

# DR. ERNESTINA ANNAN

• Climate-Land-Water Systems Researcher

• +233 573 357 482 • [ernestinaannan39@gmail.com](mailto:ernestinaannan39@gmail.com)/[ernestinaannan@knust.edu.gh](mailto:ernestinaannan@knust.edu.gh) • Emena-Boadi, Kumasi, Ghana

## ABOUT ME

A results-driven researcher specialising in the intersection of water resources, land systems, and climate resilience. I analyse complex environmental systems using data-driven approaches, integrated modelling, climate analysis, and resource management frameworks to support evidence-based environmental decision-making. Passionate about advancing interdisciplinary research to promote sustainable and resilient resource management.

## EDUCATION

- 2021 - 2025 **Kwame Nkrumah University of Science and Technology, Kumasi, Ghana**  
PhD Climate Change and Land Use (WASCAL, CCLU)
- 2018 – 2021 **Kwame Nkrumah University of Science and Technology, Kumasi, Ghana**  
M.Phil. Soil and Water Engineering
- 2013 - 2017 **Kwame Nkrumah University of Science and Technology, Kumasi, Ghana**  
BSc. Agricultural Engineering – First Class Honours

## WORK EXPERIENCE

- 2025 **WASCAL CCLU Centre, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana**  
*IT Officer and Office Manager (June – present)*
- Manage general office operations
  - Coordinate correspondence between Management and students
  - Scientific reporting and writing
  - Coordinate meetings including preparing necessary presentations and agenda
  - Assist students in their research
  - Handle and create content for the Centre's social media platforms (website and LinkedIn)
- 2020 **Non-Governmental Organization (Eve Redefined Ministries), Accra, Ghana**  
*Personal Assistant (July – August)*
- Communicated with volunteers and network members
  - Prepared monthly reports
  - Correspond with resource people for programs
  - Assisted as liaison officer in organising the first international webinar on ZOOM
- 2017 – 2018 **Kwame Nkrumah University of Science and Technology, Kumasi, Ghana**  
*Teaching/Research Assistant (September, 2017 – August, 2018)*
- Offered tutorials to undergraduate students for soil and water engineering courses
  - Assisted in office management and correspondence
- 2017 **Kwame Nkrumah University of Science and Technology, Kumasi, Ghana**  
*Project Member (Computerised Geospatial Survey and Data Analysis) March-May*
- Tasked to identify features such as water sources and vegetation in over 5000

geospatial imagery datasets

- 2015/2016 **Ministry of Food and Agriculture (MoFA), Agricultural Engineering Services Directorate, Accra, Ghana**  
*Intern (June-July)*
- Worked in a team of six and assembled a minimum of 8 tandem harrows and disc ploughs daily
  - Serviced a minimum of two tractors in a team under supervision

## TEACHING AND TRAINING EXPERIENCE

- 2026 **The Brew-Hammond Energy Centre (CCG Ghana Project), Kwame Nkrumah University of Science and Technology, Kumasi, Ghana**  
*Lead Trainer, Climate, Land, Energy and Water systems (CLEWs) Model (March 9 and April 29 – 30)*
- Delivered hands-on training on CLEWs/OseMOSYS modelling to participants, guiding them in building and interpreting integrated energy-land-water scenarios
  - Facilitated practical sessions with two co-trainers on data preparation and model interlinkages between energy, land, water systems

## CORE SKILLS

- Communication (English, French)
- Problem solving
- Attention to detail
- Flexibility and adaptability
- Teamwork
- Leadership and organizing
- Teaching

## SHORT COURSES

- 2026 Introduction to Intellectual Property (*April – May*)
- 2025 Introduction to CLEWs (Climate, Land, Energy and Water systems), *The Open University* (September)
- 2024 Developing Skills for Women Leadership in Climate Action, *C40 Cities and Fondation L'Oréal* (May)
- 2023 Mastering Python, *Purpose Software Innovation and Research Center* (May)
- 2021 4R Essentials- A Short Course in 4R Nutrient Stewardship, *Fertilizer Canada* (February)
- 2021 Français Langue Etrangere (FLE) course, *Centre International de Recherche et d'Etude de Langues, Village du Benin, Togo* (Niveau A2 du CECR-L – Excellent (77%)) (September – December)

## CONFERENCES AND POSTERS

- “Assessing the Hydrological Impacts of Land Use/Cover Change in the Ouémé River Basin, West Africa”, *Tropentag Conference 2025* on the theme “Reconciling Land System Changes with Planetary Health”, Bonn, Germany, September 8-13, 2025.
- “Innovative Water Resilience: Modelling Climate Change Impact on Water Balance in the

Ouémé River Basin”, *International DAAD Alumni Training Seminar and IFAT 2025* on the theme, “*Sustainable Management of Water Resources in Africa*”, Johannesburg, South Africa, June 30 - July 11, 2025.

- “Assessment of Land Use/Cover Changes in the Ouémé River Basin, Benin Using Google Earth Engine and Random Forest Classifier”, *2024 International SWAT Conference*. Morocco, March 6-8, 2024.
- “Impact of Climate and Land Use/Cover Change on Water Balance in the Ouémé River Basin, Benin”, *Workshop Report Series Earth Observation Research Cluster*. Department of Remote Sensing, University of Würzburg, Würzburg, Germany, January 24, 2024.
- “The Impact of Climate and Land Use/Cover Dynamics on Water Balance in the Ouémé River Basin of Benin”, *TUM-HFM PhD Seminar*. Technical University of Munich, Munich, Germany, November 2, 2023.
- “Land Use/Cover Changes in the Ouémé River Basin, Benin using Google Earth Engine and Random Forest Classifier”, *DAAD Global Centers Conference* on the theme, “*Imaginations of Climate Futures – Cross Regional Insights to get from Knowledge to Action*”, Berlin, Germany, September 10-12, 2024.

## ABSTRACTS

- “Assessing the Hydrological Impacts of Land Use/Cover Change in the Ouémé River Basin, West Africa”, *Tropentag Conference 2025* on the theme *Reconciling Land System Changes with Planetary Health*, Bonn, Germany, September 8-13, 2025.
- “Innovative Water Resilience: Modelling Climate Change Impact on Water Balance in the Ouémé River Basin”, *International DAAD Alumni Training Seminar and IFAT 2025* on the theme, *Sustainable Water Resources Management in Africa*, Johannesburg, South Africa, June 30 – July 11, 2025.
- “Assessment of Land Use/Cover Changes in the Ouémé River basin, Benin using Google Earth Engine and Random Forest Classifier”, *2024 International SWAT Conference*. Morocco, March 6-8, 2024.
- “The Impact of Climate and Land Cover Change on Water in the Ouémé River Basin, Benin”, *DAAD Global Centers Conference – Imaginations of Climate Futures – Cross Regional Insights to get from Knowledge to Action*. Berlin, Germany, September 10-12, 2024.

## WORKSHOPS AND SEMINARS

- Regional Conference on Women in STEM, *World Intellectual Property Organisation (WIPO), Japan Patent Office (LPO) and Rwandan Government*. Kigali, Rwanda, March 17 – 19, 2026.
- Energy Modelling Platform for Africa 2026 (EMP-A 2026), *Climate Compatible Growth*, University of Cape Town, Cape Town, South Africa. January 19 – February 7, 2026.
- “Agro-ecological Strategies for a Sustainable and Just Transformation of Agri-food Systems in the Global South”, *DAAD SDG Alumni Project*, University of Kassel-Witzenhausen, Germany, September 1-7, 2025.
- “Sustainable Management of Water Resources in Africa”, *DAAD Alumni Seminar in the framework of IFAT*, Johannesburg, South Africa, June 30 to July 11th, 2025.
- “Conducting Excellent and Innovative Research Despite the Pandemic”, *CSIR-Organization for Women in Science for the Developing World (OWSD)*, via Zoom, October 20, 2020.
- Soil and Water Training for Farmers and Extension Officers, *IITA – Africa RISING project*. Tamale, June 14, 2019.
- Sustainable Intensification Assessment Framework (SIAF) training, *IITA*. Tamale, March 18 –

22, 2019.

- Mentorship Workshop, *African Women in Agricultural Research and Development (AWARD)*. Nairobi, Kenya, January 20 – 26, 2019.

## RESEARCH AND PUBLICATIONS

1. Lavie, J. D., and **Annan, E.** (2026). Towards a Net Zero Emission Pathway: A CLEWs-based Study of Ghana. <https://zenodo.org/records/18498806>
2. **Annan, E.**, Merk, F., Amponsah, W., Adjei, K. A., Disse, M. & Agyare, W. A. (2025). Impact of Land Use and Land Cover Changes on Water Balance in the Ouémé River Basin, West Africa. *Hydrological Sciences Journal*. <https://doi.org/10.1080/0262667.2025.2516831>
3. **Annan, E.**, Amponsah, W., Adjei, K. A., Disse, M., Hounkpè, J., Biney, E., Agbenorhevi, A. E. & Agyare, W. A. (2024). Spatio-temporal Land Use and Land Cover Change Assessment: Insights from the Ouémé River basin. *Scientific African*, 25, e02262. <https://doi.org/10.1016/j.sciaf.2024.e02262>
4. Biney, E., Forkuo, E. K., Poku-Boansi, M., Hackman, K. O., Harris, E., Asare, Y. M., Yankey, D. B., **Annan, E.** & Agbenorhevi, A. E., (2024). Analyzing the Spatio-temporal Pattern of Urban Growth and its Influence on Urban Heat Islands in the Sekondi-Takoradi Metropolis, Ghana. 26, e02366. <https://doi.org/10.1016/j.sciaf.2024.e02366>
5. Biney, E., Mintah, B. A., Ankomah, E., Agbenorhevi, A. E., Yankey, D., & **Annan, E.** (2024). Sustainability assessment of groundwater in south-eastern parts of the western region of Ghana for water supply. *Cleaner Water*, 1. <https://doi.org/10.1016/j.clwat.2024.100007>
6. Biney, E., Forkuo, E. K., Poku-Boansi, M., Asare, Y. M., Hackman, K. O., Yankey, D., Agbenorhevi, A. E., & **Annan, E.** (2024). A comprehensive analysis and future projection of land use and land cover dynamics in a fast-growing city: A case study of Sekondi-Takoradi metropolis, Ghana. *Scientific African*, 4, e02207. <https://doi.org/10.1016/j.sciaf.2024.e02207>
7. Agbenorhevi, A. E., Amekudzi, L. K., Kelome, N., Biney, E. & **Annan, E.** (2024). Analyzing Land Use and Land Cover Change Dynamics in the Pra River Basin: A Multi-Tool Approach for Informed Decision-Making. *Environmental Challenges*, 15. <https://doi.org/10.1016/j.envc.2024.100922>
8. **Annan, E.** (2025). Impact of Land Use/Cover and Climate Change on Water Balance in the Ouémé River Basin, Benin. A Thesis Submitted to WASCAL CCLU, Department of Civil Engineering, Kwame Nkrumah University of Science and Technology, Kumasi in Partial Fulfilment of the Requirements for the Award Degree of Doctor of Philosophy in Climate Change and Land Use.
9. **Annan, E.** (2020). Planting Time of Cowpea Living Mulch Effect on Soil Moisture Fluxes and Maize Growth in the Northern Region, Ghana. A Thesis Submitted to the Department of Agricultural and Biosystems Engineering, Kwame Nkrumah University of Science and Technology, Kumasi in Partial Fulfilment of the Requirements for the Award Degree of Master of Philosophy in Soil and Water Engineering. <https://biblio.iita.org/documents/S20ThErnestinaPlantingNothomDev.pdf-04f5492a4a61c97d4618d9e941ae7c98.pdf>
10. **Annan, E.** (2017). Crop Water Productivity of Some Urban Irrigated Vegetable Crops. A Thesis Submitted to the Department of Agricultural and Biosystems Engineering, Kwame Nkrumah University of Science and Technology, Kumasi in Partial Fulfilment of the Requirements for the Award Degree of Bachelor of Science in Agricultural Engineering.

## FELLOWSHIPS AND PROFESSIONAL AFFILIATIONS

- Trainee Professional Engineer, Ghana Institution of Engineering (GhIE), 2026
- Member, Climate Compatible Growth (CCG) Ghana Network, 2025

- Member, Ghana Youth Biodiversity Network (GhYBN), 2024.
- Member, International Association of Hydrological Sciences (IAHS), 2023.
- Graduate Research Fellow, International Association of Research Scholars and Fellows, IITA, 2020.
- Fellow Mentee, African Women in Agricultural Research and Development (AWARD), 2018.

## **AWARDS**

1. “Outstanding Doctoral Student (Taught courses), Batch 5”, *WASCAL Climate Change and Land Use, Kwame Nkrumah University of Science and Technology, Kumasi* (June, 2025)
2. WASCAL Graduate Student Programme (GSP) Scholarship (2021-2025)
3. Tullow Oil Scholarship (2018-2020)

## **LEADERSHIP**

1. Deputy Class Representative, *WASCAL Climate Change and Land Use Batch 5, KNUST* (2021-2025)
  - Together with main rep, act as liaison between students and programme administration.
  - Ensure students are properly represented and well informed always.

## **TECHNICAL SKILLS**

- Proficient in Microsoft Word, PowerPoint, forms and Excel
- ArcGIS, QGIS, Google Earth Engine, IDRISI@Selva
- Agronomic Data Collection and Analysis
- Qualitative and Quantitative Research
- Python (basic) and STATA, R Statistical Packages
- Hydrological modelling (SWAT, SWAT-CUP, WaSiM)
- Climate, Land, Energy and Water systems (CLEWs) model