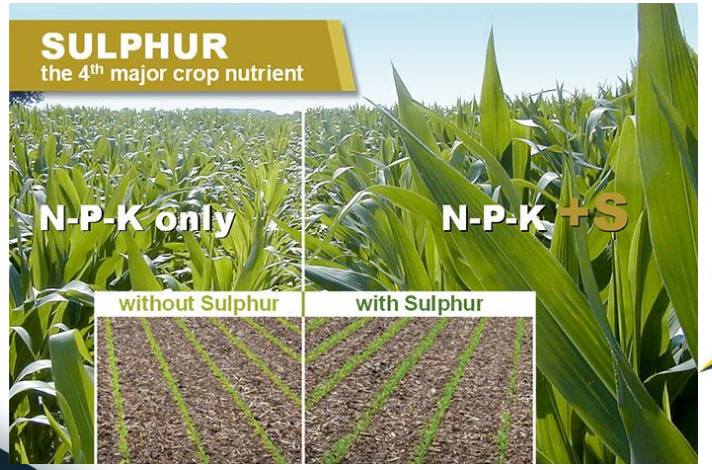
The Sulphur Institute at 65

FRST Collaborator Meeting

September 12, 2025

Ron Olson, Senior Agronomist
rolson@sulphurinstitute.org

FRST
FERTILIZER RECOMMENDATION SUPPORT TOOL



65 YEARS THE SULPHUR INSTITUTE

The Sulphur Institute at 65 YEARS THE SULPHUR INSTITUTE

Established in 1960; 65 years of continuous advocacy to the Sulphur industry. TSI was formed to:

Transform Sulphur's Value globally	**Advance Research and Technological Innovation**	**Facilitate Industry Collaboration and Knowledge Sharing**	**Establish Safety and Environmental Practices**	**Conduct Educational Outreach and Workforce Development**

Each of these contributions has been instrumental in evolving the Sulphur industry, ensuring that it remains dynamic, innovative, and sustainable in today's ever-changing industrial landscape

Freeport Sulphur Company
Hoskins Mound, Texas. May 1943

TSI Photo Archive, 2012

TSI Photo Archive, 2017

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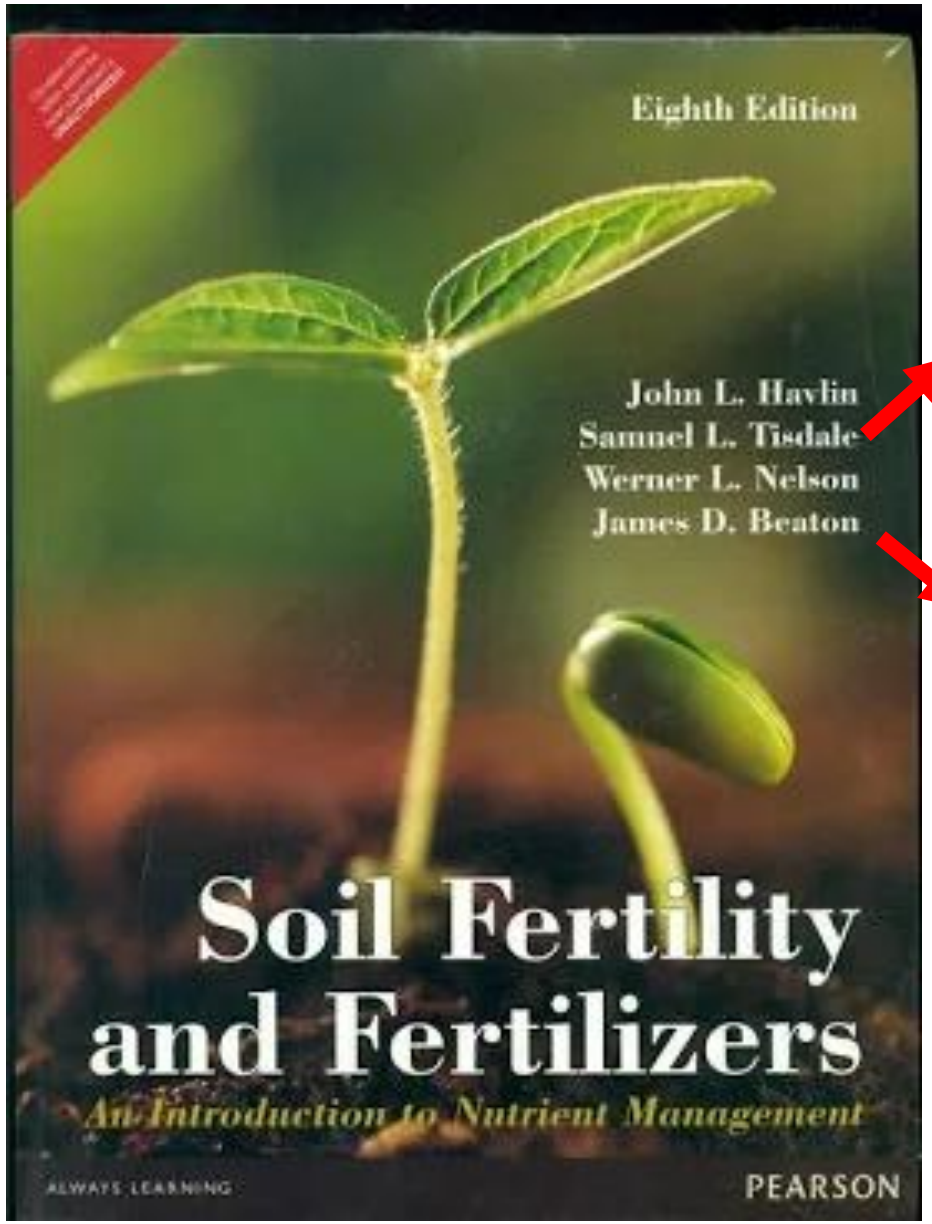
Agronomy has lead The Sulphur Institute…



Dr. Samuel L. Tisdale joined TSI in 1960 as its first Director of Agricultural Research and later served as President of TSI from 1979-1984 when he retired after 25 years at TSI.

Dr. James D. Beaton was the Director of Agricultural Research at TSI from 1973-1978. He became Western and Northwest US Director of PPI in 1978 -1988; in 1988 he became President of PPIC until he retired in 1994. He was a leading Sulphur crop nutrition advocate for western Canada. He is credited with first calling **Sulphur the 4th Major Crop Nutrient** in a 1980 presentation.

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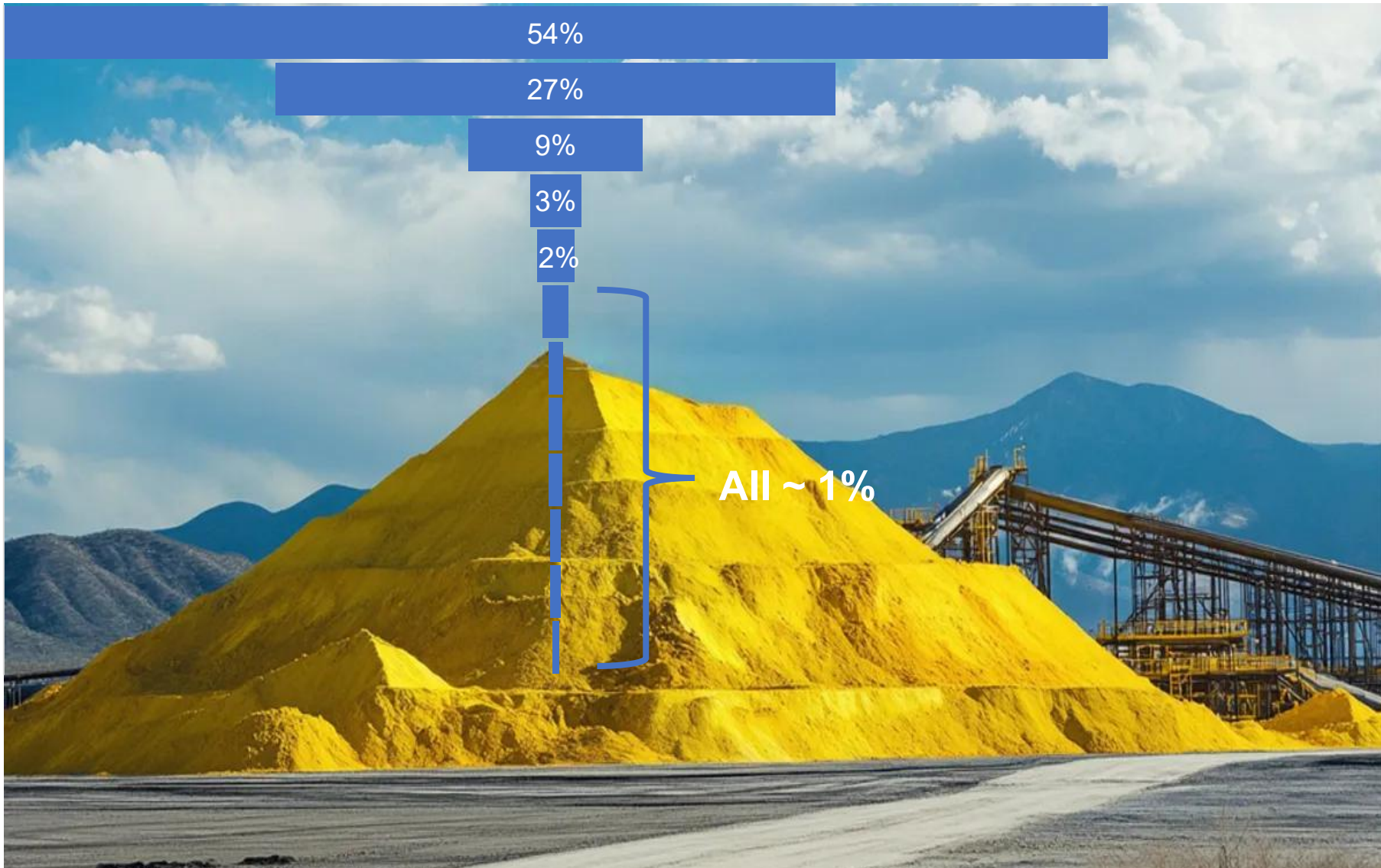
Sulphur use in Ag & Industrial applications

Percentage of US sulphur used in industrial applications



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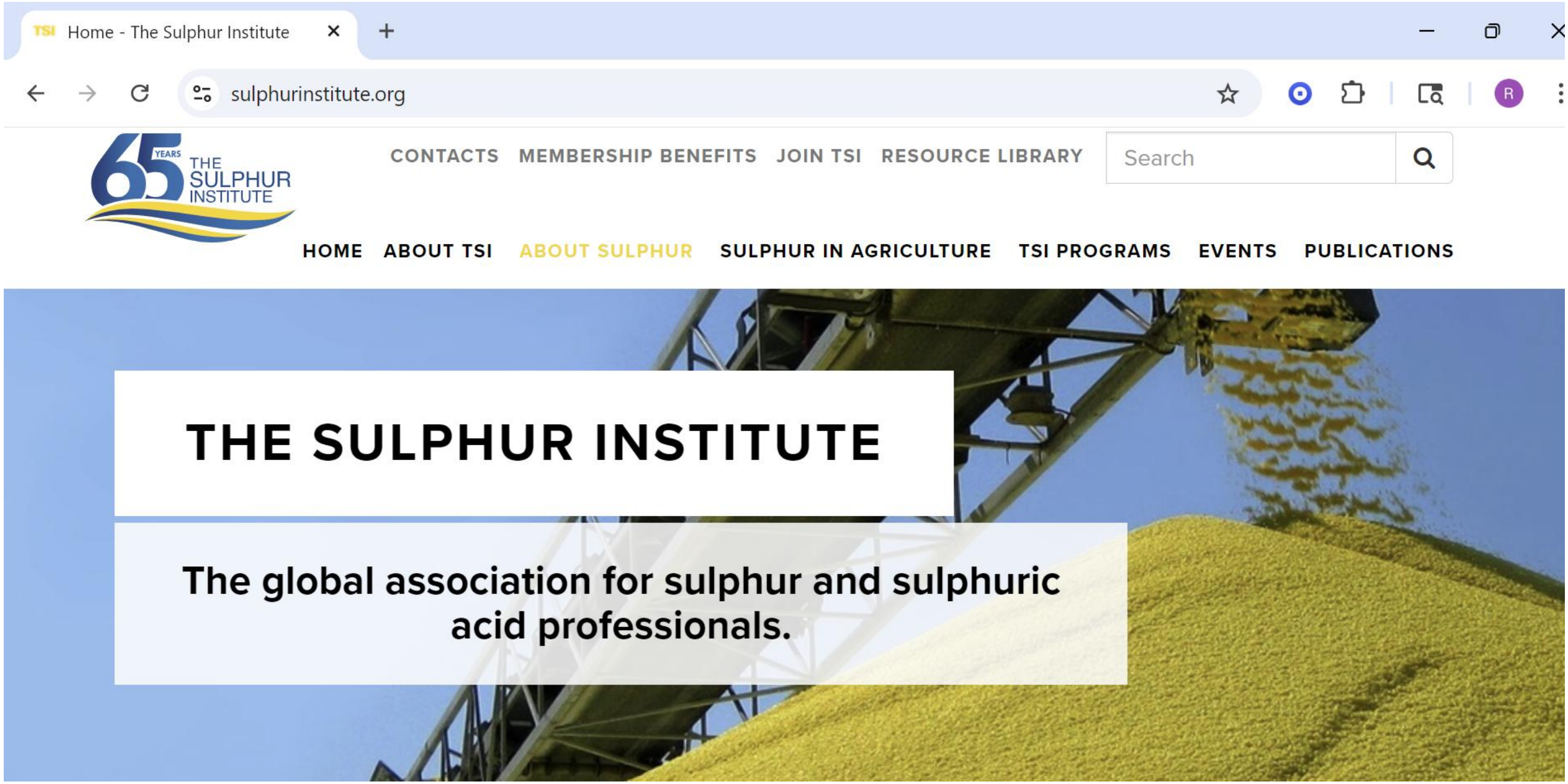

https://www.sulphurinstitute.org/

FY24-25 Member Companies

Governing Members (32)

Producers

BP Products North America
Chevron Products Supply and Trading
ExxonMobil Oil Corporation
Jupiter Sulphur LLC
Koch Sulfur Products Company
Phillips 66
Shell Sulphur Solutions
Valero Marketing and Supply
Veolia North America

Consumers

AdvanSix
CHS Industries
Freeport McMoRan
Interoceanic Corp.
ITAFOS
Nutrien
JR Simplot
Tessenderlo Kerley
The Mosaic Company

Marketers

Chemtrade Logistics
ICEC; an HJ Baker Company
International Raw Materials
Martin Operating Partnership
Mitsui & Co. (U.S.A.), Inc.
NorFalco
Rio Tinto
SATCO
Trammo, Inc.
TRICON Energy

Service Providers

Savage Services Corporation
Sultran Ltd.

Sulphur Associates (16)

Small Companies

CITIS, S.A.
Georgia Gulf Sulfur
Ioneer, Inc.
Lithium Nevada Corp
Montana Sulphur
SRx Sulfur

Transportation Associates

Aztec Marine
CSX Railroad
Gulf Transport
Iron Horse Services
Schiber Truck Company
Tengiz Trans Group
The Greenbrier Companies
Trinity Rail
Union Tank Car Company
Zwaans van der Heuvel Tankvaart

Sulphur Affiliates (12)

Consultants / Publishers / Non-Profits

Acuity Commodities
Argus Media
Con-Sul
CRU
ICIS
IFA
IHS Markit

Equipment Suppliers

Carboline Coatings
Penflex Hoses
TransQuip USA
Durlon Sealing Solutions
SBS Steel Belt Systems

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The Sulphur Institute – Agronomy Steering Committee/ASC

Company	Representative
Nutrien	Alan Blaylock – Chairman / Mike Howell
The Mosaic Company	Tryston Beyrer
Shell Consulting	Kent Martin – Martin Agronomic & Env.
	Rafael Garcia – Shell Canada
ConSul, Inc	Gerard “Jerry” d'Aquin
Invited Guest	Greg Schwab/Elevar Partners
InterOceanic Corporation	Bob Hartman
AdvanSix	Mercedes Gearhart
Tessenderlo Kerley	Zack Ogles
Simplot	Bobby Golden
CHS	Jake Niederer
EZ Sulphur	Charles Ingoldsby
The Sulphur Institute	Ron Olson/Staff Lead

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SULPHUR – THE FOURTH MAJOR CROP NUTRIENT

TSI'S PROMOTION OF SULPHUR FERTILIZER USE

Sulphur – The Fourth Major Crop Nutrient

Nitrogen (N), phosphorus (P) and potassium (K) are critical components of a well-fertilized crop. But to achieve yields and more nutritious foods, crops need sulphur (S). This website is an introduction to sulphur and its important role in agriculture.

https://www.sulphurinstitute.org/sulphur-in-agriculture/sulphur-the-fourth-major-crop-nutrient/

TSI Strategy

Value Statement and Value Drivers

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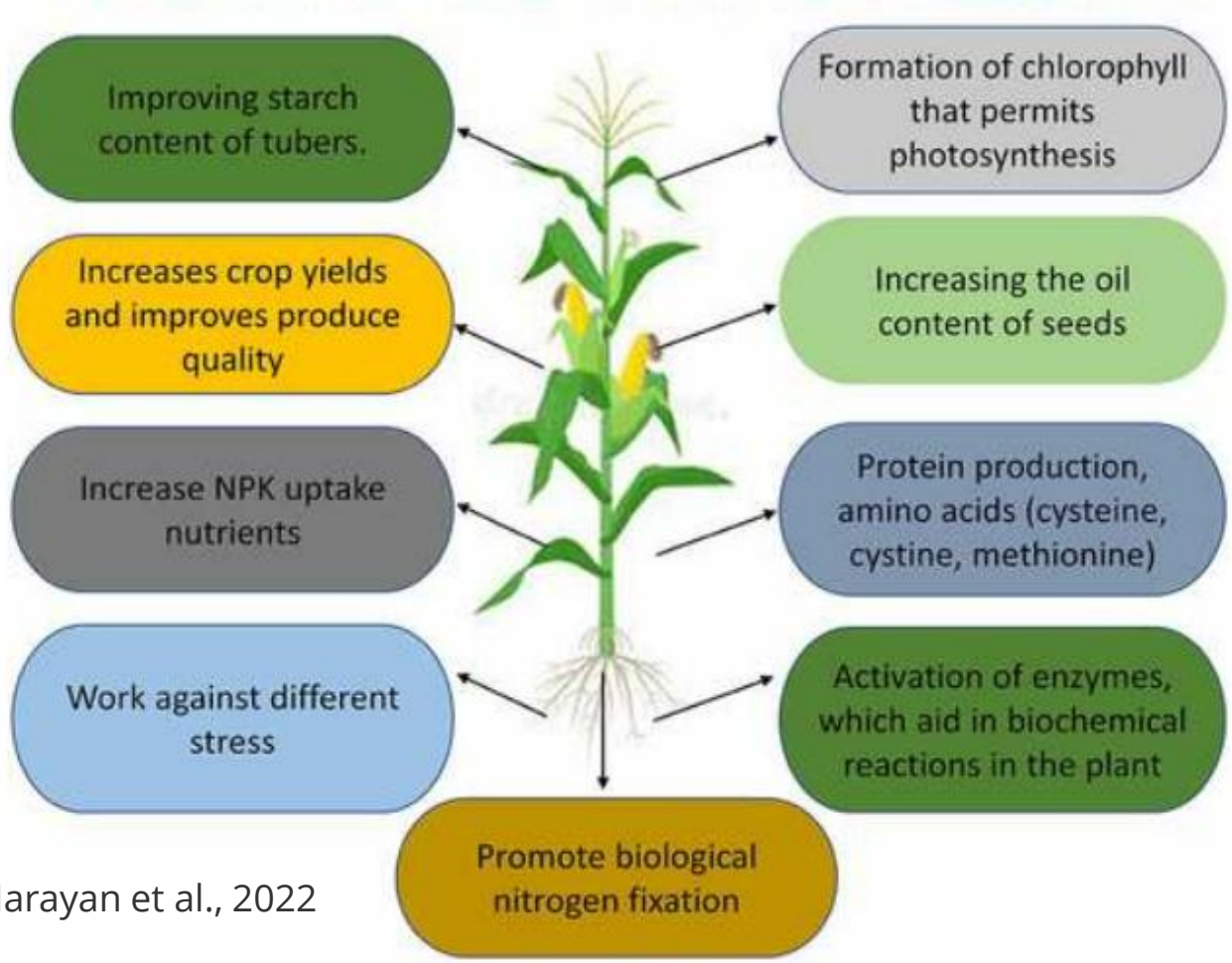
Role of Sulphur in Plant Growth and Development



Narayan et al., 2022

Immobile in the plant symptoms occur in new growth

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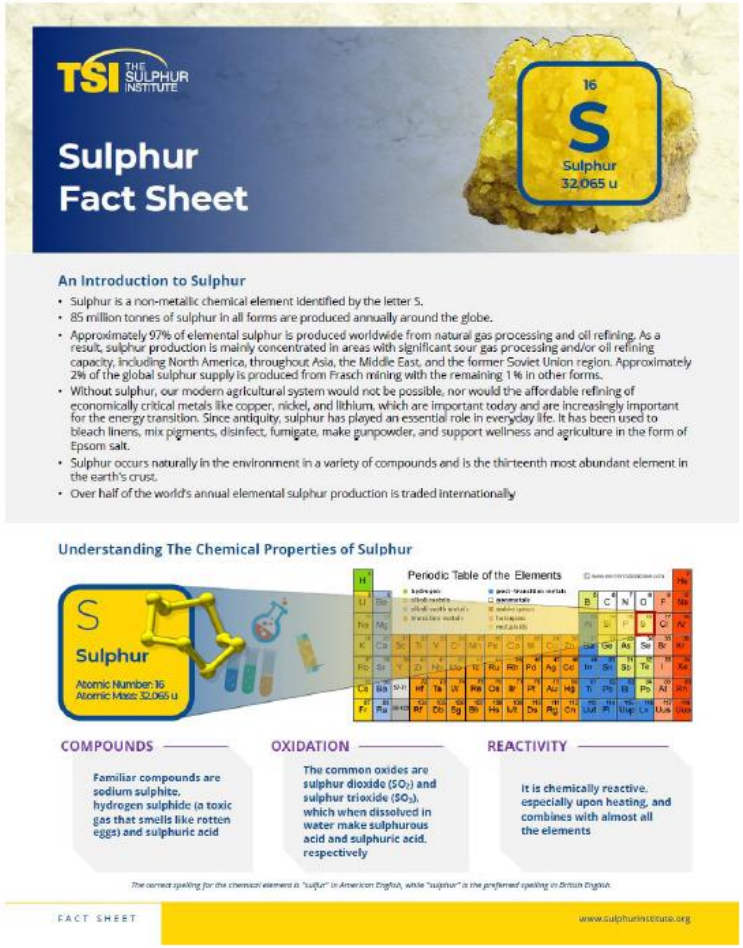
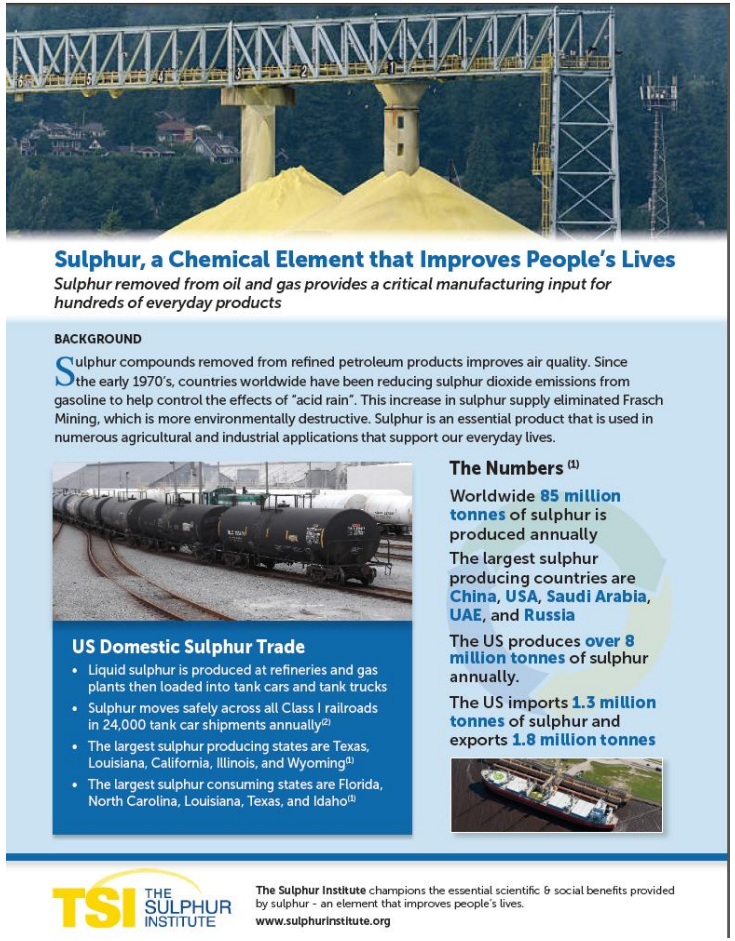
SULPHUR
the 4th major crop nutrient

Education and Training

Advocacy Papers





Working on additional info graphics to support sulphur use

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65 Ways Sulphur Improves People's Lives

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· Improves People's Lives
ur #sulphuricacid #sulfuricacid
HumanBody #insulin #atc ...more

ulphur Improves People's Lives

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nan body

crucial role in the
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together by disulfide
e formed by sulphur
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sulin due to its role in
tical bonds within the

Sulphur and the Human Body

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1,677 followers
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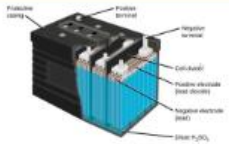
65 Ways Sulphur Improves People's Lives

#TSI #Sulphur #sulfur #sulphuricacid #sulfur ...more

65 Ways Sulphur Improves People's Lives

3 Sulphuric acid is the key chemical that powers vehicle batteries

Sulphuric acid acts as the electrolyte in a lead-acid battery, allowing the chemical reactions to occur that generate electricity when the battery is discharged; essentially, the sulphuric acid facilitates the transfer of electrons between the lead plates within the battery. The lead-acid battery is the primary source of power for starting a vehicle by supplying electricity to the ignition system.



14 · 2 reposts

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65 Ways Sulphur Improves People

#sulphur #sulfur #TSI #SulphurMatte

65 Ways Sulphur Improves People's L

2 Sulphur is the primary industrial input used in th production of phosphate fertilizers

Approximately 55% of global sulphur production is use manufacturing of phosphate fertilizer. This multistep process involves burning sulphur to make sulphuric ac the sulphuric acid (H_2SO_4) then reacts with phosphate rock to produce phosphoric acid. The phosphoric acid then reacts with ammonia to create phosphate salts li diammonium hydrogen phosphate (DAP) and monoammonium dihydrogen phosphate (MAP), which commonly used as phosphorus-based fertilizers.

16 · 1 comment · 2 reposts

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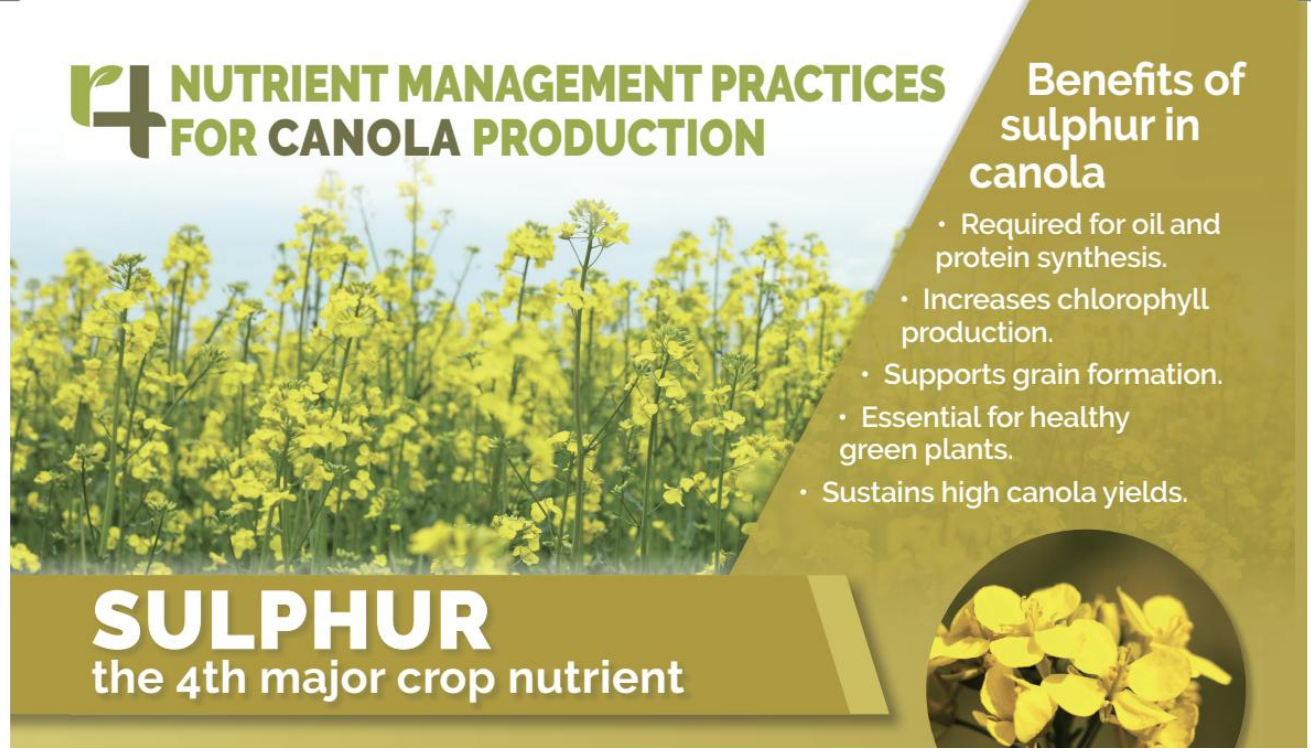

Six downloadable 4R Nutrient Management Guides for key Crops of Alfalfa, Corn, Canola, Cotton, Small Grains & Soybeans

https://www.sulphurinstitute.org/sulphur-in-agriculture/tsis-promotion-of-sulphur-fertilizer-use/

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Sulphur's Secret:
Boosting Nitrogen Efficiency in Diverse U.S. Crops

Greg Schwab, Ph.D., CPAg

ASA/CCA Webinar

February 13, 2025

ELEVAR PARTNERS

Sulphur's Emergence as an Essential Crop Nutrient

ASA/CCA webinar

January 11, 2024

Sulphur…the 4th Major Crop Nutrient

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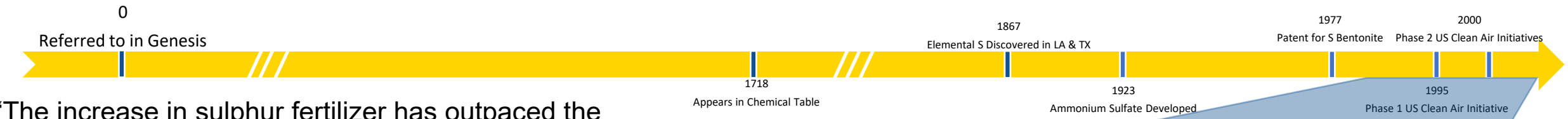
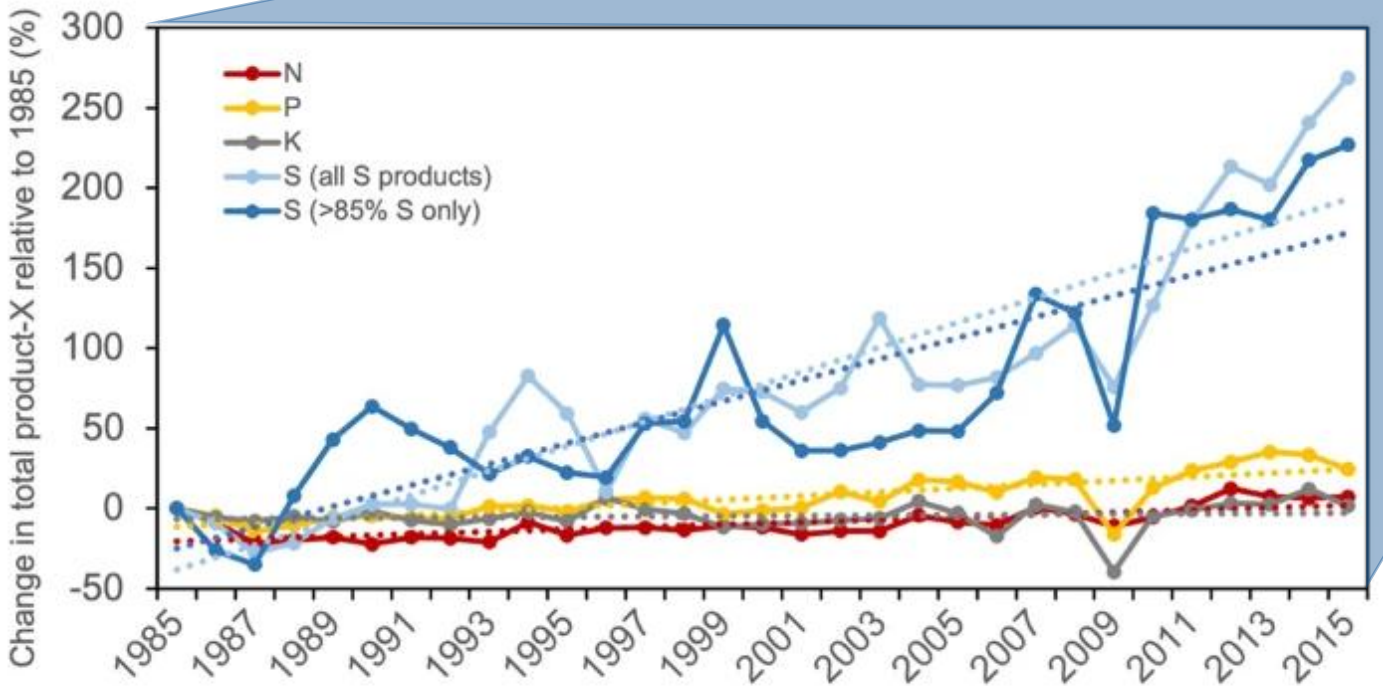
Sulphur Fertilizer Through the Years



"The increase in sulphur fertilizer has outpaced the relative rate of change in other major nutrient fertilizers including nitrogen, phosphorus and potassium, by approximately 7-fold prior to 2009, and 29-fold after 2009." – Hinckley and Driscoll



THE SULPHUR INSTITUTE

VANCOUVER
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THE SULPHUR INSTITUTE'S
SULPHUR WORLD SYMPOSIUM 2026
APRIL 28 - 30
VANCOUVER, CANADA

- JW Marriott contract signed
- Panel on projects creating sulphur demand in North America
- Registration and sponsorship launch in Q4
- Tour of Pacific Coast Terminal

SWS 2027 – Candidate Cities

- Antwerp, BE
- Vienna, AT
- Lugano, CH

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17

THE SULPHUR INSTITUTE'S
SULPHUR WORLD SYMPOSIUM 2025
APRIL 8 - 10
FLORENCE, ITALY

*Value Drivers at Work

Agronomy Steering Committee Meeting – Round Table
April 8 – 13:00-17:00

FAO Cropland nutrient balance (Global, regional and country trends, 1961–2022)

Dr. Eve Hinckley – University of Colorado at Boulder – "Recognizing Sulphur's expanded Role in Feeding the World"

*Professional Connections

Dr. Zack Ogles – Tessenderlo Kerley – U.S. – "Thio-Sul & Nitrogen Use Efficiency"

*Industry Leading Practices

Tessenderlo Kerley Thio-Sul receives double inhibitor registration in the EU

Sulfur shortage: a potential resource crisis looming as the world decarbonises

Meena Chauhan – Argus Media – Head of Sulphur and SA Research – "Sulphur Shortage-Potential Resource Crisis"

*Protecting how you conduct business

Dr. Roger Sylvester-Bradley – Yield Enhancement Network – ADAS

"Measure to Manage"

*Thought Leadership

Securing our food and enhancing the environment

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Inaugural
Sulphur Crop Nutrition Seminar

Dr. Greg Schwab – Moderator

Koch Agronomic Services, Inc.

***Sulphur*…**

the 4th Major Crop Nutrient

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Sulphur World Symposium –
Edinburgh, Scotland 04.26.2023

Inagural Agronomy Round Table
Edinburgh, Scotland -April 26, 2023

Dr. Ismail Cakmak, Sabanci University
Istanbul, Turkey

Dr. Alan Blaylock
Sr. Agronomist - Nutrien

Dr. Rob Mikkelsen
Agronomy Director – Yara

Dr. Malcolm Hawkesford
Rothamsted Research
Lead of the Designing Future Wheat Program

Dr. Shamie Zingore – Director of Research and Development
African Plant Nutrition Institute

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THE SULPHUR INSTITUTE AND IFA LAUNCH GLOBAL ASSESSMENT OF CROP SULPHUR BALANCE AND LIMITATIONS

For the first time in over two decades, a coordinated global effort is underway to evaluate sulphur balance and limitations in crop nutrition. The International Fertilizer Association **(IFA),** in collaboration with The Sulphur Institute **(TSI),** the **University of Nebraska**, and the **University of Colorado**, has launched a two-year project to improve understanding of sulphur dynamics in agricultural systems

This new two-year project, funded by TSI and IFA members, will cover a broad range of cropping systems across seven global regions. The study's three main objectives are to:

- Quantify emerging sulphur limitations to crop yields in key regions
- Develop a time series of atmospheric sulphur deposition and fertilizer use by country
- Add **sulphur as the fourth major nutrient** to the FAO global Cropland Nutrient Balance database.

Scientific committee

Patricio Grassini & Walter Carciochi (UNL)

Eve-Lyn Hinckley & Connor Olson (CU Boulder)

Achim Dobermann (IFA)

Ron Olson & Craig Jorgenson (TSI)

FAO committee on Cropland Nutrient Use

lead by Achim Dobermann – Chief Scientist for IFA – now to include N_P K S

Researcher	Institution
Cameron I. Ludemann	Plant Prod. Systems, Wageningen University & Research, The Netherlands
Achim Dobermann	IFA
Nathan Wanner	Statistics Division, FAO, Rome, Italy
Pauline Chivenga	African Plant Nutrition Institute, Benguerir, Morocco
Rasmus Einarsson	Dept of Energy, Swedish Univ of Ag Sciences, Uppsala, Sweden
Patricio Grassini	Dept of Agronomy/Hort, Univ of NE-Lincoln
Armelle Gruere	IFA
Kevin Jackson	Appalachian Lab, Univ of MD Center for Env Sciences
Luis Lassaletta	Dept Ag Production, ETSIAAB, Univ of Madrid, Madrid, Spain
Fredrico Maggi	Env Engineering School of Engineering, Univ of Sydney, NSW 2006, AU
Griffiths Obli-Laryea	Stats Division, FAO, Rome, Italy
Martin K. Ittersum	Plant Prod. Systems, Wageningen University & Research, The Netherlands
Srishti Vishwakarma	Appalachian Lab, Univ of MD Center for Env Sciences
Xin Zhang	Appalachian Lab, Univ of MD Center for Env Sciences
Francesco N. Tubiello	Stats Division, FAO, Rome, Italy
Eve-Lyn Hinckley	Cooperative Institute for Research in Environmental Sciences – University of Colorado-Boulder

Link to FAO Cropland Nutrient Global, regional and country tends 1961-2022

https://openknowledge.fao.org/server/api/core/bitstreams/99e68874-eb31-416e-94ee-20a9093b4844/content


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