Gaps in the Knowledge for Making Recommendations for Land Application of FGD Gypsum

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http://www.oardc.ohio-state.edu/agsupplyfgd
http://www.oardc.ohio-state.edu/agriculturalfgdnetwork/
http://www.oardc.ohio-state.edu/soilbiolab/
Production Variables

- Climate
- Crop Choice and Crop Genetics
- Soil Variables
- Input Options
- Incentives/Disincentives (personal and agency)
Von Liebig's Famous "Law of the Minimum"

Light
Heat
Mechanical Support
Nitrogen
Phosphorus
Potassium
Sulfur
Calcium
Water
Air
Organic Matter

Source: Brady and Weil, 1996
Crop responses to nitrogen are common and return on investment is generally guaranteed.

Phosphorous and potassium tests are well developed and return on investment is also high.

Hundreds of man hours and research dollars invested in developing management tools.

Consultants can make money helping farmers manage their N-P-K nutrients.
Crop Choice

- Match Crop with Climate, Soil, Market
- Sulfur Requirements
- Disease Resistance
- Insect Resistance

FGD gypsum will probably not be a determining factor in choice of crop grown. Its use will need to complement the choice of crop.
Crop Choice

• Plant Physiology
  ▪ Seedling vigor
  ▪ Drought tolerance
  ▪ Sensitivity to sodium or aluminum

• Crop Prices
Crop Choice

- Forages (especially alfalfa and clovers)
- Root Crops (peanuts, beets, vegetables)
- Canola
- Corn
- Cotton
- Soybean
- Wheat
Soil Variables

- Type and Concentration of Clay Minerals
- Sodium (Magnesium) Salt Concentrations
- Organic Matter Concentration
- Erosion Susceptibility
- Subsoil Acidity
Soil Variables

- Sulfur (Sulfate) Concentrations
- Nutrient Balances
- Off Site Impacts
- Drainage
- Tillage
Input Options

- Soil Itself - Organic Matter and Soil Minerals
- Sulfur in Fertilizers
- Precipitation
- Manures
- Prepared or Custom Made Composts
- Type of Sulfur Fertilizer
Input Options

- Apply as a Fertilizer Blend
- Apply Alone as Directly Received from the Utility
- Rate Determination
  - Ca:Al Ratio - Especially in Subsoil
  - Sulfur Deficiency in Soil and a Soil Sulfur Test
  - Magnesium/Sodium Saturation of the Soil’s Exchange Capacity
  - One-Time Application or Annual Smaller Applications
Incentives

- Return on Investment
- Subsidized Use
- Use on Non-Food Crops
- Education and Demonstration Information
Incentives

• Increasing Pressure on Our Soil Resource
• Secondary Benefits
  ▪ Forage Quality
  ▪ Food Quality (cancer fighting compounds)
Disincentives

- Cost of Input vs. Return on Investment
  - Benefit is not consistent from year to year
  - Benefit may be delayed
- Negative Perception by Some State Extension Services (Education is Needed)
- Fertilizer Dealers not Familiar with FGD-Gypsum
Disincentives

- Environmental Concern
- No Relationship Between Producer and End User of the FGD Gypsum
- Transportation Costs
- Storage Costs - Can Only Be Applied at Certain Times of the Year
**Final Words**

- There are many benefits for agriculture in using FGD gypsum
- These benefits create market opportunities
- The opportunities will only be realized if existing barriers are overcome
- A community focused on promoting appropriate use of FGD gypsum is key
Thank You