

IPNI REGIONAL REVIEW

Eastern Europe & Central Asia

Key Issues & Needs

- **A large gap exists** between the current crop yields and the potential yields that can be achieved with improved nutrient management.
- **Inadequate and unbalanced nutrient application** results in reduced yields and poor fertilizer efficiency.
- **Outdated fertilizer recommendations** do not reflect current yields levels and modern economics.
- Fertilizer **recommendations do not exist** for newly introduced crops in some regions.
- **Inappropriate soil testing** methods for P and K lead to inaccurate fertilizer recommendations.
- **Decreasing attention** to remediating acid and sodic soils.
- **Deficit** of current science-based educational information on plant nutrition and proper fertilizer use in modern crop production

TACTICAL PLAN highlights & priorities

4R Stewardship

The 4R principles are incorporated as an essential component in all IPNI research projects.

Translation and adaptation of *4R Plant Nutrition Manual* in Russian; development of Russian-specific modules and case studies based on IPNI regional projects.

Training and webinars on 4R Nutrient Stewardship for agronomists, farmers, and fertilizer industry.

Nutrient Education

Training programs for agronomists, farmers, university students, and fertilizer professionals to present IPNI research results at regional conferences and exhibitions.

Organization of regional workshops for delivering technical updates to plant nutrition and soil scientists.

Development of educational materials in Russian, including books, manuals, booklets and leaflets.

Quarterly IPNI Newsletter publication (in Russian), a 22-page journal containing multiple articles.

Improved Fertilizer Recommendations

Best management practices for NPKS and micronutrients are being refined in regional research projects. Routine and alternative soil testing methods for P and K are evaluated with the goal of improving fertilizer recommendations.

Closing Yield Gaps

Regional research projects are focused on intensification of crop production. Crop yields in research projects are compared to average regional crop productivity to indicate potential improvements in crop nutrient management.

Enhancing Sustainability

Creating a regional database on nutrient removal in harvested crops based on results obtained in IPNI projects. Developing a regional crop nutrient removal calculator. Assessment of NUE in regional research projects.



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examples of IMPLEMENTING THE TACTICAL GOALS

Educational Programs:

In October of 2017, IPNI co-organized a conference on *Increasing the Effectiveness of Mineral Fertilizers and Chemical Amelioration*. The conference gathered the Russian fertilizer industry, agricultural producers, scientists, and State agrochemical stations responsible for soil testing and fertilizer recommendations. Each participant of the conference received two publications recently printed by the IPNI EECA program: (1) *IPNI 4R Plant Nutrition Manual* and (2) *IFA's Micronutrients for Sustainable Food, Feed, Fiber, and Bioenergy Production* by R.W. Bell and B. Dell.

Training programs and webinars for agronomists and farmers are conducted on the following key topics: soybean and forage fertilization, fertigation of field vegetables, importance of NPKS for crop nutrition, and managing fluid and foliar fertilizers.

Training programs were conducted for agricultural students on 4R Nutrient Stewardship and for fertilizer distributors on the economics of fertilizer use.

Examples of printed educational materials in Russian:

- Quarterly Newsletter (In Russian)
- *4R Plant Nutrition Manual*
- *Micronutrients for Sustainable Food, Feed, Fiber, and Bioenergy Production (2017)*
- A book on *Nutrition of Small Grains on Chestnut Soils of Stavropol Krai*
- *A Practical Guide on Fertigation of Field Vegetable Crops*
- *A Guide to Identifying and Managing Nutrient Deficiencies in Cereal Crops*
- The booklet on *Effectiveness of P Fertilization*
- The booklet on *Effectiveness of K Fertilization*
- Full set of IPNI leaflets on *Nutrient Source Specifics*

- *Crop Nutrient Deficiency Image Collection*
- The booklet on *Forage Fertilization*
- The booklet on *Phosphogypsum Use*

Improved Fertilizer Recommendations:

Based on recent IPNI-sponsored research, K fertilizer recommendations for sugar beet, grain maize, and rapeseed produced in Central Russia have been updated. New fertilizer recommendations for soybean are now under development.

Fertilizer recommendations for maize and chickpea have been updated based on the *IPNI Global Maize Project*.

Recommendations on sulfur fertilization for soybean, spring rapeseed, cereals (winter barley, winter wheat, maize), and sugar beet have emerged from several projects.

Improvements in fertigation programs are being evaluated for tomatoes.

Foliar fertilization of soybean, winter wheat and tomato is under investigation.

New fertilizer recommendations for highly productive pastures will be developed as a result of on-going research in Vologda.

Closing Yield Gaps:

The *IPNI Global Maize Project* has shown that regional yields of maize, soybean, and chickpea can be increased with improved crop and nutrient management.

The results of IPNI research projects have demonstrated that potassium fertilization in Central Russia can increase yields of grain maize (18%), sugar beet (14%), spring rapeseed (13%), and soybean (6%), compared with current practices.

EXAMPLES OF IPNI IMPACT

Closing Yield Gaps in Volga Region of Russia through 4R Nutrient Management

The rapeseed crop area in Russia was close to 1.0 million ha in 2017 and spring-sown varieties accounted for 85% of this total. Volga Federal District is the third largest spring rapeseed growing region in the country. Fertilizer use here, however, is far below the national average, which negatively affects both crop productivity and quality.

The results of IPNI-sponsored field studies initiated in 2017 in the Republic of Bashkortostan with the leading agricultural producer show a considerable yield increase for spring rapeseed when all constituents of 4R nutrient management are

taken into consideration. Grower fertilizer practice is compared with recommended rates for phosphorus, potassium, and sulfur based on soil fertility and yield potential. Complex fertilizers containing these macronutrients are applied to spring rapeseed. Improved nutrient management resulted in a 12% yield increase compared to grower practice. Besides yield, the oil concentration in seeds improved from 31 to 38%. The profit due to 4R Nutrient Management was more than 4,000 RUB/ha or about US\$74/ha.



▶ Working with industry, universities, and leading rapeseed growers has allowed IPNI to close yield gaps due to proper crop fertilization in Volga region of Russia.



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