



## Can We Define a Global Framework within which Fertilizer BMPs can be Adapted to Local Conditions?

- Question
- We, not I
- No answer

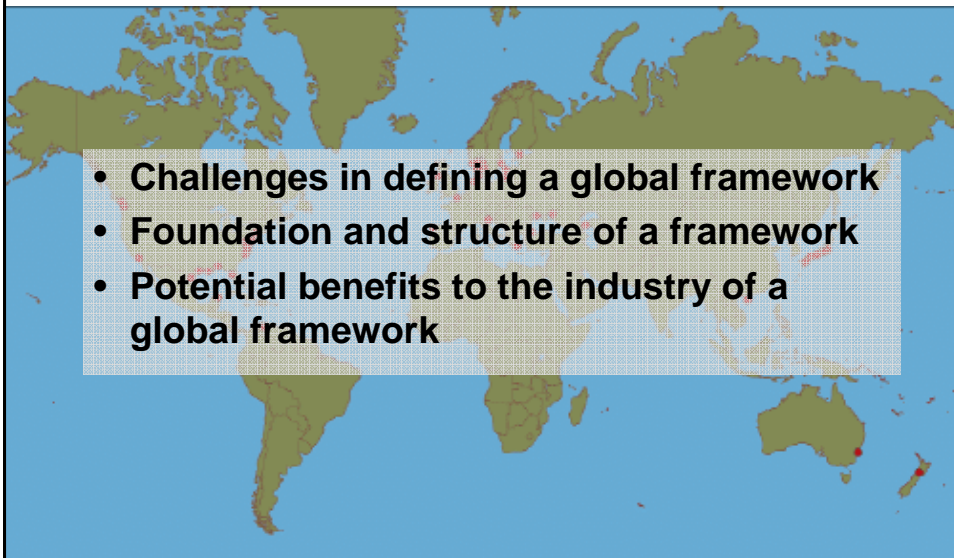
Paul Fixen  
March 7, 2007



## Issues related to defining a global framework



- Challenges in defining a global framework
- Foundation and structure of a framework
- Potential benefits to the industry of a global framework



## Challenge 1: Definition of BMPs

Many definitions spanning last two decades



- **USDA-ARS (2006):** ... developed for a particular region as effective and practical tools for **environmental protection**
- **FDCO & FAO (2004):** ... **best possible use** of applied inputs ... resulting in minimal adverse effect on the **environment**.
- **BMP Challenge (2006):** ... **cut fertilizer** costs and maintain yield.
- **NCSU (1991):** ... assure **optimum growth** and minimize adverse **environmental** effects
- **PPI (1991):** ... proven in research and tested through farmer implementation to give **optimum production** potential, input **efficiency**, and **environmental** protection

## Challenge 2: Limiting technical breadth without limiting usefulness



- U.S. Dust Bowl and extensive research
  - Catalyzed the fusing of conservation and agronomic BMPs
  - Practices interact complicating a focus on fertilizer BMPs
- Impact of a fertilizer BMP is greatly influenced by
  - Other agronomic practices
  - Soil conservation practices
- A fertilizer BMP can be ineffective if the cropping system has other serious inadequacies
- Fertilizer vs nutrient BMPs
  - Nutrient BMPs extend beyond fertilizer ... manure management, cover crops, buffer strips, other watershed nutrient capture practices
  - A focus on fertilizer BMPs does diminish the importance of these other nutrient management practices

### Challenge 3: Limiting technical depth without limiting usefulness



- How deep or detailed is the global version
  - Too much detail overly constrains site-specificity
  - Too little detail reduces benefits of unified global support of a meaningful BMP concept
- Sameness of a global framework compromising a company's potential for differentiation in the marketplace

### Challenge 4: Targeting a specific audience



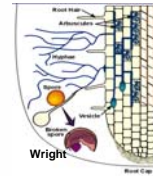
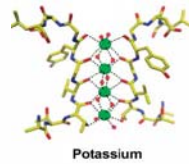
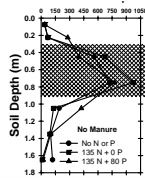
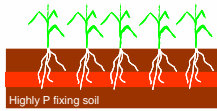
"Apply fertilizer according to annual soil test recommendations. Do not apply more fertilizer than is recommended. Apply fertilizer to actively growing crops only (NCSU, 2007)."

VS

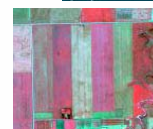
Another publication on BMPs limited in breadth to agricultural nutrients that spans **four pages of fine print** with numerous references to **additional publications** covering the details of specific nutrient BMPs in greater depth.

**Who is the audience for the framework?**

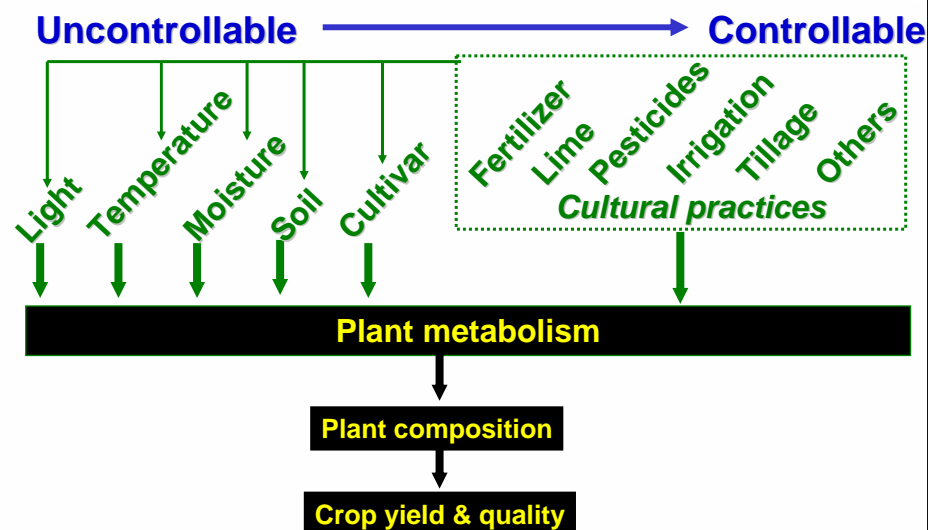
## Foundation and structure of a global framework



- Science-based principles ... the foundation
- Serve as guide to practices
  - With the highest probability of accomplishing the objectives of fertilizer management
    - Right product, rate, time, place
  - No guarantees



## A complex system involving uncertainty



After Beaufils, 1973

## Tested through farmer implementation



## Flexibility in the framework



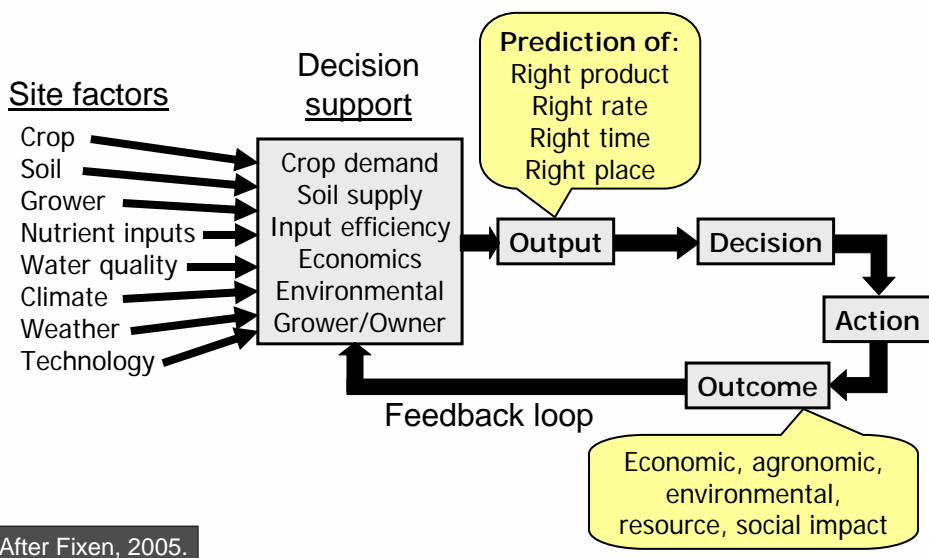
- BMPs are dynamic, change as:
  - Scientific knowledge grows
  - Technology improves
  - Practical experience teaches
- Flexibility essential for site-specificity and improvement
- Science-based local decision support facilitates refinement allowed by framework flexibility

## Possible site factors that can influence the details of specific fertilizer BMPs



- Crop - yield potential, value, tissue levels, leaf color, cultural practices
- Soil - soil nutrient supply indices, other properties impacting nutrients/crop
- Grower - land tenure, capital supply, opportunity costs, objectives
- Nutrient inputs - available commercial forms, wastes, costs
- Water quality - set back restrictions, ground water regulations
- Climate - probabilities for relevant events (for models)
- Weather - for real-time model input
- Technology - what's available and appropriate

## Decision support leading to fertilizer BMPs as a dynamic process requiring local refinement.



A global framework from which fertilizer BMPs can be adopted: **ELEMENTS**



**Appropriate  
BMP definition**

**Appropriate  
breadth**

**Appropriate  
depth**

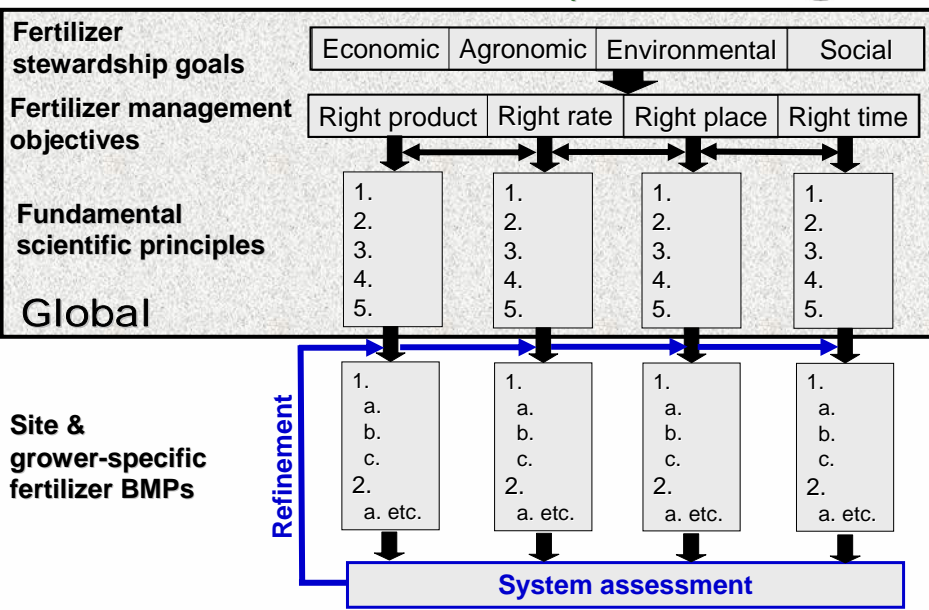
**Targeted to a specific audience**

**Science  
based**

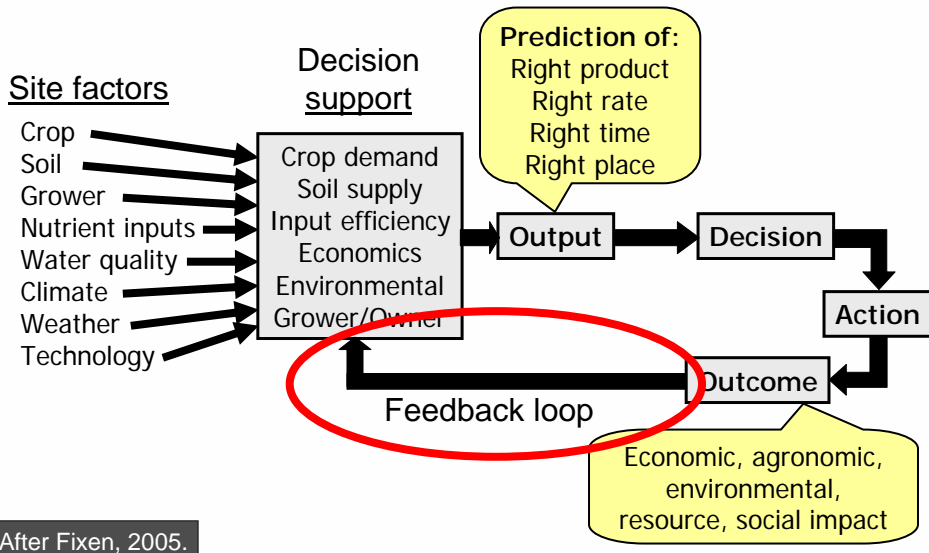
**Workable  
on farm**

**Flexible**

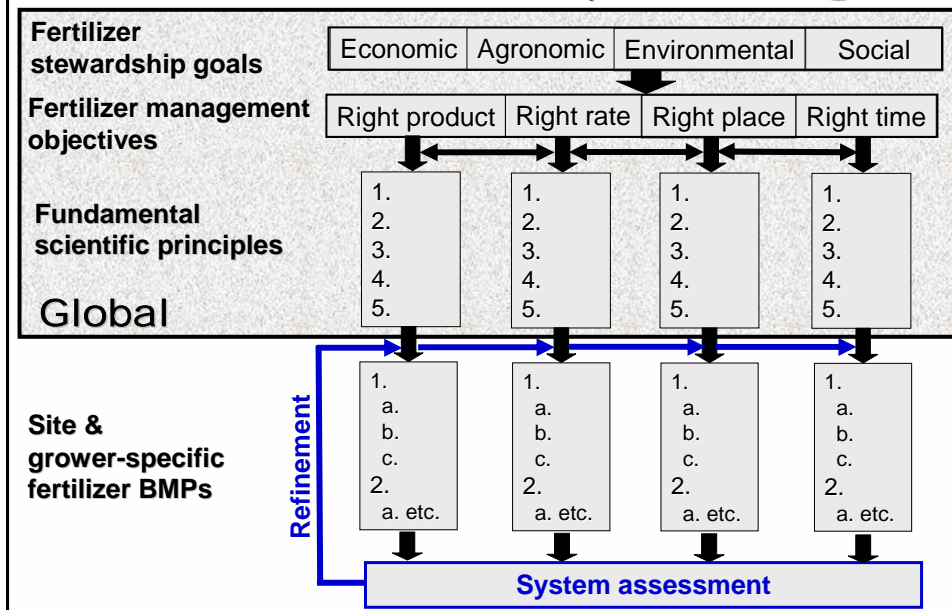
One potential global framework from which fertilizer BMPs can be adopted



## Decision support leading to fertilizer BMPs as a dynamic process requiring local refinement.

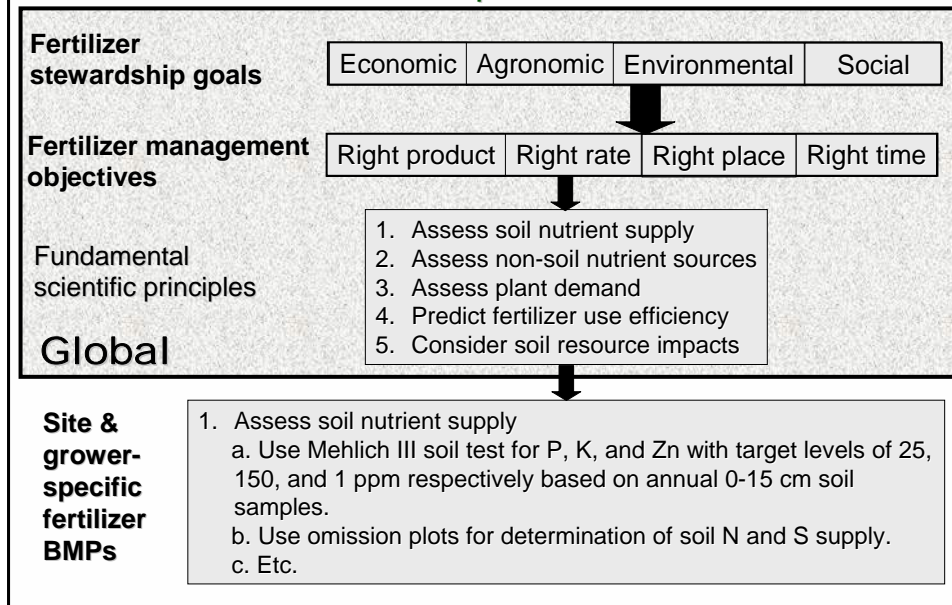


## One potential global framework from which fertilizer BMPs can be adopted





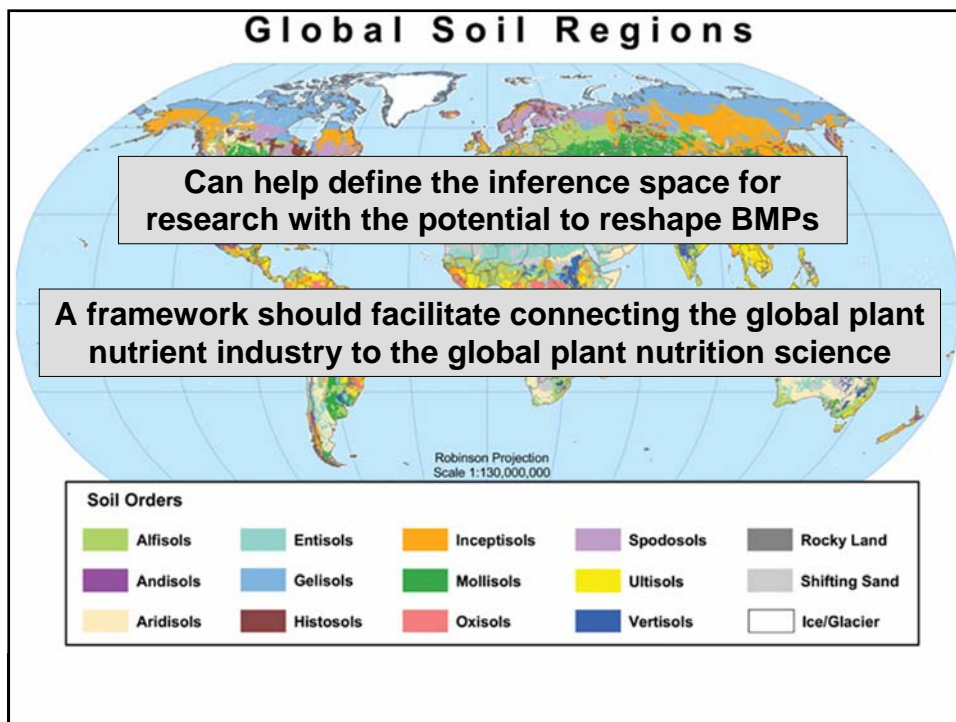
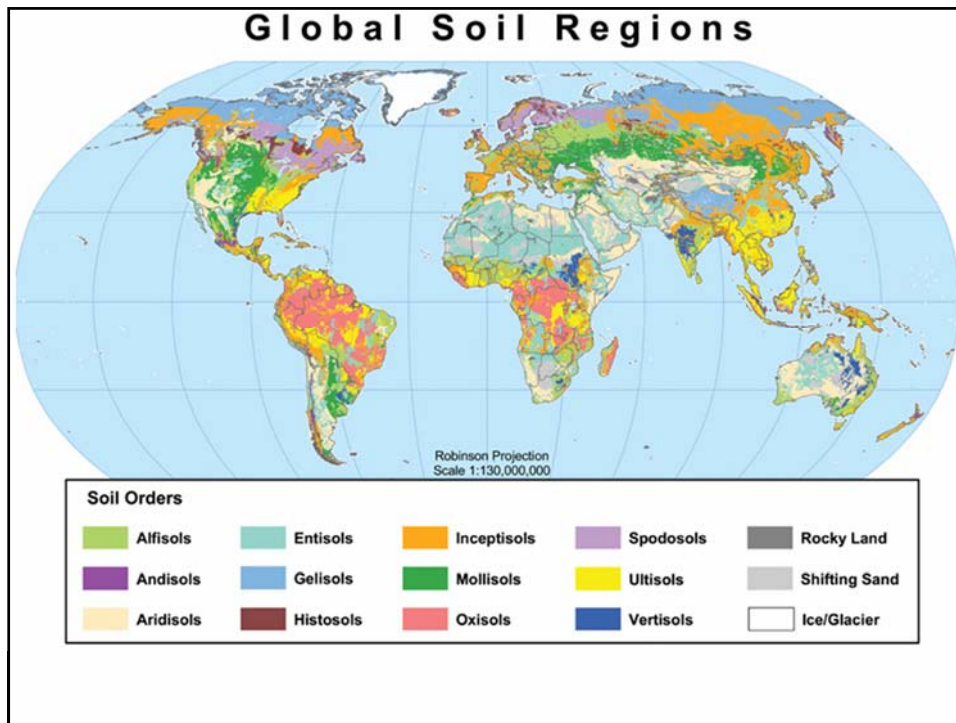
## One potential global framework with fertilizer BMP example.



## Potential benefits to the industry of a global framework



- A better framework ... collective intelligence
- Power of a unified voice
- More effective use of science and technology
  - Science provides a predictable order
  - Example – global soils



## Potential benefits to the industry of a global framework



- A better framework ... collective intelligence
- Power of a unified voice
- More effective use of science and technology
  - Science provides a predictable order
  - Example – global soils
- A universal educational (& marketing) tool
  - State-of-the-art/science educational tools
  - Focus on fundamental principles for defining site & grower specific BMPs ... fish vs fishing
    - Beyond teaching generalized BMPs to the principles needed to localize them

## An opportunity ...



To promote greater implementation and improvement of fertilizer BMPs



Help agriculture more fully realize its expanded potential as a provider of food, fiber and fuel



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