Gustavo Roa

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Education

KANSAS STATE UNIVERSITY Manhattan, KS
Ph.D. (Candidate) in Agronomy – Soil Fertility & Nutrient Management Expected 2026
Graduate Certificate in Applied Statistics
Dissertation title: "Assessing Phosphorus Management Strategies to Enhance Crop Production"
Advisor: Dorivar Ruiz Diaz. Committee: Ganga Hettiarachchi, Nathan Nelson, and Christopher Valh

KANSAS STATE UNIVERSITY Manhattan, KS
M.Sc. in Statistics - Data Science and Analytics track Expected 2026
Report title: "Model Averaging to Improve Optimum Rate and Critical Soil Test under Model Uncertainty"
Advisor: Christopher Valh. Committee: Trevor Hefley, Josefina Lacasa, and Dorivar Ruiz Diaz

KANSAS STATE UNIVERSITY Manhattan, KS
M.Sc. in Agronomy – Soil Science 2023
Thesis title: "Evaluating diagnostic tools for phosphorus and sulfur management in corn"
Advisor: Dorivar Ruiz Diaz. Committee: Ganga Hettiarachchi, Nathan Nelson, and Christopher Valh

UnADM (Open and Distance University of Mexico) Online, Mexico
Master's in Food Security 2020
Thesis title: "Application of sulfur in wheat cultivation (*Triticum aestivum*): Its importance for food security"
Advisor: Eber Quintana. Committee: Mariela Gonzalez, Brenda Santiago, and Dafne Orosco

EARTH UNIVERSITY Limón, Costa Rica
Licenciatura in Agricultural Sciences, degree of Agronomic Engineer. 2017
Graduation project title: "Development of a mobile application for the design and sizing of biodigesters"
Advisor: Mildred Linkimer

- Distinguished student, fourth-year & best graduation project presentation

CERRITO'S SAN FRANCISCO AGRICULTURAL SCHOOL Benjamín Aceval, Paraguay
Technical High School Diploma in Agricultural Production. 2013
Technical High School Diploma in Hospitality & Tourism.

Experience

KANSAS STATE UNIVERSITY Manhattan, KS
Graduate Research Assistant January 2021 – Present

- Led multidisciplinary teams in research on phosphorus (P) and sulfur (S) management, including P correlation and calibration, residual P's effect, long-term P placement, and P & S interactions.
- Established and managed over 40 site-years in collaboration with farmers and university extension fields, supervising student interns and coordinating various nutrient management studies on corn, soybean, wheat, and sorghum.
- Analyzed and interpreted research data, contributing to scientific publications and presentations at professional conferences.
- Translated and adapted six technical extension documents for supporting Spanish-language outreach.

KANSAS STATE UNIVERSITY Manhattan, KS
Research Assistant July 2019 – December 2020

- Assisted in setting up and maintaining fertility trials, testing company products, and overseeing greenhouse studies, including sulfur and nitrogen use with N15 isotope tracers.
- Managed sample handling and processing, ensuring accuracy and consistency in data collection.
- Operated and maintained research equipment, including planting, tractor operations, fertilizer, and herbicide application.

SMITHFIELD HOG PRODUCTION Princeton, MO
Production Inter (Ohio International Intern Program) May 2018 – April 2019

- Assisted in daily farm operations, including feeding, monitoring animal health, and maintaining facility cleanliness.
- Advanced in operational certifications and assisted in artificial insemination and farrowing processes, ensuring successful breeding and birthing outcomes.
- Monitored and recorded data on animal growth and health, contributing to improved farm management practices and animal welfare.

EARTH UNIVERSITY Costa Rica
Undergraduate Research Assistant January 2017 – December 2017
Renewable Energy Research and Development Center (CIDER)

- Developed and implemented renewable energy solutions for communities, including solar panels, small biodigesters, solar cooking, water desalination, and water pumping systems.
- Conducted research on biodigesters and assisted in organizing workshops and events to educate communities on renewable energy technologies.
- Collaborated with team members to design and execute sustainable energy projects, enhancing energy access and environmental sustainability.

UTA FOUNDATION & REDBIOCOL Colombia
Student Intern August 2016 – December 2016
Sustainable Energy project (SEPS 2016-2017)

- Evaluated the use of biosolids from biodigesters as fertilizer for nursery coffee farms, enhancing soil fertility and crop productivity.
- Installed and trained rural communities on the use of biodigesters and gasification systems, while constructing and installing efficient wood stoves to improve energy efficiency.
- Tested various coffee subproducts for gasification and assisted in designing and building gasification units to produce energy and biochar.

Complementary Education

Wageningen University & Research through EdX Online
Professional Certificate in Crop Production and Soil Management 2025
Courses 2: Sustainable Food Security: Crop Production and Sustainable Soil Management: Soil for Life

Harvard University through EdX Online
Professional Certificate in Data Science 2024
Courses 9: R Basics, Visualization, Probability, Inference and Modeling,
Productivity Tools, Wrangling, Linear Regression, Machine Learning and Capstone

Wageningen University & Research through EdX Online
Professional Certificate and XSeries in Food Security and Sustainability 2021
Courses 3: Crop Production, Food Access, and The Value of Systems Thinking

Leadership and Activities

- 2025-present: Member of the ASA, CSSA, and SSSA (Tri-Societies) Graduate Student Committee
  - Supports subcommittees on workshops, leadership, webinars, travel grants, and strategic planning for the Tri-Societies.
- 2023-2025: GSC/SGA Liaison (Graduate Student Council) / (Student Governing Association) – Kansas State University
  - Facilitates communication and collaboration between the Graduate Student Council and the Student Governing Association, advocating for graduate student interests.
- 2024-2025: Graduate Student Representative for College of Agriculture Committee on Planning – Kansas State University
  - Represents graduate students in strategic planning and decision-making within the College of Agriculture.
- 2023-2024: Member of the College of Ag Graduate Student Advisory Committee – Kansas State University
  - Advise on policies and decisions affecting the College of Agriculture, ensuring student needs are considered.
- 2021-2024: Spanish course instructor (Volunteer) – UFM Community Learning Center
  - Teaches Spanish to community members, enhancing cultural exchange and integration.
- 2023: President of Agronomy Graduate Student Association (AGSA) – Kansas State University
  - Led the association in organizing academic initiatives and professional development events for agronomy students.
- 2023: Graduate Student Representative for the Agronomy Course & Curriculum Committee, Department of Agronomy – Kansas State University
  - Ensures graduate student input in curriculum development to meet educational needs in agronomy.
- 2023: Student moderator program at the 78th SWCS International Annual Conference. August 2023, Des Moines, IA
  - Facilitated discussions and moderated sessions at a major international conference on soil and water conservation.
- 2023: Vice-president of the Soil and Water Conservation Society, student chapter – Kansas State University
  - Coordinated chapter activities promoting soil and water conservation practices within the community.
- 2022: Chair of the Scientific Communication Committee, Agronomy Graduate Student Association (AGSA) – Kansas State University
  - Led efforts to enhance scientific communication skills among agronomy students through workshops and seminars.
- 2017: Chair of the Gastronomy Committee of the EARTH Multicultural Fair - EARTH University
  - Managed multicultural food events showcasing diverse culinary traditions among students and community.
- 2015: Member of the Student Electoral Tribunal (TEE) - EARTH University
  - Ensured integrity and fairness in student government elections and democratic processes.

Service to the Profession

- Judge for the Practices to Reduce Nutrient Loss and Improve Environmental Quality oral competition, Environmental Quality Community, CANVAS, Salt Lake City, UT, 2025.
- Reviewer for the Journal of Soil and Water Conservation, Soil and Water Conservation Society, 2024–2025.
- Student moderator, 78th SWCS International Annual Conference, Des Moines, IA, 2023.

Awards

- 3rd place, AgTech Hackathon CANVAS-Bayer Crop Science, Salt Lake City, UT, 2025
- 1st place, NUE Workshop Hackathon Team Competition, Ames, IA, 2025
- North Central Extension-Industry Soil Fertility Conference - Graduate Student Award, Des Moines, IA, 2021
- Distinguished student, fourth year. EARTH University, Guacimo, Costa Rica, 2017
- Best Graduation Project Presentation in Renewable Energies. EARTH University, Guacimo, Costa Rica 2017

Scholarships

- Bonczkowski scholarship and Armbrust scholarship (2024). Amount $1,250
- Kansas Corn Next Generation Scholarship Graduate Level Winner (2024). Amount $1,000
- Agronomy Graduate Student Association Club Scholarship (2021 & 2023)
- Graduate Student Council-Leadership Scholarship (2024). Amount $2,000
- Timothy R. Donoghue Graduate Scholarship (2023). Amount $2,000
- BECAL Scholarship (2021-2023). Amount $90,000
- Irvin D. and Dora Mae Atkins Family (2023). Amount $1,500
- Dr. Neal F. and Florence E. Morehouse (2022). Amount $1,500
- Schrader-Massier Graduate Excellence Fund (2021). Amount $1,500
- Mastercard Foundation Scholarship (2014-2017). Approximate amount $100,000
- Perry Foundation through Fundación Paraguaya (2014-2017). Amount $4,800

Grant proposals

Kansas Fertilizer Research Funds (2021). "Developing updated phosphorus fertilizer recommendations for corn in Kansas". led by Dr. Dorivar Ruiz Diaz. Amount $61,662

Skills & Interests

Technical: Proficient in programming with R, intermediate with SAS and Python. Practical experience using QGIS and GEE.
Language: English – Full professional proficiency; Portuguese – Full professional proficiency; Spanish – Native or bilingual proficiency; Guarani - Native or bilingual proficiency.
Laboratory: Proficient in various phosphorus extraction methods, soil pH and colorimetric, ICP, and NIR analysis.
Interests: Data analysis, applying statistics, food security, soil fertility, nutrient management, plant nutrition and soil science education.

Professional Memberships

- American Society of Agronomy (ASA) since 2019-present
- Crop Science Society of America (CSSA) since 2019-present
- Soil Science Society of America (SSSA) since 2019-present
- Soil and Water Conservation Society (SWCS) since 2022-present
- International Society of Precision Agriculture (ISPA) since 2023-present
- American Statistical Association (ASA) since 2025-present

Publications

Peer-Reviewed Journal Articles

- **Roa, G. A**., & Ruiz Diaz, D.A. (2025). Evaluation of tissue phosphorus concentrations as diagnostic tool for phosphorus nutrition in corn. *Soil Science Society of America Journal*, 89, 70031. https://doi.org/10.1002/saj2.70031
- **Roa, G.A.**; Quintana-Obregón, E.A.; González-Renteria, M.; Ruiz Diaz, D.A. Increasing Wheat Protein and Yield through Sulfur Fertilization and Its Relationship with Nitrogen. *Nitrogen* 2024, 5, 553-571. https://doi.org/10.3390/nitrogen5030037

Datasets

- **Roa, Gustavo**, 2024, "Dataset for meta-analysis on sulfur fertilization effect on wheat protein and yield", https://doi.org/10.7910/DVN/4RLPP1, Harvard Dataverse, V4

Manuscripts in Progress

- Roa, G.A. and Ruiz Diaz, D.A. 2025 (Under-review) Assessing Corn Response to Sulfur Fertilization in Kansas: Efficiency, Optimum Rate, and Diagnostic Tools. *Agronomy Journal.*

- Roa, G.A., de Oliviera, J. B., Wanithunga, I., Rice, C.W. and Ruiz Diaz, D.A. 2025 (In preparation) Nitrogen-15 Tracer Techniques for Agronomy Research: Practical Guidelines and Case Studies. *Agrosystems, Geosciences & Environment.*

Extension and Outreach Publications

- Xin, X., Nepal, J., de Oliveira, J. **Roa, G.,** Cominelli, S., and Maryam, H. 2025. "Managing soil N for productivity and sustainability: Understanding gains and losses" *CSA News*, Vol. 70(12), November.
- Cruz, P., de Oliveira, J., Barra Netto-Ferreira, J., **Roa, G.A.**, Gadhiparti, V. 2025. "Rooted in Resilience: Regenerative Agriculture and the Future of Food Systems" *CSA News*, Vol. 70(8), August.
- **Roa, G.A.** and Ruiz Diaz, Dorivar A. (2023) "Evaluating the Impact of Long-Term Phosphorus Placement on Corn and Soybean Rotation under Minimum Tillage System" Kansas Agricultural Experiment Station Research Reports: Vol. 9: Iss. 8. https://doi.org/10.4148/2378-5977.8545
- **Roa, G.A.**; Rutter, Edmond B.; and Ruiz Diaz, Dorivar A. (2023) "Evaluation of Plant Tissue Analysis to Assess Phosphorus Nutritional Status for Corn and Soybean" Kansas Agricultural Experiment Station Research Reports: Vol. 9: Iss. 8. https://doi.org/10.4148/2378-5977.8548
- **Roa-Acosta, G.A.** and Ruiz Diaz, D. A. (2022) "Evaluation of Soil Test Phosphorus Extractants and Tissue Analysis for Corn" Kansas Agricultural Experiment Station Research Reports: Vol. 8: Iss. 9. https://doi.org/10.4148/2378-5977.8347
- **Roa-Acosta, G.A.** and Ruiz Diaz, D. A. (2022) "Early-Season Corn Response to Broadcast Pre-Plant Phosphorus Fertilizer Application" Kansas Agricultural Experiment Station Research Reports: Vol. 8: Iss. 9. https://doi.org/10.4148/2378-5977.8348

Thesis

- **Roa Acosta, Gustavo A.** 2024. "Evaluating diagnostic tools for phosphorus and sulfur management in corn". Master of Science, Kansas State University, Manhattan, Kansas.
- **Roa Acosta, Gustavo A.** 2024. "Application of sulfur in wheat cultivation (Triticum aestivum): its importance for food security" [Spanish]. Master's in Food Security, UnADM, Mexico.
- **Roa Acosta, G.A.** 2017. "Development of a mobile application (App) for the design and sizing of biodigesters" [Spanish]. Graduation Project. EARTH University, Guacimo, Costa Rica.

Conference Posters, Presentations & Proceedings

- **Roa, G.A.,** and Ruiz Diaz, D.A. (2025). Critical Soil Test Phosphorus for Corn: Updates and Method Comparison in Kansas. 55th North Central Soil Fertility Conference. November 2025, Des Moines, IA.
- **Roa, G.A.,** Spooner, J., Hefley, T. and Ruiz Diaz, D.A. (2025). Improving Phosphorus Correlation and Calibration Studies with Bayesian Approaches. CANVAS. November 2025, Salt Lake City, UT.
- **Roa, G.A.,** and Ruiz Diaz, D.A. (2025). Refining Soil Test Phosphorus Recommendations for Corn in Kansas. CANVAS. November 2025, Salt Lake City, UT.
- Leiva, J.C., **Roa, G.A.** and Ruiz Diaz, D.A. (2024). Efficiency of Different Nitrogen Management Strategies on Winter Wheat Production. 2024 Nitrogen Use Efficiency Workshop. August 2024, University of Illinois Urbana Champaign, IL.
- **Roa, G.A.** and Ruiz Diaz, D.A. (2024). Enhancing Phosphorus Nutrient Management in Corn Through Tissue Analysis and Diagnostic Tools. ISPA 16th International Conference on Precision Agriculture. July 2024, Manhattan, KS.
- **Roa, G.A.** and Ruiz Diaz, D.A. (2024). Evaluation of Long-Term Phosphorus Management: An 18-Year Field Study. SSSA Bouyoucos Summer Conference. June 2024, San Juan, Puerto Rico.
- **Roa, G.A.** and Ruiz Diaz, D.A. (2024). Exploring Long-term Phosphorus Management Strategies for Optimizing Crops Yields in Kansas. Great Plains Soil Fertility Conference. March 2024, Lubbock, TX.
- **Roa, G.A.** and Ruiz Diaz, D.A. (2023). Assessing Sulfur Response, Utilization Efficiency, and Diagnostic Tools for Corn in Kansas. 53rd North Central Soil Fertility Conference. November 2023, Des Moines, IA.

- **Roa, G.A.** and Ruiz Diaz, D.A. (2023). Evaluating tissue phosphorus concentration as a diagnostic tool in corn. ASA, CSSA, SSSA International Conference. October 2023, St Lois, MO.
- Bourns, M.A., Nelson, N.O., **Roa, G.A.** and Ruiz Diaz, D.A. (2023). Sustainable Sufficiency: A New Approach to Phosphorus Fertilizer Management. ASA, CSSA, SSSA International Conference. October 2023, St Lois, MO.
- **Roa, G.A.,** Rutter, E.B., and Ruiz Diaz, D.A. (2022). Evaluation of Plant Tissue Analysis to Assess Phosphorus Nutritional Status for Corn and Soybean in Kansas. 52nd North Central Soil Fertility Conference. November 2022, Des Moines, IA.
- **Roa, G.A.** and Ruiz Diaz, D.A. (2022). Corn and Soybean Response to Long-term Phosphorus Placement Under Minimum Tillage System in Kansas. ASA, CSSA, SSSA International Conference. November 2022, Baltimore, MA.
- **Roa, G.A.** and Ruiz Diaz, D.A. (2022). Corn Yield Response and Evaluation of Soil Test Phosphorus Extractants in Kansas. ASA, CSSA, SSSA International Conference. November 2022, Baltimore, MA.
- **Roa, G. A.** and Ruiz Diaz, D. A. (2022). Evaluation of Soil Test Phosphorus Extractants and Tissue Analysis for Corn in Kansas. Great Plains Soil Fertility Conference. March 2022. Virtual.
- **Roa, G.A.** and Ruiz Diaz, D.A. (2021). Corn response to phosphorus fertilization and evaluation of soil test methods in Kansas soils. 51st North Central Soil Fertility Conference. November 2021, Des Moines, IA.
- **Roa, G.A.** and Ruiz Diaz, D.A. (2021). Evaluation of Sulfur and Nitrogen Interaction in Winter Wheat Using Different Fertilizer Sources. ASA, CSSA, SSSA International Conference. November 2021, Salt Lake City, UT.
- **Roa, G.A.** and Ruiz Diaz, D.A. (2021). Early-season corn response to broadcast pre-plant phosphorus fertilizer application in Kansas. ASA, CSSA, SSSA International Conference. November 2021, Salt Lake City, UT.
- **Roa, G.A.**, Samudio, L.F., Bonini, C.A., and Ruiz Diaz, D.A. (2020). Soil microbial properties with changes in surface soil pH in a long-term no-till system. ASA, CSSA, SSSA International Conference. October 2020, Virtual.

Invited Talks

- **Roa, G.A.** (2024, December 5). Comprehensive soil management: research on fertilization, nutritional diagnostics, and prediction [Spanish]. Invited speaker at the *World Soil Day Commemoration*. Organized by IAAS Paraguay; SOPACIS; Fertimax; and the Faculty of Agricultural Sciences – UNA, San Lorenzo Campus, Paraguay.

Translation Contributions

- Murphy, P., Minson, S., Harner, J., George, H., Harvey, M., & Wells, D. (2024). Mantenimiento y protecciónde pozos privados / Private well maintenance and protection [Spanish translation by Gustavo A. Roa & Eduardo Gutierrez Brito]. Kansas State University Research and Extension (MF3666S)
- Murphy, P., Minson, S., Harner, J., George, H., Harvey, M., & Wells, D. (2024). Ubicación segura de pozos de agua privados / Private wells: Safe location [Spanish translation by Gustavo A. Roa & Eduardo Gutierrez Brito]. Kansas State University Research and Extension (MF3667S)
- Murphy, P., Minson, S., Harner, J., George, H., Harvey, M., & Wells, D. (2024). Pruebas de calidad del agua para pozos privados / Water quality tests for private wells [Spanish translation by Gustavo A. Roa & Eduardo Gutierrez Brito]. Kansas State University Research and Extension (MF3679S)
- Murphy, P., Minson, S., Harner, J., George, H., Harvey, M., & Wells, D. (2024). Nitrato y aguas subterráneas / Nitrate and groundwater [Spanish translation by Eduardo Gutierrez Brito & Gustavo A. Roa]. Kansas State University Research and Extension (MF857S)
- Murphy, P., Minson, S., Harner, J., George, H., Harvey, M., & Wells, D. (2024). Cloración de choque de sistemas de pozos de agua privados / Shock chlorination of private water well systems [Spanish translation by Eduardo Gutierrez Brito & Gustavo A. Roa]. Kansas State University Research and Extension (MF911S)

- Murphy, P., Minson, S., Harner, J., George, H., Harvey, M., & Wells, D. (2024). Pruebas de sistemas de agua privados / Testing private water systems [Spanish translation by Eduardo Gutierrez Brito & Gustavo A. Roa]. Kansas State University Research and Extension (MF3655S)
- Defoe, P., Presley, D., & Hettiarachchi, G. (2023). Jardinería en sueloscontaminados con plomo / Gardening on Lead-Contaminated Soils [Spanish translation by Eduardo Gutierrez Brito & Review by Gustavo A. Roa]. Kansas State University Research and Extension (MF3166S)
- Martin, S., & Hettiarachchi, G. (2023). Jardinería en terrenos baldíos:Análisis de contaminantes en el suelo / Gardening on Brownfields: Testing Your Soil for Contaminants [Spanish translation by Eduardo Gutierrez Brito & Review by Gustavo A. Roa]. Kansas State University Research and Extension (MF3192S)
- Review of translation from English to Spanish of the K-State Research and Extension publications, "Gardening on Lead-Contaminated Soils" and "Gardening on Brownfields: Testing Your Soil for Contaminants". March 2023. https://ksre.k-state.edu/tuesday/announcement/?id=88801

Other participations or recognitions

- Recognition on Book Preface. M.B. Kirkham, 2023. Principles of Soil and Plant Water Relations, Third Edition. ISBN: 9780323956413. https://doi.org/10.1016/B978-0-323-95641-3.05001-7