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Plant Nutrition TODAY
Better Crops, Better Environment...through Science

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FITTING THE 4Rs INTO NUTRIENT CYCLE STEWARDSHIP

The farm nutrient cycle is now a central focus of sustainable development discussions. It plays crucial roles in global issues including food security, climate change, biodiversity, and water quality. Thus it is important to understand where 4R Nutrient Stewardship fits into the stewardship of the cycle.

The flow of nutrients through a farm includes inputs from the atmosphere, internal turnover, and outputs in the form of crop removals and losses with soil erosion, in drainage water, and back to the atmosphere. The 4Rs directly address an important part of that cycle: the application of nutrients to the soil. Agricultural service providers have a large but not total influence on producer decisions regarding the right source, right rate, right time and right place for nutrient application. The 4R concept addresses everything included in those decisions, and its implementation requires stewardship of all important controls of nutrient flows into, within, and from the farm.

It's no surprise that the 4R concept has been widely embraced by agricultural service providers. It is the most appropriate place to start in any effort to reduce nutrient loss. While managing source, rate, time and place may not be enough, why put effort into controlling and trapping excess nutrients coming off the edge of the field, before doing what can be done to avoid loss at the point of application? From a grower's perspective, it's the most profitable way to reduce nutrient loss.

The 4Rs address the full decision cycle for choices of source, rate, time and place. Any technology relating these choices to the full farm nutrient cycle can be considered part of 4R Nutrient Stewardship. Enhanced efficiency fertilizers, soil testing, and variable rate application can't be considered technologies separate from the 4Rs. They are included, along with a list of traditional practices like plant analysis and scouting for symptoms, and precision tools like GPS, GIS, yield monitors, sensors, and weather-based computer models.

Nevertheless, the agricultural service provider's role in the stewardship of nutrient cycling need not be limited to nutrient applications. Crop, soil and pest management practices interact strongly with source, rate, time and place choices. Key performance indicators of nutrient stewardship—crop productivity, soil health, and nutrient use efficiency—can be influenced strongly by choices of crop genetics, pest control, and conservation tillage. Tillage and drainage systems also influence the amounts and forms of nutrients lost. Most service providers already provide service relating to these choices.

In many cases, reducing nutrient losses to societally acceptable levels will require going beyond agronomic practices. 'Control and trap' practices beyond the edge of field may be necessary because, face it, to attain the productivity levels demanded for today and tomorrow, crops need nourishment beyond natural levels. Agricultural service providers are considering how to provide services addressed at nutrient losses beyond the edge of the field. It is challenging, but efforts are being made. Possibilities for making it profitable include environmental credit trading, food industry supply chain sustainability initiatives, and other collaborative actions.

Society increasingly expects agriculture and agri-business to improve its stewardship of the nutrient cycle. Agricultural service providers applying 4R Nutrient Stewardship embrace every opportunity to engage this challenge.

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