



IPNI

INTERNATIONAL
PLANT NUTRITION
INSTITUTE

TACTICAL PLAN

Phosphorus

IPNI Phosphorus Program Tactical Plan

Phosphorus (P) plays a crucial role as a nutrient limiting the productivity of cropping systems, but its use in crop production can lead to losses impacting water quality. Improved understanding of the sciences involved in the study of the fate of P in agricultural and ecological systems can lead to better recommendations for the source, rate, time, and place of P application—enhancing crop productivity, limiting water quality impact, and enhancing social benefit. The role of IPNI is to lead in communicating advances in the sciences relevant to sustainable P use in agricultural systems.



Need 1: 4R Nutrient Stewardship must become globally adopted as the scientific basis for sustainable crop nutrition.

IPNI Response:

- Facilitate development of regional P fertilizer recommendations that fully incorporate 4R principles.
- Lead agricultural retailers and agronomists in applying principles of 4R Nutrient Stewardship to P.
- Develop educational materials on the efficacy of 4R and conservation practices for reducing dissolved and total losses of P.
- Maintain effective working relationships with leading P scientists.
- Perform a scientific review of key issues addressing P sustainability.

Need 2: Education on plant nutrition is inadequate for current and future agronomists.

IPNI Response:

- Develop educational materials on the impact of P fertilizer stewardship on harmful algae and hypoxia, crop yields, and crop P removal.
- Create slide sets on P nutrition describing source, rate, time, and place of application.
- Develop 4R case studies showing how right place application reduces P losses.
- Develop articles and 4R learning module on tile drainage and P placement and timing.
- Write media (e.g., *Plant Nutrition Today*) and other articles on P and its contribution to sustainability.

Need 3: Better fertilizer recommendations are needed to boost productivity, economic returns, and environmental stewardship.

IPNI Response:

- Develop decision support tools for source, rate, time, and place of P fertilizer application, in conjunction with conservation tillage practices.
- Write an article on stratification of soil test P and its impact on water quality, and on calibration of soil test P for Ohio and Lake Erie watershed.
- Conduct scientific review of source, rate, time, and place of P application and its impact on crop productivity, P use efficiency and risks of P loss.

Need 4: Yield gaps must be identified and closed to provide a sustainable food supply.

IPNI Response:

- Document the contribution of P fertilization to crop yield.
- Develop metric on farmland productivity to include P contribution to farmland productivity.

Need 5: Agricultural sustainability requires responsible nutrient management.

IPNI Response:

- Develop metrics of sustainable crop nutrition, including P, to support recognition of 4R Nutrient Stewardship in sustainability initiatives.
- Develop a list of sustainability metrics with technical descriptions.
- Develop nutrient use efficiency targets for cereal crops.
- Assist in the revision of IPNI's Nutrient use GIS (NuGIS) to achieve improved clarity and specificity of data available for interactive download.
- Develop articles pointing out the value of NuGIS and IPNI's soil test summary for North America.
- Explain to a wider range of stakeholders the role of P stewardship in agricultural sustainability.
- Establish a web portal for the IPNI P Program, with links to key information.
- Create visibility of fertilizer industry at scientific conferences relating soil science to sustainable development.
- Aid North American Partnership for P Sustainability (NAPPS) and P Research Coordination Network (P-RCN) to visibly promote 4R Nutrient Stewardship.



Stewardship of crop nutrition seeks to implement programs and practices consistent with principles of sustainable development. IPNI promotes the utilization of the principles of 4R Nutrient Stewardship with multiple partners in collaborative initiatives that promote and communicate improvements in sustainability.

IPNI expects to be recognized as an authoritative scientific voice on the fate and impact of P applied as a plant nutrient. The 4R Nutrient Stewardship concept has been incorporated into

public and private extension programs promoting best management practices, through efforts of IPNI and its partners.

In the next years, a more transparent and better validated connection to performance metrics will be developed, gaining recognition in government and industry sustainability initiatives, with publicly recognizable change in practices at the farm level.



IPNI develops and promotes scientific information for the responsible management of plant nutrition for the benefit of the human family.



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