



Request for Pre-proposals (RFPP) Expanding Research on Impacts of 4R Nutrient Stewardship

4R Nutrient Stewardship is an evidence-based approach to fertilizer best management practices. This approach considers economic, social, and environmental dimensions of nutrient management and is essential to sustainability of agriculture systems. The concept is simple: apply the right source of nutrient, at the right rate, at the right time, and in the right place. However, the implementation of these practices is knowledge-intensive, site-specific, and is likely to change as new technologies become available and our understanding of nutrient management evolves.

More information on the technical aspects of 4R Nutrient Stewardship is available at <http://www.ipni.net/4R> and on 4R industry programs at <http://www.nutrientstewardship.com/> and <http://4R.fertilizercanada.ca>. The first round (2013-2018) of the 4R Research Fund supported projects evaluating economic, environmental and social impacts of 4R practices in major commodity crops. Descriptions of these projects, completed and ongoing, are available at http://research.ipni.net/toc/category/4r_research_fund. The second round (2018-2022) seeks to support 4R practices for additional regions and cropping systems.

The objective of this RFPP is to solicit pre-proposals for field research and demonstration projects evaluating and promoting the economic, social, and environmental outcomes of 4R Nutrient Stewardship. Projects must address at least one of the 4Rs (preferably all four). Recognition of system and site interactions on the effectiveness of specific 4R practices will be important, including interactions among cultural practices such as rotation, genetics, tillage, nutrient-nutrient interactions, cover crops, etc. Outcome indicators should be scalable and must include productivity and profitability per unit area, plus key environmental or socio-economic impacts, including one or more of the following:

- a. mass balance (nutrient inputs, soil/crop pools, transfers, and losses from the crop-soil system) for specific nutrients, especially N and P;
- b. crop nutrient uptake and nutrient use efficiency;
- c. soil C, N and P retention or storage;
- d. dissolved and particulate N and P loss through tile drainage, leaching or runoff;
- e. ammonia emission losses through volatilization and nitrous oxide emissions via denitrification or nitrification;
- f. changes in soil health (e.g. soil organic matter, water infiltration, water holding capacity, soil biology) and its interaction with 4R choices and their impacts;
- g. changes in receiving water body biotic integrity or trophic index (includes nutrient concentrations, BOD, etc.);
- h. changes in field, farm or watershed ecosystem services;
- i. other socio-economic factors.

Priority Cropping Systems and Issues:

1. **Cropping Systems** – the foregoing list of outcome indicators applies to each of the following:
 - 1.1. Cotton.
 - 1.2. Perennial tree crops in irrigated systems.
 - 1.3. Irrigated fruit and vegetable crops west of the Rockies.
 - 1.4. Rice.
 - 1.5. Fruit and vegetable crops.
2. **Issues** – the following applies to a wide range of cropping systems, and affects the credibility of 4R practices among farmers, environmental organizations, scientists, and public interest groups.
 - 2.1. Reliability of soil fertility and plant nutrition recommendation systems.

Desirable project features include:

1. **Multiple outcomes beyond field boundaries.** Projects that simultaneously evaluate economic impacts and environmental effects beyond field boundaries will be given priority.
2. **Focus on specific regional issues larger than state or provincial boundaries.** Examples of such issues include water quality in a specific receiving water body that is currently impaired, or atmospheric emissions from crop-soil systems believed to currently be high emitters.
3. **Collaboration with on-going activities.** Projects that bring together multiple disciplines to address the multifaceted aspects of a particular research endeavor will receive higher priority as will projects with evidence of leveraging of 4R Fund support with other funding sources.
4. **Partner involvement.** Partnering with growers, the fertilizer industry, Certified Crop Advisers, NGOs, and others involved in agri-environmental issues is strongly encouraged.
5. **Outreach activities.** Pre-proposals should indicate how the information developed in the project will be communicated to the appropriate audiences.

Requirements:

1. The pre-proposal:
 - a. should be presented in 12 point font, 1” margins, single spacing;
 - b. may not exceed two (2) pages in length including: key references, total funds requested, and a list of deliverables and timeline;
 - c. must limit payment of indirect costs by the 4R Research Fund to no more than 10% of the total budget;
 - d. must not exceed 5 years in length;
 - e. should list key scientific personnel;
 - f. pre-proposals should be submitted to the International Plant Nutrition Institute (research@ipni.net) by close of business on **30 October 2018**.
2. Cooperation with the 4R Research Fund Technical Advisory Group in developing a full proposal within two months of pre-proposal selection.
3. Submission of annual progress reports and a completion report, presentations at 4R Fund Review meetings, and submission of one or more peer-reviewed publications.
4. All publications and presentations are required to acknowledge support from the 4R Research Fund. A logo is available for use in presentations.
5. Data generated by 4R Fund projects must be submitted for inclusion in an open access 4R Fund project database, in a format that will be subsequently determined and prescribed. Original sources will be credited.

Award limitations:

Projects will be considered for funding to a maximum annual budget of \$300,000/year for no more than 5 years. However, to be competitive at levels approaching this maximum funding level, a project will need to be truly exceptional in its potential for major impact. Projects with annual budgets from \$50,000 are anticipated and encouraged. Funds will be allocated annually based on successful completion of milestones/deliverables. The Fund anticipates awarding a minimum total of \$500,000/year in response to this RFPP.