

4R Nutrient Stewardship: Opportunities for meeting Lake Erie targets



Tom Bruulsema, Phosphorus Program Director
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Guelph, Ontario, Canada



Agrium Inc.



Arab Potash Company



Belarusian Potash Company

BELARUSIAN
POTASH COMPANY



bhpbilliton

BHP Billiton



CF Industries Holdings, Inc.



Compass Minerals Plant Nutrition



International Raw Materials LTD.



Intrepid Potash, Inc.



K+S KALI GmbH



LUXI Fertilizer Industry Group



The Mosaic Company



OCP S.A.



PhosAgro



PotashCorp



Qatar Fertiliser Company (QAFco)



Shell Sulphur Solutions



Simplot



Sinofer Holdings Limited



SQM



Toros Tarim



Uralchem



Uralkali

Formed in 2007 from the Potash & Phosphate Institute, the **International Plant Nutrition Institute** is supported by leading fertilizer manufacturers.

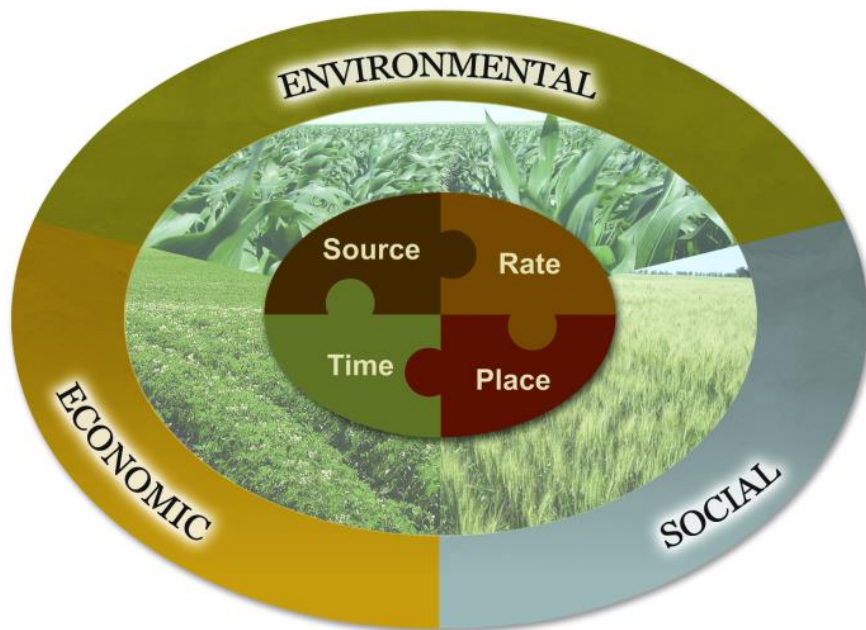
Its mission is to develop and promote science for responsible management of crop nutrition

4R: “right” means sustainable



Field to Market™

The Keystone Alliance for Sustainable Agriculture



Walmart

SustainabilityHUB

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How to Make a Difference - Fertilizer optimization



FARM & FOOD
Care ONTARIO



“Building public trust”



4R
PLANT
NUTRITION

4R Adaptive Management for Plant Nutrition

Policy Level – Regulatory,
Infrastructure, Product Development

Regional Level

Agronomic scientists,

Agri-service
providers

Farm Level

Producers,
Crop advisers

DECISION SUPPORT based
on scientific principles

Recommendation of **right source,
rate, time, and place** (BMPs)

DECISION

Accept, revise, or reject

ACTION

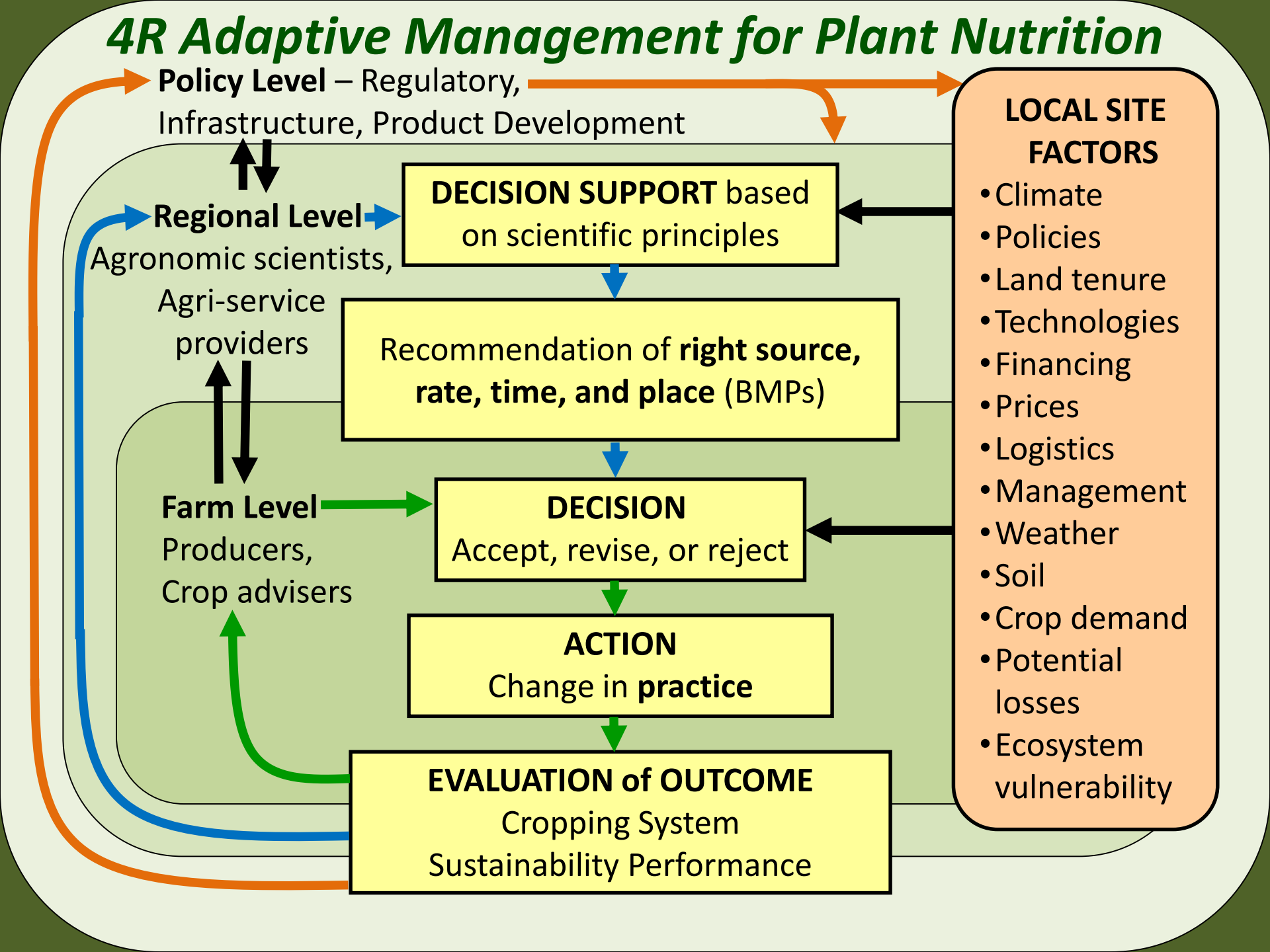
Change in **practice**

EVALUATION of OUTCOME

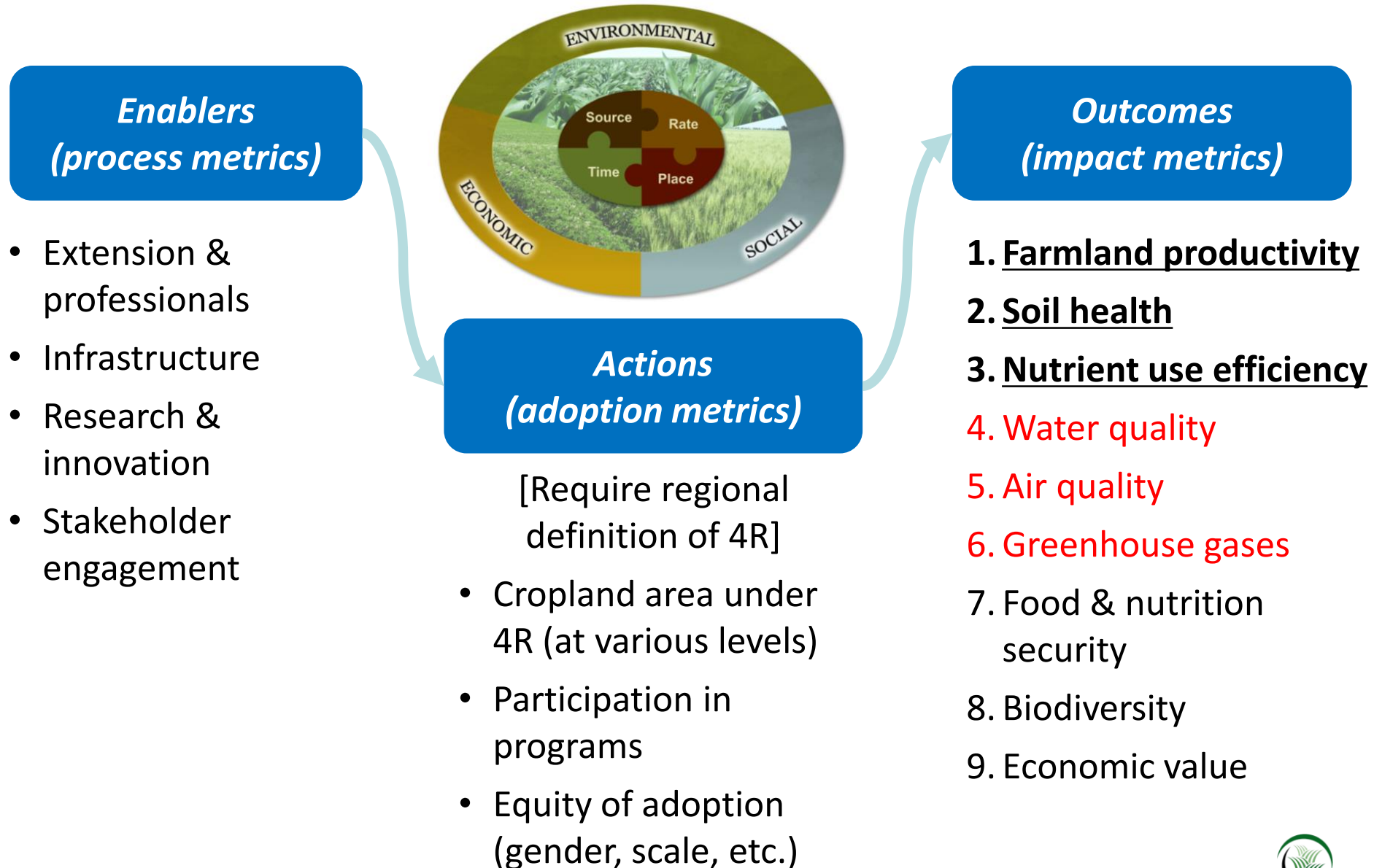
Cropping System
Sustainability Performance

**LOCAL SITE
FACTORS**

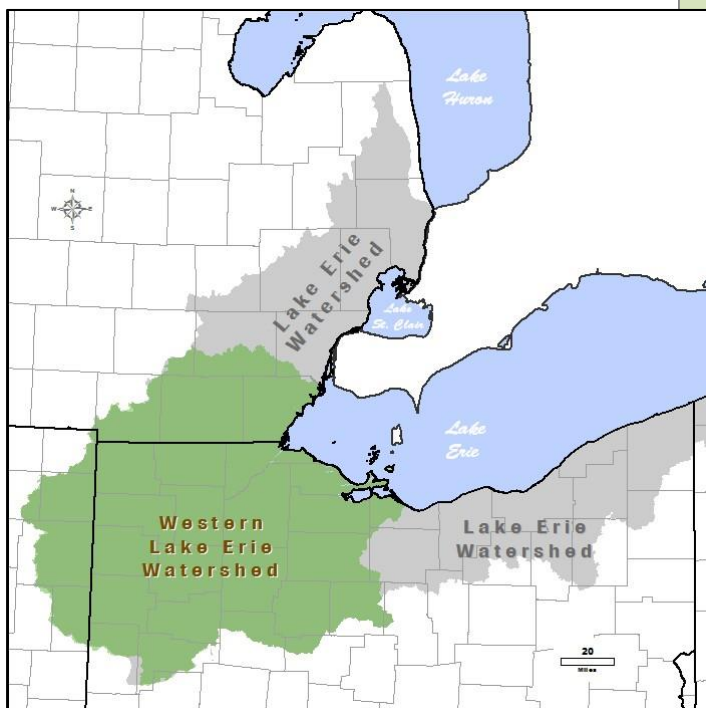
- Climate
- Policies
- Land tenure
- Technologies
- Financing
- Prices
- Logistics
- Management
- Weather
- Soil
- Crop demand
- Potential losses
- Ecosystem vulnerability



Nutrient Stewardship Metrics for Sustainable Crop Nutrition

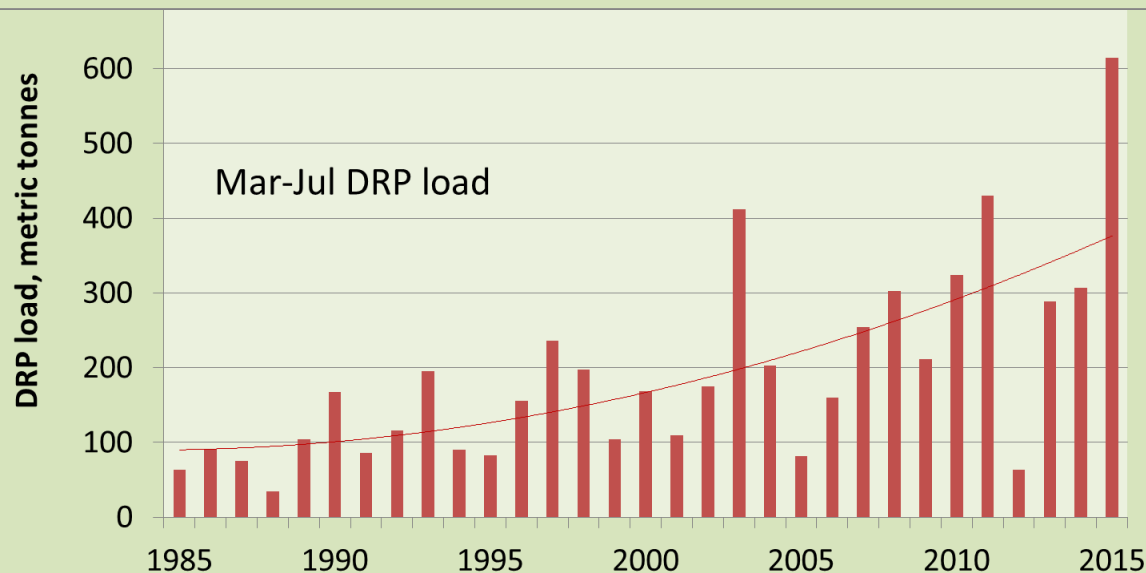
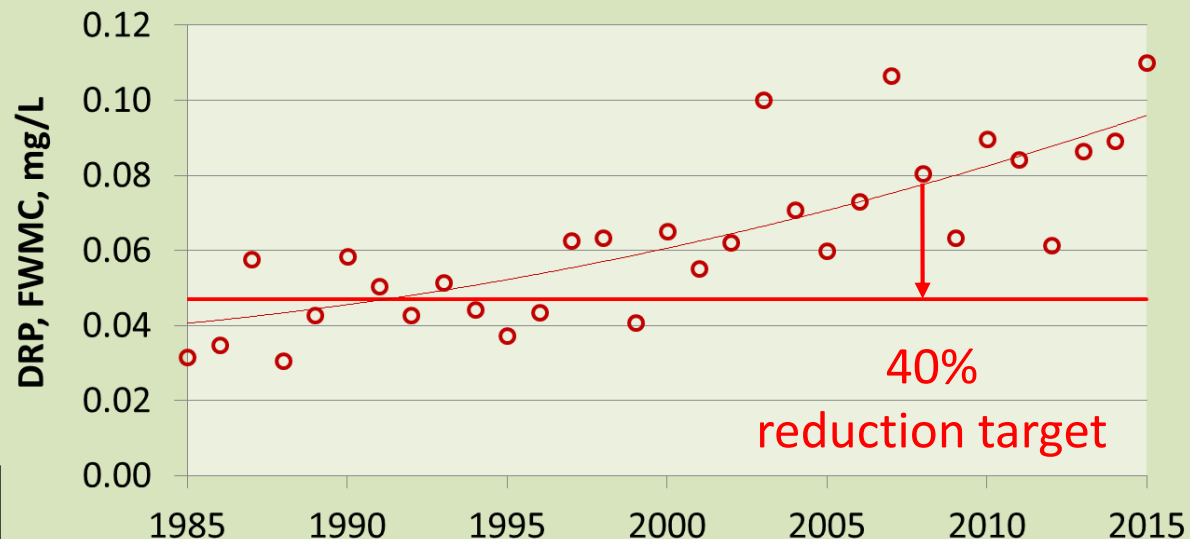


Western Lake Erie: dissolved P trends increasing since early 1990s



Maumee River, Mar-Jul DRP, 1984-2015

flow-weighted mean concentration





Developing 4R Nutrient Stewardship Certification



Marketing Program of Michigan
Michigan Corn Growers Association





4R Nutrient Stewardship Certification Standard

Requirements for Certification of Nutrient Service Providers in the Lake Erie Watershed

1 Initial Training and Ongoing Education

1.1.1 Nutrient Service Providers, sales, and application staff have undergone an initial training and are able to demonstrate knowledge about 4R Nutrient Stewardship and the 4R Certification Program.



2 Monitoring of 4R implementation

2.1.1 Nutrient Service Provider records the recommendation given to the grower customer and track application with annual summary totals of fertilizer products applied on custom applied acres.

3 Nutrient Recommendations and Application

3.5.7 Broadcast applications of nitrogen and phosphorus without immediate incorporation are neither made nor recommended unless the NOAA forecast indicates less than a 50% chance of a rainfall event involving more than an inch of rain beginning in the next 12 hours.

<http://4Rcertified.org/>



Lake Erie 4R implementation

- Certification
- Research – 4R Fund Project



Edge of Field

Watershed

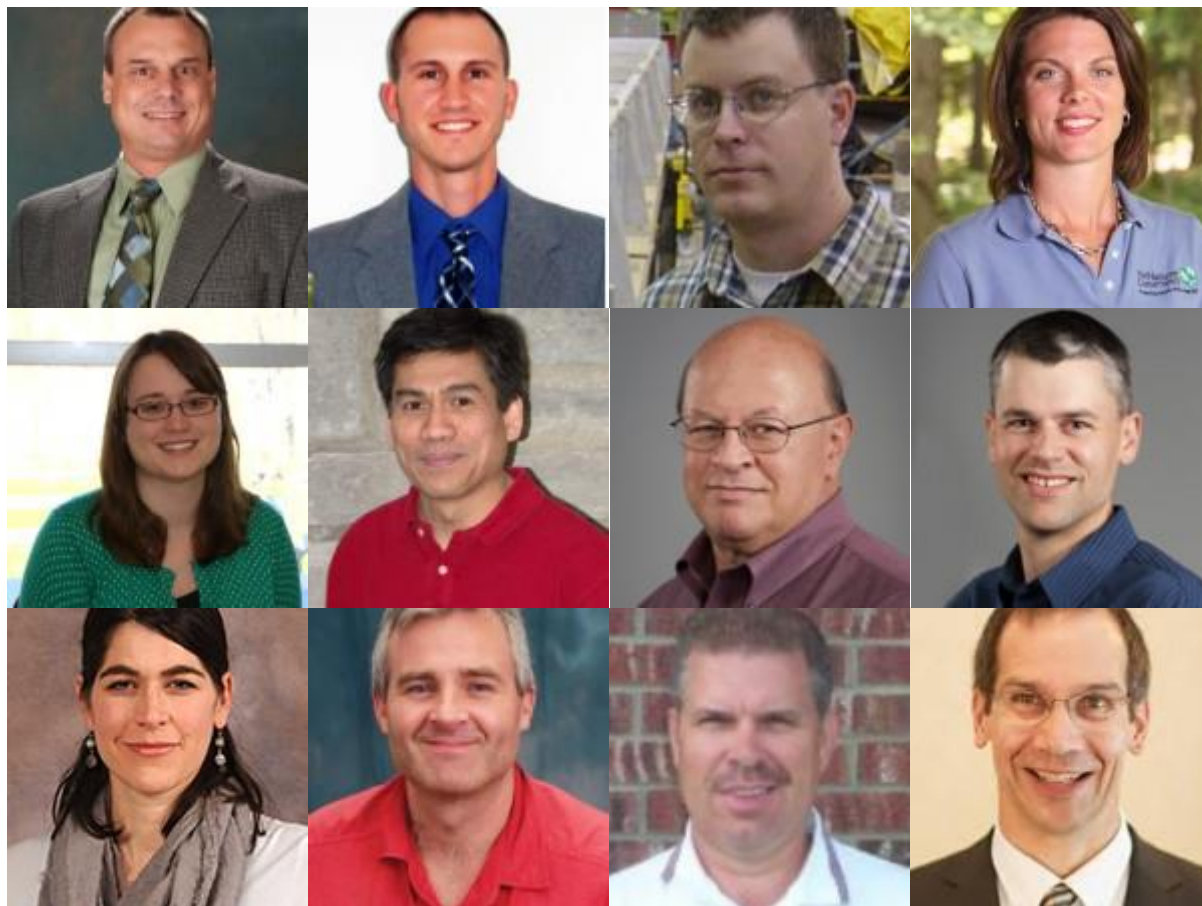
Lake Erie

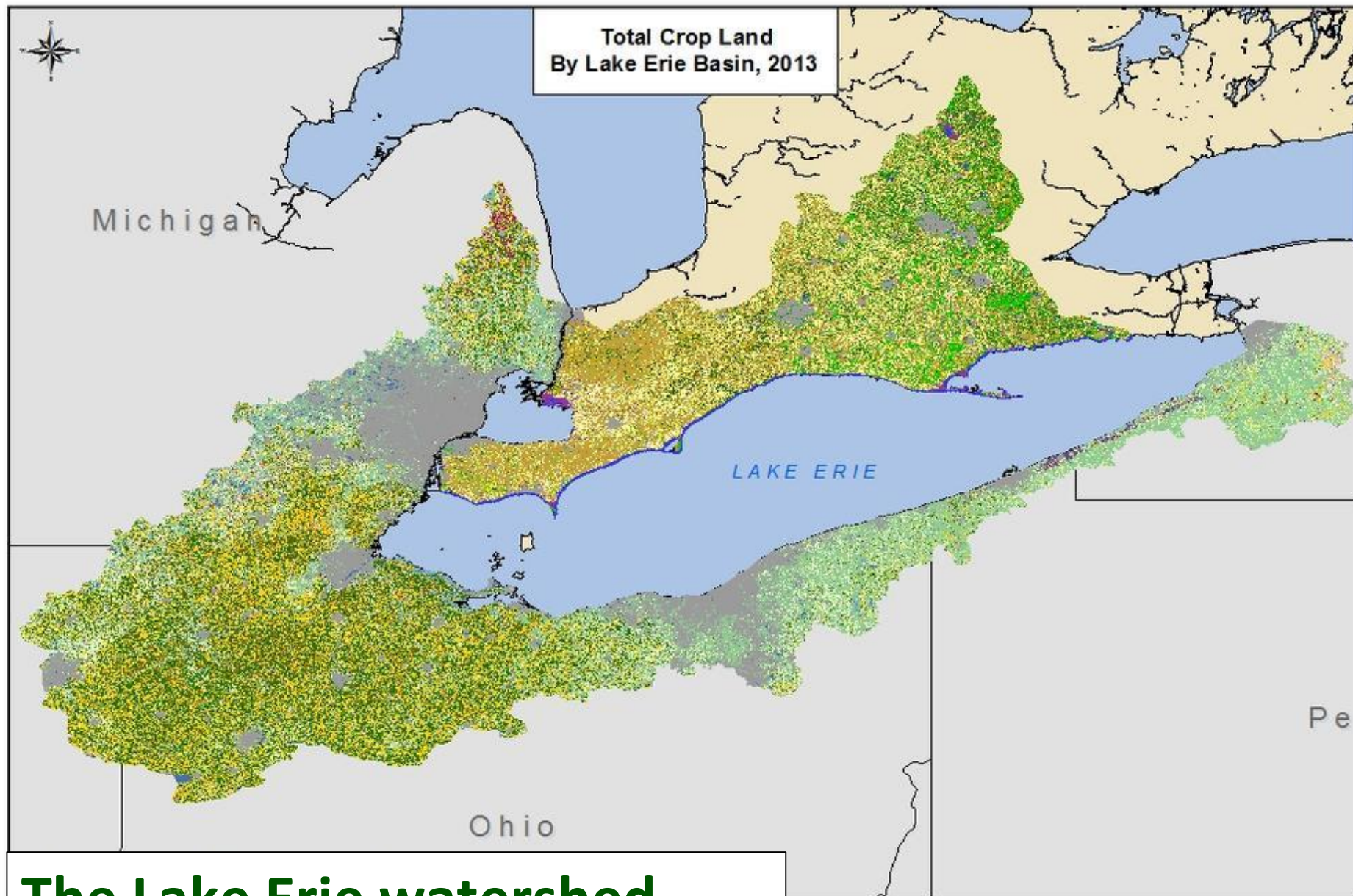


4R Research Fund: Evaluating the 4R Nutrient Stewardship Concept and Certification Program in the Western Lake Erie Basin

- 4R Practices and the 4R Certification Program
- 12 collaborating scientists... land-river-lake continuum... 2014-2019
- Ohio State U, USDA-ARS, Heidelberg U, LimnoTech, TNC

Project lead
Kevin King
USDA-ARS,
Columbus,
OH





**The Lake Erie watershed
includes cropland in Ontario**

This map is for illustrative purposes only. Do not rely on it as being a precise indicator of routes, locations of features, or as a guide to navigation. This map may contain cartographic errors or omissions.

Map data compiled from 2013 Agriculture and Agri-Food Canada Crop Layer, Statistics Canada and 2013 National Agricultural Statistics Service, United States Department of Agriculture.

Projection: WGS 84
Datum: World Geodetic System 1984

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4R Nutrient Stewardship



4R Designation in Manitoba



CANADIAN FERTILIZER INSTITUTE
INSTITUT CANADIEN DES ENGRAIS

The 4R Nutrient Stewardship Program will play a key role in meeting the sustainability challenge



4R Nutrient Stewardship Planning Guide

1. Introduction
2. Farm Information
3. Sustainability Goals and Indicators
4. Production Information
5. Nutrient Balance
6. Planned Nutrient Application

Certified Crop Adviser Specialties



- 4R Nutrient Management Planning Specialist
 - Performance objectives effective May 2015
 - Over 60 people wrote August exam, ~50% pass rate
 - Canadian version under discussion (CCA Ontario and Fertilizer Canada)
- Sustainability Specialty Exam
 - Performance objectives effective May 2015
 - First exam February 2016
 - References 4R Nutrient Stewardship

SW Ag Partners invests in zone tillage

Farmers can explore variable rate technology



BY JEFFREY CARTER

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A good way to deal with the regulatory challenges is to act proactively. That's a key factor behind South West Ag Partner's new Sustainable Cropping Systems program.

As part of that program SW Ag has purchased a 16-row Soil Warrior together with a 460-horsepower tractor to pull it as part of their investment for their Sustainable Cropping Systems program.

Innovative Farmers Association of Ontario conference in February, said he's been able to reduce his fertilizer use by about 75 per cent – likely because of improved placement – as compared to conventional systems.

While fall operation of his equipment is an option, Reints likes to use his system just a day or two before planting. He said this helps warm the soil as well as supplying nutrients within the tillage zone.

Page said Soil Warrior is an all-in-one system rather than utilizing a cart to carry the fertilizer. There are three bins from which fertilizer can be dispensed at variable rates.

This allows farmers to better



South West Ag Partners purchased a 16-row Soil Warrior and a 460-horsepower tractor to pull it as part of their investment for their Sustainable Cropping Systems program.

utilize the field information they've accumulated from such sources as yield maps, soil tests and visual imagery.

There are plans to demonstrate the equipment this sum-

mer. There will also be on-farm trials or SW Ag customers may simply plant a small acreage with the machine.

"This is very much about research. We'll be able to part-

ner with a small group of customers," Page said.

The big John Deere that was part of the equipment package was a necessary investment. "It takes about 30 horsepower per row unit to pull it. There are 16 row units. You can do the math from there," Page said.

The investment in the Soil Warrior is just part of SW Ag's Sustainable Cropping Systems program, Page said. Other elements of the program will be introduced later.

SW Ag Partners is a supplier of crop input and grain marketing services in Southwestern Ontario with a heritage dating back to 1947. The head office is located in Chatham in Chatham-Kent.