DR. AHMED EL-NAGGAR

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Profile Summary

Dr. Ahmed H. El-Naggar is a seasoned Soil Management Scientist and Associate Professor with over 25 years of expertise in soil fertility, sustainable land management, and environmental protection. His work focuses on enhancing nutrient use efficiency, soil restoration, carbon sequestration, and sustainable agricultural practices in arid and saline environments. Dr. El-Naggar has a proven track record of implementing large-scale projects addressing soil degradation, salinity, and contamination, contributing to global food security and environmental resilience.
Dr. El-Naggar has extensive experience collaborating with government agencies, including the Environmental Agency Abu Dhabi, to develop practical solutions for sustainable soil management and resource conservation. His expertise integrates advanced technologies and field-based approaches to drive impactful environmental initiatives.

Key Research Areas

- **Soil Fertility and Nutrient Management**: Development of innovative strategies to improve fertilizer use efficiency, reduce nutrient losses, and enhance crop productivity in challenging conditions.

- **Carbon Sequestration and Soil Restoration**: Implementation of advanced soil amendments such as biochar and compost to improve soil health and long-term carbon storage.
- **Soil Salinity Management**: Development of tailored solutions to mitigate the effects of salinity on soil and crops, ensuring agricultural sustainability in arid regions.
- **Sustainable Land Use Planning**: Creation of digital soil maps and classification systems to support evidence-based decision-making for land resource management.
- **Soil and Water Quality Monitoring**: Utilization of advanced analytical methods to assess and improve the quality of soil and water resources in degraded areas.
- **Policy and Capacity Building**: Designing training programs and workshops to empower stakeholders in adopting sustainable soil and water management practices.

Work Experience

Soil Management Scientist
International Center for Biosaline Agriculture (ICBA), Dubai, UAE
October 2018 – Present

- Led research initiatives to enhance soil health and mitigate salinity through innovative soil amendments.
- Supervised the Central Analytical Laboratory (CAL), providing high-quality analytical services for soil and water research.
- Developed practical soil management solutions for improving agricultural productivity in arid and saline soils.
- Conducted training sessions on soil fertility management and sustainable practices for regional stakeholders.

Associate Professor of Soil Sciences
Faculty of Agriculture, Ain Shams University, Cairo, Egypt
2017 – Present

- Taught and developed courses on soil fertility, sustainable agriculture, and environmental management.
- Supervised master's and Ph.D. research projects on soil amendments, salinity management, and land restoration.
- Collaborated with national and international institutions on research and development projects for soil conservation.

Assistant Professor of Environmental Soil Chemistry
King Saud University, Riyadh, Saudi Arabia
2010 – 2018

- Conducted research on soil contamination and remediation techniques to improve soil and water quality.
- Taught graduate and undergraduate courses on soil chemistry and nutrient management.

- Supervised graduate students on projects related to sustainable agriculture and environmental protection.

Postdoctoral Fellow
Institute of Plant Nutrition, Humboldt University, Berlin, Germany
2009

- Investigated strategies to improve nutrient use efficiency and organic matter stabilization in soils.

Future Research Objectives

- **Revolutionizing Soil Monitoring through IoT and AI:** Develop advanced Internet of Things (IoT)-based systems integrated with Artificial Intelligence (AI) to provide real-time monitoring of soil health parameters, enabling precision agriculture and sustainable management practices.
- **Smart Soil Management Systems:** Engineer adaptive soil management solutions that utilize real-time data feeds from IoT sensors, satellite imagery, and AI analytics to dynamically optimize agricultural practices based on changing environmental conditions.
- **Synthetic Biology and Microbial Engineering:** Harness synthetic biology to design microbial solutions that enhance soil fertility, degrade organic pollutants, and improve nutrient cycling, reducing dependency on chemical inputs.
- **Innovative Carbon Sequestration Strategies:** Explore microbial-driven mechanisms for carbon stabilization in arid soils, combining advanced soil amendments such as biochar with microbial inoculants to maximize long-term carbon storage.
- **Advanced Spectral Techniques for Soil and Water Analysis:** Implement cutting-edge spectral technologies to perform rapid, non-destructive assessments of soil and water quality, supporting data-driven decision-making in agriculture.
- **Integrated Nanotechnology and Biofertilizers:** Develop and evaluate nanofertilizer-biofertilizer hybrids to improve nutrient delivery efficiency, reduce losses, and promote soil health in challenging environments.
- **Sustainable Soil Rehabilitation Frameworks:** Create scalable frameworks for rehabilitating degraded lands using a combination of microbial ecology, innovative soil amendments, and precision technologies, aligning with global sustainability goals.

Education

- **Ph.D. in Soil Sciences and Environmental Management**
  University of Copenhagen, Denmark (2003 – 2007)
  Thesis: "Plant Soakings and Amino Acids Uptake in Low-Input Agriculture"
- **M.Sc. in Organic Farming**
  Mediterranean Agronomic Institute of Bari (CIHEAM), Italy (2000 – 2003)
  Thesis: "Effects of Water Extracts of Compost on Soil Fertility and Plant Nutrition"
- **B.Sc. in Soil Sciences**
  Ain Shams University, Egypt (1995 – 1999)

Thesis: "Using Competitive Chelating Method for Predicting Heavy Metals in Clay Soils"

Selected Projects:

- **Development of Soil Contamination Levels for Abu Dhabi Emirate**
  Principal Investigator from ICBA for the initiative that was led by Environmental Agency of Abu Dhabi (EAD)
- Collaborated to establish scientifically sound guidelines for soil pollution monitoring and mitigation.
- **Effect of Selected Soil Amendments and Biochar on Crop Production Under Salinity Stress in the UAE**
  Principal Investigator, ICBA
- Investigated sustainable solutions to enhance crop productivity in saline soils using biochar and other amendments.
- **Joint Production of UAE -WRB Soil Maps**
  Principal Investigator from ICBA in collaboration with Environmental Agency of Abu Dhabi
- Created detailed soil maps for classification and effective land resource management.
- **Rehabilitation of Phosphate Mining Land in Youssefia, Morocco**
  Principal Investigator, OCP Foundation
- Designed and implemented sustainable agro-systems to restore soil health and improve farmers' livelihoods.
- **Liquid Nano Clay for Soil Improvement**
  Principal Investigator, Desert Control AS
- Evaluated the potential of Liquid Nano Clay to enhance soil structure and water retention in arid soils.

Teaching Statement and Training:

As an academic and researcher deeply committed to education and capacity building, I have dedicated a significant portion of my career to teaching and training in the field of soil sciences and sustainable agriculture. My teaching philosophy centers on integrating theoretical knowledge with practical applications, ensuring that students and professionals are equipped with the skills and understanding necessary to address contemporary challenges in agriculture and environmental management.

Courses Taught:

- **Soil Sciences Department, King Saud University:**
  - Soil and Plant Analysis and Techniques (520 SOCM)
  - Environmental Analysis (513 ENV)
  - Soil Pollution (523 ENV)
- **Soils and Water Department, Ain Shams University, Egypt:**
  - Principles of Soil Sciences

- Principles of Organic Farming
- Soil Fertility and Fertilization
- Plant Nutrition

Training and Capacity Building:

I have actively engaged in training researchers, farmers, and professionals across various countries, including Egypt, Saudi Arabia, UAE, Azerbaijan, Uganda, Sierra Leone, Botswana, and Morocco. My training sessions focus on sustainable soil fertility management, leveraging both organic and inorganic amendments to enhance soil health and crop productivity.
Notable training programs and workshops include:

Date	Program/Workshop	Location	Topics Covered
March 4-8, 2024	Capacity Building of Farmers in Integrated Soil Fertility Management	Uganda	Soil fertility management under irrigated rice systems, organic and inorganic amendments
December 11-15, 2023	Regional Training Workshop on Land, Water, and Crop Management	Dakar, Senegal	Soil health, fertility diagnostics, rehabilitation of degraded soils
November 6-9, 2023	Global Training Course on Biosaline Agriculture	ICBA HQ, Dubai, UAE	Biosaline agriculture as an approach to land restoration
December 19-23, 2022	Training Workshop on Agricultural Crops in Saline-Affected Areas	Baku, Azerbaijan	Soil ecosystem, nutrient cycling, amendments for soil rehabilitation
October 26-27, 2022	Technical Training Course on Horticulture and Quinoa for Silal	ICBA HQ, Dubai, UAE	Soil management, soil suitability for crop production, rehabilitation of degraded soils

References

Dr. Ismahane Elouafi, CGIAR Executive Managing Director

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Prof. Dr. Pandi Zdruli
Senior Research Scientist, CIHEAM Mediterranean Agronomic Institute of Bari, Italy
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Book chapters

Ali, E., Mosa, Abu El-Eyuoon A, Xiao Yang, Yousaf B., **El-Naggar, A. H.,** Yanjiang C, Scott X. Chang **(2022)** Chapter 18 - **Biochar for remediation of alkaline soils contaminated with toxic elements,** Editor(s): Daniel C.W. Tsang, Yong Sik Ok, Biochar in Agriculture for Achieving Sustainable Development Goals, Academic Press, 2022, Pages 223-240, ISBN 9780323853439, https://doi.org/10.1016/B978-0-323-85343-9.00029-X.

Ali, E., Mosa, Abu El-Eyuoon A, Xiao Yang, Yousaf B., El-Naggar, A. H., Yanjiang C, Scott X. Chang (2022) Chapter 8- Potential of Biochar to Immobilize Vanadium in Contaminated Soils, Editor(s): Rinklebe, J. (Ed.). (2022). Vanadium in Soils and Plants (1st ed.). CRC Press. https://doi.org/10.1201/9781003173274

Selected Peer-reviewed Articles

1. Stone, Tiffanie F., Jerry Alford, Petra Hanáková Bečvářová, Mohammad AM Eisa, **Ahmed H. El-Naggar**, María José Carpio Espinosa, Magdalena Frąc et al. "Food system strategies to increase grain legume-cereal intercropping in Europe." *Agroecology and Sustainable Food Systems* (2024): 1-25.
2. Raj, P., Almakrani, M., Foulon, F., Padiyath, N., **El-Naggar, A**., Voigt, G., & Semioshkina, N. (2024). Field-based soil-plant uptake measurements of natural radionuclides for key vegetables and ghaf leaves in Abu Dhabi. ***Journal of Environmental Radioactivity***, *276*, 107415.
3. Dionysia, A.L., Raman, A., Hozayen, A., Abou-Zaid, F.O., **El-Naggar, A.H.**, Mansoor, S., Mahmudi, H., & Ammar, K. (2022). Evaluation of Salicornia bigelovii Germplasm for Food Use in Egypt and the United Arab Emirates Based on Agronomic Traits and Nutritional Composition. **Plants,** 11(19), 2653. https://doi.org/10.3390/plants11192653
4. El-Shal, R.M.; **El-Naggar, A.H.**; El-Beshbeshy, T.R.; Mahmoud, E.K.; El-Kader, N.I.A.; Missaui, A.M.; Du, D.; Ghoneim, A.M.; El-Sharkawy, M.S. (2022). Effect of Nano-Fertilizers on Alfalfa Plants Grown under Different Salt Stresses in Hydroponic System. **Agriculture**, 12, 1113. https:// doi.org/10.3390/agriculture12081113
5. El-Sharkawy, M., **El-Naggar, A. H.,** AL-Huqail, A. A., & Ghoneim, A. M. (2022). Acid-Modified Biochar Impacts on Soil Properties and Biochemical Characteristics of Crops Grown in Saline-Sodic Soils. **Sustainability**, 14(13), 8190.
6. Mohammed-Nour, A., Al-Sewailem, M., **El-Naggar, A. H**., El-Saeid, M. H., Aly, A. A., & Elfaki, J. (2021). Carbon and Nitrogen Dynamics, and CO2 Efflux in the Calcareous Sandy Loam Soil Treated with Chemically Modified Organic Amendments. **Molecules**, 26(16), 4707.
7. Hachem, M., Sharma, B. K., **El Naggar, A**., Pilankar, I., & Anwar, N. (2020). Systematic Approaches For Soil Analysis In Forensic Investigation. In 2020 Advances in Science and Engineering Technology International Conferences (ASET) (pp. 1-5). **IEEE**.
8. El-Naggar, A., **El-Naggar, A. H**., Shaheen, S. M., Sarkar, B., Chang, S. X., Tsang, D. C., ... & Ok, Y. S. (2019). Biochar composition-dependent impacts on soil nutrient release, carbon mineralization, and potential environmental risk: A review. **Journal of environmental management.**
9. Mohammed-Nour, A., Al-Sewailem, M., & **El-Naggar, A. H.** (2019). The Influence of Alkalization and Temperature on Ammonia Recovery from Cow Manure and the Chemical Properties of the Effluents. **Sustainability,** 11(8), 2441.
10. **El-Naggar A.H.,** Alzhrani A.K.R., Ahmad M., Usman A.R.A., Mohan D., Ok Y.S., Al-Wabel M.I. (2016) Preparation of Activated and Non-Activated Carbon from Conocarpus Pruning Waste as Low-Cost Adsorbent for Removal of Heavy Metal Ions from Aqueous Solution. **BioResources** 11:1092-1107.

11. Ahmad, M., Ahmad, M., **El-Naggar, A. H**., Usman, A. R., Abduljabbar, A., Vithanage, M., ... & Al-Wabel, M. I. (2018). Aging effects of organic and inorganic fertilizers on phosphorus fractionation in a calcareous sandy loam soil. **Pedosphere**, 28(6), 873-883.
12. Masmali, A. M., Fagehi, R. A., **Ahmad, H**., Almubrad, T. M., & Akhtar, S. (2018). Structure and microanalysis of tear film ferning of camel tears, human tears, and Refresh Plus. **Molecular Vision**, 24, 305.
13. Al-Wabel, M.I., Sallam, A.E.-A.S., Usman, A.R.A., Ahmad, M., **El-Naggar, A.H**., El-Saeid, M.H., Al-Faraj, A., El-Enazi, K., Al-Romian, F.A., (2017). Trace metal levels, sources, and ecological risk assessment in a densely agricultural area from Saudi Arabia. **Environmental Monitoring and Assessment** 189, 252
14. Al-Wabel M., El-Saeid M.H., **El-Naggar A.H**., Al-Romian F.A., Osman K., Elnazi K., Sallam A.S. (2016) Spatial distribution of pesticide residues in the groundwater of a condensed agricultural area. **Arabian Journal of Geosciences** 9:1-10. http://dx.doi.org/10.1007/s12517-015-2122-y.
15. Usman A.R.A., Al-Wabel M.I., Ok Y.S., Al-Harbi A., Wahb-Allah M., **El-Naggar A.H**., Ahmad M., Al-Faraj A., Al-Omran A. (2016) Conocarpus Biochar Induces Changes in Soil Nutrient Availability and Tomato Growth Under Saline Irrigation. **Pedosphere** 26:27-38. http://dx.doi.org/10.1016/S1002-0160(15)60019-4.
16. Al-Wabel, M. I., El-Saeid, M. H., Usman, A. R. A., Al-Turki, A. M., Mahtab, A., Hassanin, A. S., and **El-Naggar, A. H.** (2016). Identification, quantification, and toxicity of PCDDs and PCDFs in soils from industrial areas in the central and eastern regions of Saudi Arabia. ***Bulletin of Environmental Contamination and Toxicology*****,** . **96**: 622-629.
17. **El-Naggar A.H.,** Usman A.R.A., Al-Omran A., Ok Y.S., Ahmad M., Al-Wabel M.I. (2015) Carbon mineralization and nutrient availability in calcareous sandy soils amended with woody waste biochar. **Chemosphere** 138:67-73. http://dx.doi.org/10.1016/j.chemosphere.2015.05.052.
18. Al-Wabel M.I., Usman A.R.A., **El-Naggar A.H.,** Aly A.A., Ibrahim H.M., Elmaghraby S., Al-Omran A. (2015) Conocarpus biochar as a soil amendment for reducing heavy metal availability and uptake by maize plants. **Saudi Journal of Biological Sciences** 22:503-511. http://dx.doi.org/10.1016/j.sjbs.2014.12.003.
19. El-Mahrouky M., **El-Naggar A.H**., Usman A.R., Al-Wabel M. (2015) Dynamics of CO2 Emission and Biochemical Properties of a Sandy Calcareous Soil Amended with Conocarpus Waste and Biochar. Pedosphere 25:46-56. DOI: http://dx.doi.org/10.1016/S1002-0160(14)60075-8.
20. Usman A.R.A., Ahmad M., El-Mahrouky M., Al-Omran A., Ok Y.S., Sallam A.S., **El-Naggar A.H.,** Al-Wabel M.I. (2015) Chemically modified biochar produced from conocarpus waste increases NO3 removal from aqueous solutions. **Environmental Geochemistry and Health**:1-11. http://dx.doi.org/10.1007/s10653-015-9736-6.
21. Usman A., Sallam A., Al-Omran A., **El-Naggar A**., Alenazi K., Nadeem M., Al-Wabel M. (2013) Chemically Modified Biochar Produced from Conocarpus Wastes: An Efficient Sorbent for Fe(II) Removal from Acidic Aqueous Solutions. **Adsorption Science & Technology** 31:625-640. http://dx.doi.org/10.1260/0263-6174.31.7.625.
22. Al-Wabel M.I., Al-Omran A., **El-Naggar A.H.,** Nadeem M., Usman A.R.A. (2013) Pyrolysis temperature induced changes in characteristics and chemical composition of biochar produced from conocarpus wastes. **Bioresource Technology** 131:374-379. http://dx.doi.org/10.1016/j.biortech.2012.12.165.
23. Al-Farraj A.S., Al-Wabel M.I., El-Saeid M.H., **El-Naggar A.H**., Ahmed Z. (2013) Evaluation of Groundwater for Arsenic Contamination Using Hydrogeochemical Properties and Multivariate Statistical Methods in Saudi Arabia. **Journal of Chemistry** 2013:9. http://dx.doi.org/10.1155/2013/812365.
24. El-Saeid M.H., Al-Wabel M.I., Al-Farraj A.S., **El-Naggar A.H.,** Zaheer A. (2013) Monitoring of organic contaminants in Soil by MAE and EIGC-MS. Research Journal of Chemistry and Environment 17:27-33.
25. **El-Naggar A H**, de Neergaard A, El-Araby A and Høgh-Jensen H (2009) Simultaneous uptake of multiple amino acids by wheat. Journal of Plant Nutrition, 32: 725–740
26. **El-Naggar A.H.,** El-Araby A., de Neergaard A., Høgh-Jensen H. (2008) Crop responses to foliar application of organic and inorganic nitrogen. Nutr. Cycl. Agroecosyst 80, 49-60.
27. **El-Naggar A H,** Rasmussen J, El-Araby A, de Neergaard A and Høgh-Jensen H (2010) Sources and temperature determine the releases of multiple amino acids from plant materials. Agronomy for Sustainable Development. Published Online: 19 January 2010. DOI: 10.1051/agro/2009049
28. Sirieix, L., Kledal, P. R., **El Naggar, A**., & Auersalmi, M. (2010). Organic consumers in the Egyptian Metropolis of Cairo. ***African Journal of Economics and Management***, 6-9.
29. El-Araby A and **El-Naggar A** (2008) Nitrogen management in the desert soil for organic agriculture production. Proceedings of Organic Agriculture in Asia, ISOFAR International Symposium on soil fertility, Dankook University, Korea
30. **El-Nagger, A**., Ounmaa, A., Muukka, E., Zaleckas, E., Abraityté, G., Jansons, I., ... & Høgh-Jensen, H. (2006). Globalisation as a challenge or opportunity for organic farming. **DARCOFenews**.
31. Ibrahim, A; T. Abdel-Latif; Sh. Gawish and A. **El-Naggar**. (2004) Response of strawberry plants to fertigation with different K-KCl/K-KNO3 combination ratios. Arab Univ. J. Agric. Sci., Ain Shams Univ., Cairo, 12(1), 469-480.