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Nutrient Stewardship

Voluntary Initiatives for a Sustainable Industry

Clyde Graham, CFI
N₂O Emissions Reduction Protocol Workshop
Oct. 28, 2008
Calgary

Becoming a Sustainable Industry

SUSTAINABILITY GOALS

Environmental

- Sustain or improve soil quality
- Maintain nutrient levels within natural ecosystems
- Preserve wildlife habitat



Social

- Produce nutritious, abundant and affordable food
- Support programs for strong and caring communities
- Help meet global food needs
- Provide ongoing employment opportunities in agriculture and related industries



Economic

- Produce revenue to sustain farm operations
- Preserve quality of life
- Make the most of dollars spent on fertilizer






What is “Best” for nutrient management?

- A flexible, site-specific approach
- Based on science and industry expertise
- Voluntary initiatives accommodate both these objectives



Voluntary BMP Framework

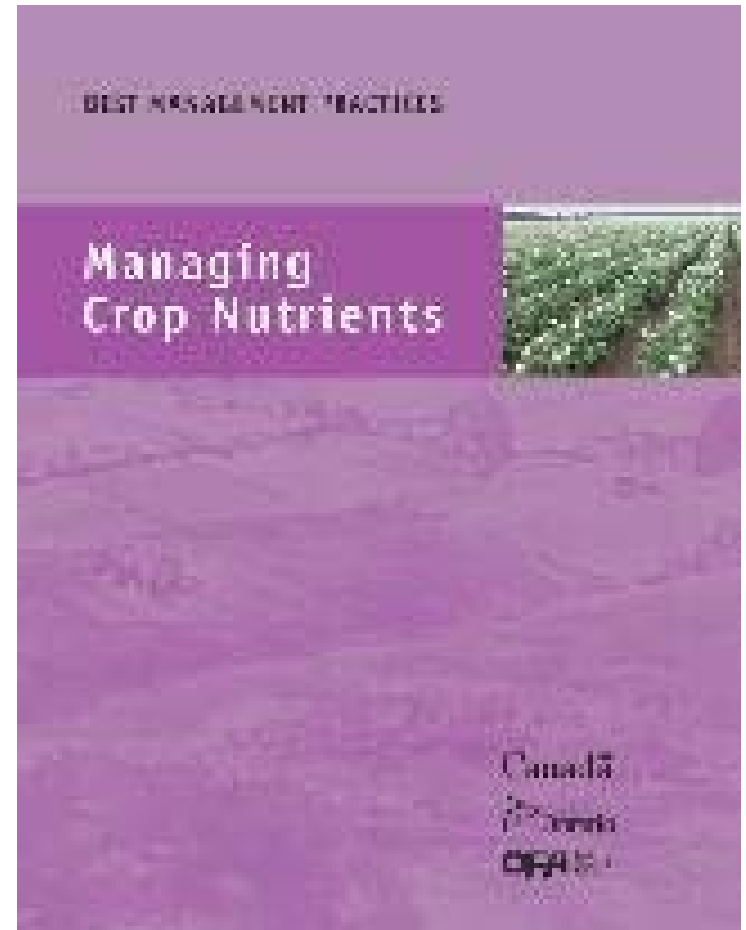
The Right Products at the...

| BEST MANAGEMENT PRACTICES (BMPs) | |
|---|---|
| BMP Category | BMP Examples |
|  <p>Right Rate <i>Match amount of fertilizer to crop needs</i></p> | <ul style="list-style-type: none">• Soil Testing• Yield Goal Analysis• Crop Removal Balance• Nutrient Management Planning• Plant Tissue Analysis• Applicator Calibration• Crop Scouting• Record Keeping• Variable Rate Technology |
|  <p>Right Time <i>Make nutrients available when crops need them</i></p> | <ul style="list-style-type: none">• Application Timing• Controlled Release Technologies• Inhibitors• Fertilizer Product Choice |
|  <p>Right Place <i>Keep nutrients where crops can use them</i></p> | <ul style="list-style-type: none">• Application Method• Incorporation of Fertilizer• Buffer Strips• Conservation Tillage• Cover Cropping• On-Farm Fertilizer Storage |



3Rs/4Rs

- TFI and CFI are working to get government recognition for nutrient BMPs system – the Right Product @ Right Rate, Right Time, Right Place®
- Next Step: International recognition



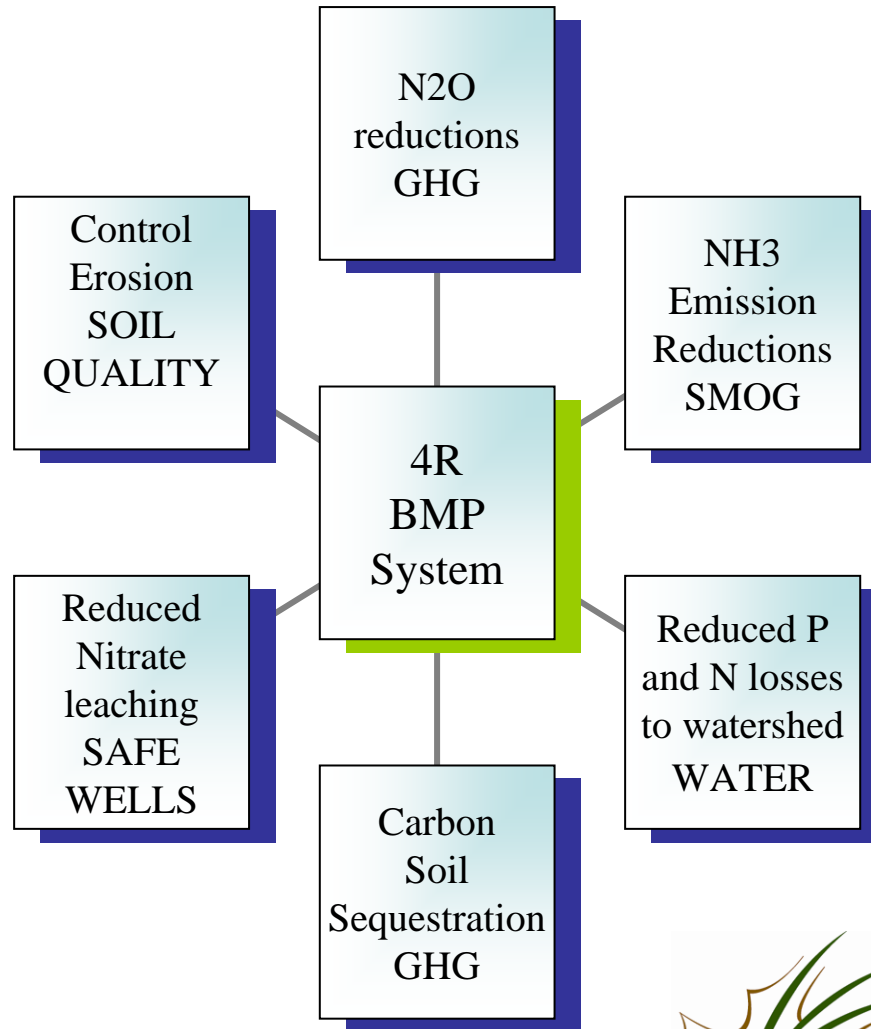
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Critical Elements

- Science-based
- Extension is needed
- Partnerships with farmers is essential
- Voluntary is key



Multiple Applications



Science-based



- Better Crops, Better Environment...through Science
- BMP definition, improvement and impact measurement



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Extension: Certified Crop Advisers

- ▶ American Society of Agronomy's Certified Crop Adviser Program (CCA)
- ▶ The largest certification program in agriculture
- ▶ Over 14,000 certified throughout the USA and Canada



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Partnerships with farmers



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CNC Mission

- “To promote science-based Beneficial Management Practices for crop nutrients that enhance both the ***economic*** and ***environmental*** sustainability of agriculture”
- It’s all about balance



4Rs Implementation in Canada

| Pillars | Strategy | Tactics |
|-------------------------|--|--|
| Science | Developing BMPs and supportive research | <ul style="list-style-type: none"> ■ IPNI—Cliff Snyder ■ CFI Science Cluster (\$10 million) ■ N₂O Emission Reduction Protocol |
| Recognition | Promoting partnerships with Ottawa, Provinces, Municipalities, Farmers, Environmentalists, Cottagers | <ul style="list-style-type: none"> ■ Communities in Bloom ■ Focus on hotspots: P.E.I, Lake Champlain, Lake Winnipeg, Lake Simcoe ■ Provincial Workshops ■ Federal-Provincial framework ■ Credits for farmers based on 4Rs |
| Public Education | Building Nutrients for Life, Urban Fertilizer Council, Crop Nutrients Council | <ul style="list-style-type: none"> ■ Curriculum for schools, teacher conferences and workshops ■ Phosphorus articles ■ Greener Lawns publication |
| Extension | Publishing Tips and Training for farmers, parks officials, gardeners | <ul style="list-style-type: none"> ■ CCA training program ■ Lawn applications training ■ Communications in stores for the “Do It Yourself” |
| Measurement | Evaluating success in nutrient management based on 4Rs principles | <ul style="list-style-type: none"> ■ Sustainability Reporting system under development |

Working with the Provinces

- CFI is working with federal and provincial governments as well as farm groups to promote adoption of ***Right Product @ Right Rate, Right Time, Right Place***® BMP system



Voluntary Nutrient Management Plans

- Focus has been on manure management
- Fertilizer is next
- Avoid regulation that imposes quantitative limits instead of supporting nutrient balance
- Protect fertilizer's reputation
- **RIGHT PRODUCT @ Right Rate, Right Time, Right Place®**
 - ▶ This is the foundation



Communication of BMPs

- **Right Rate, Right Time, Right Place®**
- **Right Product, Right Rate, Right Time, Right Place®**
- **RIGHT PRODUCTS @ Right Rate, Right Time, Right Place®**



4Rs at the farm gate

- **Most provinces have reduced agricultural extension for direct on-farm advice and education Certified Crop Advisors or les agronomes and other professional industry advisors have taken on the this role**
- **CCAs employed by agri-retailers work with farmers on nutrient application and environmental management**
- **They need the tools to make the right decisions for the environment**



4Rs at the farm gate

- ***All the “Rights” need to be considered when making nutrient management decisions***
- ***The system is meant to be flexible and customized at the farm level***
- ***Every farm and field is unique every season***





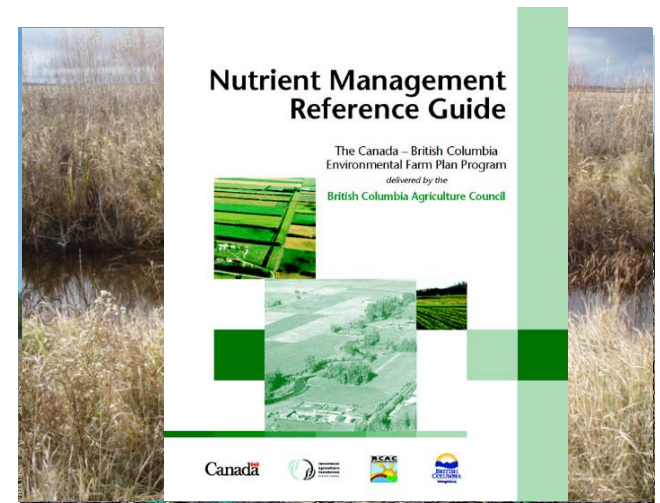
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An Economic Evaluation of BMPs for Crop Nutrients in Canadian Agriculture

Purpose

- To estimate farm profitability before and after participation in crop nutrient BMPs.
 - ▶ With and without financial assistance
- BMPs evaluated:
 - ▶ Soil testing
 - ▶ Variable rate fertilization
 - ▶ Minimum tillage
 - ▶ No-tillage
 - ▶ Nutrient management planning
 - ▶ Buffer strips



Survey of Canadian Producers

- 1,000 producers surveyed across Canada
- Producers are familiar with BMPs:
 - ▶ 97% of producers use at least one BMP
 - ▶ 50% of producers use multiple BMPs
- High level of importance on managing their farm to protect the environment.
 - ▶ 98% of survey respondents
- Low uptake of financial assistance programs
 - ▶ Only 1-7% of producers using financial assistance



Survey of Canadian Producers

- Key reasons to adopt BMPs:
 - ▶ Increased yields
 - ▶ More efficient use of fertilizer and manure
 - ▶ Concern about soil quality/erosion
 - ▶ Fuel, labour and monetary savings
- Barriers to adoption:
 - ▶ Cost
 - ▶ Lack of equipment
 - ▶ Believing that BMPs are unnecessary



Farm Profitability Models

- Developed representative farm models for western, central and eastern Canadian farms.
 - ▶ Based on 2006 provincial cost of production budgets
- Survey results used to determine impact of BMP on yields and operating costs
 - ▶ Determined % change in net income due to the adoption of the BMP based on producer perceptions
- Estimated results with and without financial assistance



Farm Profitability Models - Results

(% change in net income due to BMP)

| | Soil Testing | VRF | Min-Till | No-Till | NMP | Buffers |
|-----------------------|--------------|-----|----------|---------|-----|---------|
| Alberta - Black Soils | | 53 | | | 78 | -10 |
| Alberta - Brown Soils | 19 | | 34 | | 33 | |
| Sask - Black Soils | 24 | 25 | | | 38 | |
| Sask - Brown Soils | 15 | | 17 | | 30 | |
| Manitoba | 12 | -7 | 12 | 12 | 20 | -1 |
| Ontario | 59 | -9 | 23 | 23 | 42 | -3 |
| Quebec | 1 | -6 | 12 | 8 | 13 | -2 |
| Prince Edward Island | | | | | | -1 |

VRF – Variable Rate Fertilization

NMP – Nutrient Management Planning

Note: Table shows models without financial assistance



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Key Results

- Profitable BMPs included:

- ▶ Soil testing
- ▶ Nutrient management planning
- ▶ Minimum tillage
- ▶ No-tillage



- These BMPs increased yields which offset any increase in operating costs, enhancing farm profitability.



Key Results

- Unprofitable BMPs included:
 - ▶ Variable Rate Fertilization
 - Equipment costs outweighed benefits of the BMPs.
 - Exception: Alberta and Saskatchewan
 - ▶ Buffer strips
 - High costs of establishment and lost crop production.



Summary and Conclusions

- Research provides farmers with knowledge of how adopting BMPs affects their financial bottom line.
- Research demonstrates that some BMPs can improve farm profitability.



Summary and Conclusions

- To manage environmental risk using BMPs, barriers to adoption need to be addressed.
- How?
 - ▶ Written material on adopting BMPs
 - ▶ More accurate information on economic and environmental impacts of BMPs on the farm
 - ▶ Workshops/seminars
 - ▶ Agricultural extension assistance
 - ▶ More financial assistance



The Second Green Revolution

“The challenge for your industry is to be at the head of this green revolution as you were at the head of the last one. Just as you have helped turn farming from a subsistence business into a flourishing industry that feeds the world, I now call on you to work with farmers, environmentalists and governments to help fine-tune agriculture into a business that feeds the world without harming the natural world.”

- Hon. George Webster, P.E.I. Minister of Environment, Energy and Forestry



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Industry's Response



- We are in the public eye now, more than ever
- The food crisis has shifted the public's focus from organic issues to supply
- This allows us to help farmers recast the debate from one of “environmental harm” to “sustainability”
- We can achieve all of the industry's economic – social – environmental goals with a call for a Second Green Revolution



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