additives that help reduce greenhouse gas emissions from milk production and address the prevention and treatment of cryptosporidiosis and parasitic infestations in farm animals. When used in conjunction with existing therapeutic products, the solutions we are developing will enable comprehensive animal care.

In 2023, at the livestock breeding complex, a branch of the Federal Williams Research Centre of Forage Production and Agroecology, we started trials of a biologised forage grass nutrition system with the Company's fertilizer system, which will be completed in 2026. The data obtained will make it possible to develop a comprehensive forage growing programme and an animal nutrition system based on PhosAgro Group's products.

the finished product) of feed-grade MCP produced by the Balakovo branch of Apatit.

4 APPLICATION IMPROVEMENT

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Pro Agro Lectorium training programme

Since 2021, PhosAgro Group has been running Pro Agro Lectorium, an new training programme for a broad audience, students, and university professors, reaching out to 47 agricultural universities across Russia. Most importantly, the platform is convenient and serves as a source of up-to-date information on innovations in the industry from leading scientists and experts for agricultural producers and employees of agricultural companies in Russia and BRICS.

Today, the platform features over 400 lectures, 18 additional professional education courses culminating in the awarding of official state qualifications. Pro Agro Lectorium offers lectures in Russian, English, and Portuguese.

In ProAgro Lectorium, university students can access modern expertise in agriculture and agricultural sciences and better understand the nature of their future profession, graduates can use lectures for a smoother

The programme aims to provide unique up-to-date expertise in various farming practices. It includes lectures on topics such as agronomy and agrochemistry, crop and livestock production, innovations and digitalisation in agriculture, economics and responsible farming with free access for the target audience.

Over 140 speakers from Russia, China,

India, Brazil, South Africa, and other countries have already contributed

lectures in 22 areas to the platform.

Research as part of

and forestry.

accumulation.

PhosAgro's carbon farm

project in the Vologda region

As part of a long-term climate action,

the Company has set up a carbon

absorption of carbon emissions by

various ecosystems, as well as to test

hands-on solutions for establishing large-scale carbon farms in agriculture

In 2025, PhosAgro Group and

the Centre for Forest Ecology

and Productivity of the Russian

a comprehensive analysis of the

two-year dynamics of carbon

Academy of Sciences will conduct

farm to study CO₂ compensation,

onboarding at a new job, teachers can align their knowledge with the latest scientific developments and self-study, and seasoned farmers can receive additional training.

Equal opportunities and unhampered access to knowledge make it easier to adapt university curricula to modern labour market requirements, providing students with relevant knowledge and practical skills.

Key features of PhosAgro's carbon farm project

Decation	Cherepovets and Vologda districts of the Vologda region at a distance of 100 km from each other
Site area	100 ha of forest plantation and 100 ha of agricultural plantation
Study period	2022–2025 with a possible extension of up to 100 years within the forest plantation
Project participants	 PhosAgro Group Vologda region government Russian Academy of Sciences
Specifications and results of experiments in forest plantations	 24 experimental forest sites at the carbon farm The technology of accelerated seedling cultivation was perfected: the Company's fertilizers reduced the period for coniferous species from seven to three years. Data were obtained on birch, willow, aspen, spruce, and pine survival (23% lost with a benchmark of 50%), cost-effective soil preparation and crop planting practices. Methods were developed to calculate the carbon pool of forest sites with a total absorption of 15.98 t of CO₂-eq. / year, and 5.2 carbon units / ha / year using the CDM methodology. Total sequestration: 20,092 carbon units within 40 years
Specifications and results of experiments in agricultural landscapes	 Study of the absorption capacity of various crops (forage grasses, grain cereals, and pulse crops) with varying organomineral nutrition regimes. An additional average annual carbon sequestration of 2.6 carbon units / ha with a total accumulation of 13.69 t of CO₂-eq. / year and an increase in total yield to 11.6%

Key results of the PhosAgro Innovation Centre in 2024:



tê;

Trials were carried out to explore carbon dioxide sequestration in forage grasses using the Company's fertilizers.

Results of testing to study the carbon footprint of fertilizers and their biologised counterparts were obtained at the Russian State Agrarian University -Moscow Timiryazev Agricultural Academy. The nitrogen loss ratio of mineral fertilizers is 0.62-0.94% and 0.59-0.83% for their biologised counterparts with an 8 to 35% reduction in the carbon footprint of the produce.

Â

The centre and the Izrael Institute of Global Climate and Ecology (IGCE) are drafting practical recommendations for 100 crops, which will include 50 subsections (methodologies) to be used by farmers. The work helped us acquire experience in using the equipment to estimate carbon gain in ecosystems and the carbon footprint of products.

PLANS FOR 2025:

 together with the Russian Agrarian State University -Moscow Timiryazev Agricultural Academy, develop calculation formulas for assessing the carbon footprint of the plant nutrition system for 38 crops, which will be

Cutting-edge biologised adaptive plant nutrition systems

In 2023–2024, experts from the Company and the Federal Williams Research Centre of Forage Production and Agroecology ran a production

Two biofertilization options were tested during the trial. The first option involved additional use of the Extrasol

	Gr	een mass we	eight in 2023,	t/ha	Green mass weight in 2024, t/ha				Total in two
	lst cut	2nd cut	3nd cut	Total in 2023	lst cut	2nd cut	3nd cut	Total in 2024	years, t/na
Check strip	21.44	12.95	8.80	43.19	16.81	17.82	8.04	42.37	85.56
Trial plot 1	21.66	14.18	11.60	47.44	21.12	19.70	10.20	51.02	98.46
Trial plot 2	23.77	15.48	12.50	51.75	27.66	23.86	11.40	62.92	114.49
Trial plot 1 Trial plot 2	21.66 23.77	14.18 15.48	11.60 12.50	47.44 51.75	21.12 27.66	19.70 23.86	10.20	51.02 62.92	98.46



ammonium nitrate with biologised urea and using the same nitrogen dose along with ApaSil (trial plot 2).

Share capital

In trial plot 1, where the Extrasol biological agent and the ApaSil adaptogen were used, the green mass harvest per area unit for two years was 98.46 t/ha, which is 15% higher than in the ordinary practice.

The maximum yield was achieved in trial plot 2. in the variant where crops were fertilized with biologised urea and treated with the ApaSil adaptogen – 114.49 t/ha of green mass in two years (six cuts), which is 33.8% higher than initially.

Product quality for biologised nutrition systems was also higher, suggesting a high potential for biologised nutrition systems to intensify farming, reduce production costs, improve feed quality for dairy farming, and increase carbon sequestration by forage grass systems.

		2023, two cuts			2024, three cuts	
	Dry matter, t/ha	Crude protein, t/ha	Metabolic energy, GJ/ha	Dry matter, t/ha	Crude protein, t/ha	Metabolic energy, MJ/ha
Check strip	7.34	1.22	69.950	9.43	1.65	88.240
Trial plot 1	7.61	1.24	72.585	11.91	2.06	108.050
Trial plot 2	8.20	1.42	78.987	13.46	2.52	124.300

Thus, the new types of fertilizers developed by PhosAgro help agricultural producers increase

RECSOIL PROJECT

RECSOIL is an international

mechanism established by the UN

Food and Agriculture Organisation (UN FAO) for scaling up sustainable soil management with a focus on

increasing soil organic carbon and

improving overall soil health.

In 2024, PhosAgro Group

supported by UN FAO and in

partnership with the Soil Science

Faculty at Lomonosov Moscow

State University and AgroGard

launched RECSOIL project

The project's key objective is to improve soil carbon content

management practices.

while reducing greenhouse gas emissions through sustainable soil

in Russia.

crop yields despite the constraints of limited land resources while also improving forage quality, reducing

carbon footprint, enhancing soil fertility, and increasing production margins.

• soil samples taken for lab analysis

2024 HIGHLIGHTS:

- suitable fields (sites) selected for proiect implementation: soil of the selected fields described;
 - for a set of physical and chemical indicators.

PLANS FOR 2025:

- adapt low-carbon agricultural practices in the fields;
- produce crops with low carbon footprint;
- conduct training jointly with UN FAO:
- register RECSOIL as a climate project.

An important project deliverable should be a model of carbon accumulation in soil and calculation of the product's carbon footprint, which will be integrated into PhosAgro's Agro Calculator. In addition, the Company plans to develop model

methodologies for climate projects similar to RECSOIL. which farmers can use as a template for registering projects as climate projects without the costly step of developing a customised methodology. All this will contribute to building a pool of

5 COOPERATION WITH UNIVERSITIES AND RUSSIAN AND INTERNATIONAL R&D CENTRES

Our strategy for innovating and helping students, teachers, and farmers to develop profession competencies relies on partnerships with the leading agricultural universities and R&D centres





carbon units formed by nature-based projects, and, on top of that, establish an effective mechanism for verifying the carbon footprint of premium lowcarbon agricultural products.

Appendic

Share capital

Corporate gover

Partner

Green Chemistry for Life, a joint grant programme by PhosAgro, **UNESCO** and the International Union of Pure and Applied Chemistry (IUPAC)

Financial support and scientific guidance for young scientists doing research in emerging Green Chemistry technologies to address environmental challenges and ensure sustainable use of natural resources.

UNESCO-Russia Mendeleyev **International Prize in Basic Sciences**

The prize aims to foster scientific progress, basic research popularisation, and international cooperation. The prize is the only award granted for sustainabilityfocused research in fundamental sciences under the auspices of UNESCO.

Key results in 2024





As part of the 10th IUPAC International Conference on Green Chemistry in Beijing, PhosAgro jointly with UNESCO and IUPAC presented young scientists from Russia, Brazil, Portugal, Pakistan, Tunisia, and the UAE with grants for green chemistry research for the eighth time. Over the course of eight rounds of the programme, more than 1,000 applications from young researchers across 120 countries were submitted, with grants awarded to 55 scientists from 33 countries.



In 2024, PhosAgro Group was the general partner at the grant award ceremony of UNESCO-Russia Mendeleyev International Prize.

Partner

INTERNATIONAL UNION OF PURE AND APPLIED CHEMISTRY (IUPAC)

Summer Schools on Green Chemistry project run jointly by PhosAgro, IUPAC and Green Sciences for Sustainable Development Foundation

The project is an educational initiative to improve the qualifications of young scientists engaged in green chemistry with a view to promoting innovations.

22nd Mendeleyev Congress on General and Applied Chemistry

The Mendeleyev Congress is held once every five years under the auspices of IUPAC. In 2024, the Congress was dedicated to the 300th anniversary of the Russian Academy of Sciences and the 190th anniversary of Dmitry Mendeleyev.



Strategic r



Key results in 2024



The sixteenth session of the IUPAC Summer School on Green Chemistry took place at Ca' Foscari University of Venice, Italy from 1 to 7 July 2024. It brought together 70 young scientists from 33 countries, including 28 African researchers. Since the project's inception, it has attracted over 1,000 young researchers from 75 countries.

PhosAgro was the general sponsor and partner of the 22nd Mendeleyev Congress on General and Applied Chemistry. Some 4,000 participants from 38 countries attended the Congress, including leading Russian and foreign chemists.

Appendic

Partner

Key results in 2024



Development of Sustainable Agriculture through the Implementation of the Global Soil Doctors Programme and the Creation of the Global Soil Laboratory Network

The joint project of PhosAgro and FAO promotes the expansion of the Regional Soil Laboratory Network (RESOLAN) in Africa, Asia, Latin America, Russia, and the Middle East, and sustainable soil management among farmers.

Recarbonisation of Global Soils (RECSOIL) project

The UN FAO initiative's key objective is to improve soil carbon content while reducing greenhouse gas emissions from farm lands through the implementation of sustainable soil management practices.



In 2024, PhosAgro Group and UN FAO signed an agreement to launch stage 3 of the global project for sustainable soil management.

As part of the project, PhosAgro supports UN FAO in implementing the Global Soil Doctors Programme and the Creation of the Global Soil Laboratory Network (GLOSOLAN). Currently, the global network comprises over 1,000 laboratories across 160 countries As part of the Global Soil Doctors Programme, over 11,000 farmers from 20 developing countries. Are improving their knowledge of soil management.



On the occasion of the World Soil Date, PhosAgro, AgroGard, and Lomonosov Moscow State University supported by UN FAO launched a pilot project of the FAO Global Soil Partnership for the Recarbonisation of Global Soils (RECSOIL) in Russia.

Partner

UNITED NATIONS **GLOBAL COMPACT**

PhosAgro contributes by providing expert advice on a wide range of topics on the UN's global socioeconomic agenda

PhosAgro remains a leader of the UN Global Compact by vigorously supporting the Climate Ambition Accelerator and CEO Water Mandate initiatives to combat climate change and ensure the efficient use of water resources.



dioxide emissions.

LEADING AGRICULTURAL ASSOCIATIONS FROM AFRICA

PhosAgro's expert contribution to building Africa's food sovereignty and expanding scientific and educational cooperation between Russian and African universities

Development of scientific and educational potential of African countries, along with the training of qualified personnel for agricultural and chemical industries to build Africa's food sovereignty.

(ASARECA).

Key results in 2024

During the 29th session of the Conference of the Parties (COP29) to the UN Framework Convention on Climate Change, PhosAgro arranged a session titled "Innovation and artificial intelligence - transformative technologies in climate action" to discuss how to limit the rate of global warming and reduce carbon



In 2024, cooperation agreements were signed with leading African agricultural associations – the South African Grain Farmers Association (SAGRA) and the Association for Strengthening Agricultural Research in Eastern and Central Africa

Pro Agro Lectorium, the Company's e-learning platform, was recognised as the official platform of the BRICS Business Council Agribusiness Working Group and won the BRICS Solutions Awards in 2024.

200

MINISTRY OF

SCIENCE AND HIGHER

RUSSIAN FEDERATION

Young Scientists Congress

Partnership in the international

digital education technologies.

MENDELEYEV

OF RUSSIA

Mendeleyev

UNIVERSITY OF

CHEMICAL TECHNOLOGY

basic sciences and research in

chemistry to further sustainable

development as well as the legacy

of great Russian scientists Dmitry

Partnership in promoting

promotion of basic research, scientific and educational cooperation and

EDUCATION OF THE

Partner



Key results in 2024

PhosAgro Group and the Ministry of Science and Higher Education of the Russian Federation made an agreement at 2024 SPIEF.

PhosAgro Group supported the 7th BRICS Young Innovators contest as part of the 4th Young Scientists Congress. The winners were young scientists from Brazil, China, and Russia. More than 7.000 people from 63 countries took part in the Conaress.



In 2024, PhosAgro Group awarded scholarships to 20 winners of the 5th and 6th competitions of the Laverov scholarship programme established for young scientists from the Mendeleyev University of Chemical Technology in 2022. Since that time, 60 gifted students have been recognised winners of the competition.

In 2024, PhosAgro Group awarded the first ten winners of the Sadykov scholarship programme at the branch of the Mendeleyev University of Chemical Technology in Tashkent.

PEOPLES' FRIENDSHIP UNIVERSITY OF RUSSIA (RUDN)

BRICS International School for Sustainable Agriculture

Partnership in promoting scientific and educational projects in sustainable agriculture, environment, and environmental protection.



In 2024, PhosAgro Group and Peoples' Friendship University of Russia launched the BRICS International School for Sustainable Agriculture, bringing together 60 students from six BRICS nations: Egypt, India, Iran, China, Russia, and South Africa.

Partner

DIPLOMATIC ACADEMY OF THE RUSSIAN MINISTRY **OF FOREIGN AFFAIRS**

Partnership in scientific research with a focus on sustainable development and green economy

> PhosAgro Group, the Diplomatic Academy of the Russian Ministry of Foreign Affairs, and the Russian State Agrarian University – Moscow Timiryazev Agricultural Academy with the support from FAO organised an international symposium for the BRICS countries on climate-smart and eco-friendly agriculture. The event attracted more than 300 participants from Russia, Latin America, Asia, and Africa.

EUROPEAN SUSTAINABLE PHOSPHORUS PLATFORM (ESPP)

Partnership on the European political, scientific and technical agenda for the sustainable use of phosphate resources

ARAB FERTILIZER ASSOCIATION (AFA)

PhosAgro Group's expert contribution to the Association's committees on a wide range of matters as a representative of Russia's mineral fertilizer industry







Key results in 2024





In 2024, the Company participated in the 5th European Sustainable Phosphorus Conference that brought together representatives of business, stakeholders, regional and national authorities.

At the event, we presented our best practices of phosphogypsum application.

In 2024, PhosAgro Group took part in AFA's 36th Technical Fertilizers Conference and exhibition on the rational use of mineral fertilizers and food security.