

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

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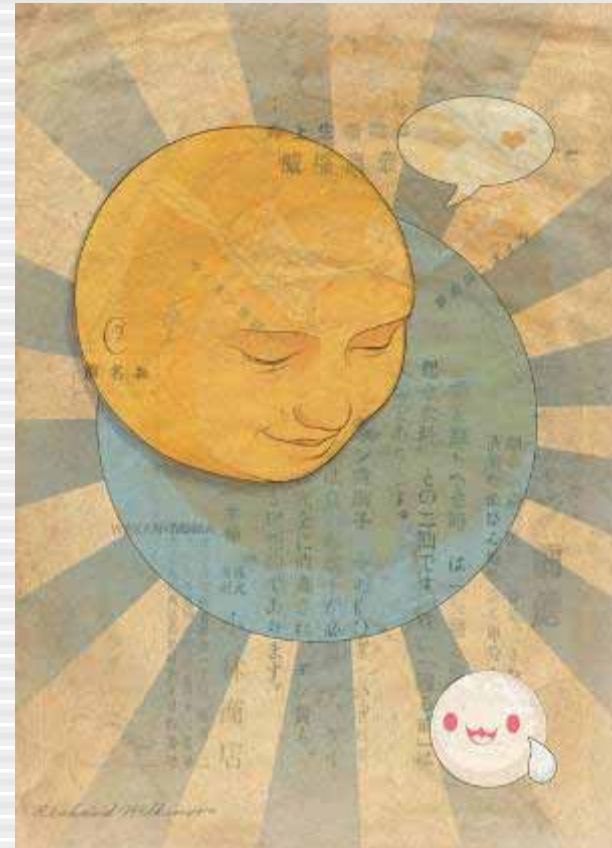
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<http://www.oardc.ohio-state.edu/agriculturalfgdnetwork/>

<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

Focus on Nitrogen, Phosphorus and Potassium Fertility Research

- 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



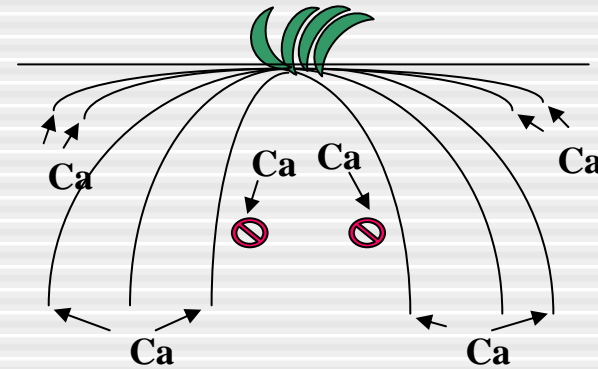
Input Options

- 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

ohio1ne.ag.ohio-state.edu -- your Link to Information, News, and Education



FactSheet Extension

Ohio State University Extension Fact Sheet
School of Natural Resources
2021 Coffey Road, Columbus, Ohio 43210

Gypsum for Agricultural Use in Ohio—Sources and Quality of Available Products

ANR-20-05

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Incentives

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

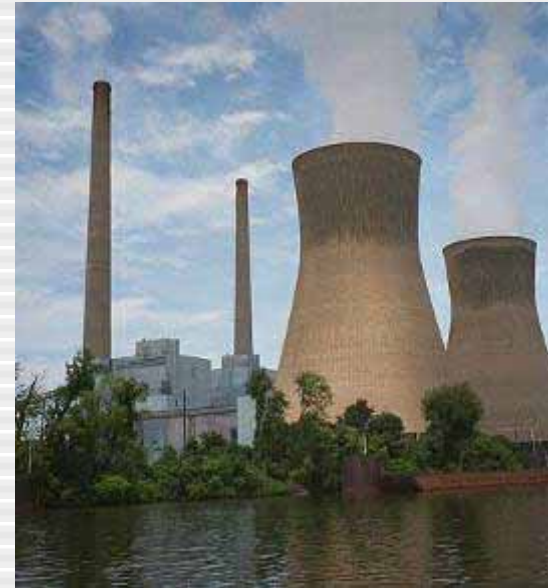


Disincentives

- 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