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Ahmed Elsayed Amin Abd Elaziz

Work : Soil Science Department, Faculty of Agriculture, Zagazig University, 44511, zagazig, Egypt

Email: aeamin@agri.zu.edu.eg **Email:** ahmdamyn19p@gmail.com

Phone: (+20) 1201594859 **Website:** http://www.aeamin.faculty.zu.edu.eg/

WeChat: WeChat ID: Ahmed-Elsayed-Amin

WhatsApp Messenger: Whatsapp: +201201594859 **Skype:** +201201594859

research gate: https://www.researchgate.net/profile/Ahmed-Amin-30/research

LinkedIn: https://www.linkedin.com/in/ahmed-amin-6235941ab/

Date of birth: 20/02/1996 **Nationality:** Egyptian

ABOUT ME

I am a PhD student with a great passion for scientific research, especially in issues related to soil fertility. I strive to enhance my knowledge in soil science and am currently focused on mastering Python and machine learning to use them in precision agriculture. This integration aims to improve the efficiency and accuracy of devices used to measure and monitor key soil nutrients such as nitrogen, phosphorus, and potassium, as well as other important parameters like moisture content, electrical conductivity (EC), and pH. My goal is to demonstrate the possibility of creating "smart soil" using innovative technology.
During my participation in the Soil4Med project funded by the European Union, I faced challenges related to sensing technologies. One significant issue is the considerable gap between the potassium values obtained from the sensors and the laboratory estimates. A similar gap was observed with phosphorus measurements, despite the devices being from a leading global brand. I found that all sensing devices struggle to estimate these two elements, which sparked my curiosity to further investigate and understand the underlying causes of these discrepancies.

WORK EXPERIENCE

[2024 – Current] **PhD student**

Soil Science Department, Faculty of Agriculture, Zagazig University

City: zagazig | **Country:** Egypt

- Research Scope: The application of machine learning and digital soil mapping in soil science.

- Scientific Expertise: Soil Science (Pedology) and classification, Soil fertility and management practices, Crop science and its relation to soil productivity, Environmental impact on soil health, Soil analysis techniques (lab and field), precision agriculture, python, GIS, geospatial tools, soil fertility tracing, soil carbon pools, proximal and remote sensing, machine learning algorithms, and data analysis and visualizations.

[2024 – Current] **Researcher in the research project Soil4med**

Soil Science Department, Faculty of Agriculture, Zagazig University

City: zagazig | **Country:** Egypt

Currently, I am involved in a research project called Soil4med, and the title of this project is (soil health monitoring and information systems for sustainable soil management in the Mediterranean region). It is funded by the European Union (The PRIMA Program).

[2020 – 2024] **MSc. student**

Soil Science Department, Faculty of Agriculture, Zagazig University

City: Zagazig | **Country:** Egypt

- Master thesis title: Pedological studies and assessment of fertility and productivity of delta region soils.
- Research Scope: Studying the physical and chemical properties of soils in the Nile Delta. Assessing soil fertility and its relationship to agricultural productivity. Classifying soil types and determining their suitability for crops. Analyzing the impact of agricultural activities on soil fertility. Providing recommendations to improve agricultural productivity. Application of machine learning in soil science.
- Scientific Expertise: Soil Science (Pedology) and classification, Soil fertility and management practices, Crop science and its relation to soil productivity, Environmental impact on soil health, Soil analysis techniques (lab and field), Data analysis and modeling for soil trends, machine learning algorithms, and data analysis and visualizations.

[2019 – Current] **Assistant lecturer**

Soil Science Department, Faculty of Agriculture, Zagazig University

City: zagazig | **Country:** Egypt

my work experiences in this position :

1. Assisting in teaching and organizing undergraduate courses in soil science and water, including topics such as Irrigation water management, Irrigation and Drainage, Soil Fertility, Pedology, Soil and Plant Water Relationship, Mineralogy, Land Reclamation, Use of Geographic Information Systems (GIS) in Soil Sciences, Calculus, Chemistry of Fertilizer Production, Use of Machine Learning in Soil Management, geochemistry, precision agriculture, and Plant Nutrition.
2. Supervising practical lab sessions and guiding students in hands-on applications.
3. Evaluating student performance and providing academic support.
4. Developing lesson plans and teaching materials for courses on subjects such as soil fertility, plant nutrition, and irrigation techniques.
5. Participating in research projects related to precision agriculture, soil and water sustainability.

EDUCATION AND TRAINING

[2020 – 2024] **M.Sc. in soil science**

Soil Science Department, Faculty of Agriculture, Zagazig University https://www.zu.edu.eg/Home/Index

City: Zagazig | **Country:** Egypt |

[2014 – 2018] **B.Sc. in Agricultural Sciences (Soils & Water) (Excellent with honor degree)**

Soil Science Department, Faculty of Agriculture, Zagazig University https://www.zu.edu.eg/Home/Index

City: Zagazig | **Country:** Egypt |

LABORATORY SKILLS

[05/01/2019 – Current] **Soil Analysis Laboratory Skills**

Dry Lab Skills:

- Proficient in conducting data analysis and using specialized software for soil and environmental studies such as Q GIS, ASLE (Applied System for Land Evaluation), ENVI software, using Python in data analysis and visualization.
- Proficient in using Microsoft Offices (Word, Excel, Power Point Presentation, Data Base (Access))

- Experienced in handling and interpreting large datasets for predictive modeling and trend analysis in agricultural systems.
- Skilled in theoretical model development and hypothesis testing based on laboratory findings.

Wet Lab Skills:

- Skilled in conducting chemical and physical analyses of soil samples and nutrient profiling.
- Proficient in laboratory techniques: flamephotometer, spectrophotometer, calcimeter, Kjeldahl digestion and distillation units, atomic absorption spectrometers, mobile soil testing unit called Mridaparikshak and AGRONXT.
- Skilled in soil sampling, sample preparation and laboratory testing protocols.

LANGUAGE SKILLS

Mother tongue(s): Arabic

Other language(s):

English

LISTENING C1 **READING** C1 **WRITING** C1

SPOKEN PRODUCTION B2 **SPOKEN INTERACTION** B2

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

WORKSHOPS

[13/06/2023 – 27/06/2023] **Sensing Applications for Field Evaluation of Irrigated Agriculture**

Workshop Name : "Sensing Applications for Field Evaluation of Irrigated Agriculture "

This workshop was held at Utah State University in the United States.

This workshop focused on advancements in water management technologies to improve irrigation efficiency and support food security. It involved field visits, practical fieldwork, and laboratory activities that provided hands-on experience with farm water management instrumentation.

Key topics covered included:

1. Soil moisture and flow monitoring
2. Remote sensing and UAV applications in irrigation
3. Evapotranspiration modeling and energy balance analysis
4. Precision irrigation and soil mapping

Key Learning Outcomes:

1. Gained proficiency in using soil, canopy, and weather sensors for field instrumentation.
2. Acquired the ability to quantify farm water balance and assess irrigation efficiency.
3. Gained experience in high-resolution aerial imagery for evapotranspiration (ET_0) modeling.
4. Developed skills in processing and analyzing soil mapping data for precise irrigation management.

SUMMER SCHOOL

[03/08/2024 – 26/08/2024] **Water-Energy-Food Nexus School 2024 (WEF Nexus)**

I attended the WEF Nexus School, which was held at the American University in Cairo (AUC) in Egypt and focused on understanding the interrelation between Water, Energy, and Food (WEF Nexus). The goal of this school is to educate junior researchers on sustainable solutions. The lecturers have strong backgrounds in research and practice.

During the school, I:

- Gained practical knowledge and support on the latest practices and technologies in Water, Energy, and Food.
- Engaged in hands-on project activities, which allowed us to apply the theories learned and foster teamwork and interdisciplinary cooperation among participants from diverse backgrounds.
- involved in hands-on project activities like: made hydroponic and Aquaponic system from A to Z.
- visited a desalination station which used two water treatment techniques: Forward Osmosis (FO) and Reverse Osmosis (RO), and learned how the station operates.

I was the group leader for a project titled "The Sustainable Village," where our group achieved first place among eight competing groups.

PUBLICATIONS

[2024] **Improving Soil Salinity Prediction In Semi-Arid Areas Using Machine Learning Models**

MANAGEMENT AND LEADERSHIP SKILLS

Team Leadership and Achievement in the WEF Nexus Competition

I led my team in the WEF Nexus summer school at the American University in Cairo (AUC) and the Center of Excellence for Agriculture and Water, where we won first place and the Best Project award out of six projects, for the second consecutive year.

I assigned tasks based on each member's expertise, ensuring efficiency and accuracy, and maintained daily check-ins with clear deadlines. When challenges arose, I addressed them through direct communication with team members to resolve issues collaboratively.

Our team was honored at the 2nd annual symposium of the Center of Excellence for Agriculture and Water, where professors from partner U.S. universities recognized our achievement.

HONOURS AND AWARDS

[2024] **Best Project Award – WEF Nexus Summer School Competition Awarding institution:** The American University in Cairo (AUC) and the Center of Excellence for Agriculture and Water

[2018] **First Place in Undergraduate Studies Awarding institution:** Faculty of Agriculture, Zagazig University

Ranked first among 40 students in the Department of Soil Sciences during undergraduate studies, recognizing outstanding academic performance.

[2021] **Certificate of Appreciation for Environmental Volunteering Awarding institution:** Go Green Association, Egyptian Ministry of Environment

Recognized for dedicated volunteer work with the "Go Green" initiative, contributing to environmental awareness and sustainability projects.

[2022] **Certificate of Appreciation at the Annual Soil Science Conference Awarding institution:** Faculty of Agriculture, Zagazig University

Honored for contributions in teaching and practical guidance provided to undergraduate students, recognized during the faculty's annual Soil Science conference.

ONLINE COURSES

I obtained several online courses in many platform

Nature, Udemy, Coursera, Open University in London, Egyptian Knowledge Bank, and edX

VOLUNTEERING

[2023] **Environmental Volunteer – Go Green Initiative** Go Green Association, under the Egyptian Ministry of Environment, Egypt

Skills and Experiences Gained: Through my work with the Go Green initiative, I gained experience in environmental awareness and sustainability efforts, enhancing my skills in community outreach, project coordination, and public communication to promote eco-friendly practices.

[2020] **Community Support Volunteer – Resala Association** Egypt

Skills and Experiences Gained: I supported people in need through initiatives providing food, housing, and education, gaining skills in community service and resource coordination.

MEMBERSHIPS AND CONFERENCES

[12/08/2020 – Current] **Member of the Egyptian Soil Science Society**

[2024] **Member of The World Youth Parliament for Water (WYPW)**

The World Youth Parliament for Water is an international network of young leaders from over 80 countries, all dedicated to making a positive impact in the water sector. We address water issues through local community projects and advocate for youth representation on global stages, like the United Nations. Our aim is to support youth-led water initiatives and ensure that young voices are valued in decision-making processes within water management. We're driven by a shared passion to create meaningful change in water sustainability and management worldwide.

[10/2024] **Attended the 3rd international annual research symposium of the Center of Excellence for Agriculture and Water**

The Center of Excellence for Agriculture and Water is a USAID funded project implemented by the American University in Cairo with the aim to create the Center of Excellence for Water at Alexandria University and in partnership Egyptian Ministries and Governorates, US Universities (Temple University, Utah State University, University of California at Santa Cruz and Washington State University), Egyptian Universities (Ain Shams University, Alexandria University, Aswan University, Beni Suef University and Zagazig University), Egyptian Research Centers, and Egyptian and US foundation and private sector.

Link: https://www.coew-grantportal.info/#/landing