

Serigne Mbacké COLY

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in Serigne Mbacké COLY | GitHub Serigne Mbacké Coly | R[®] Serigne Mbacké Coly

01 Rue de la science, Ouagadougou, Burkina Faso

PROFESSIONAL PROFILE

Ph.D. in Water and Environmental Sciences specializing in geospatial climate vulnerability analysis, with 5+ years of experience transforming complex datasets into policy recommendations. Proven ability to bridge technical research (R/GIS) and stakeholder engagement, as demonstrated in World Bank-funded projects on Sahelian livelihood resilience. Seeking to apply data-driven approaches to the Data Foundation’s climate policy initiatives.

EDUCATION

- Ph.D. in Water and Environmental Sciences** June 2025
International Institute for Water and Environmental Engineering (2iE) Ouagadougou, Burkina Faso
 - Thesis Title: Modeling the vulnerability of Sahelian populations in the context of climate change and insecurity: the case of Burkina Faso.
- Master in Atmospheric and Ocean Sciences** May 2019
Assane Seck University of Ziguinchor (UASZ) Ziguinchor, Senegal
 - Thesis Title: Local characterization in Tahiti of large-scale meteorological situations and its implications for the qualification of renewable energy resources.
- Bachelor in Physics and Chemistry** November 2016
Cheikh Anta Diop University (UCAD) Dakar, Senegal
 - Courses: Thermodynamics, Organic Chemistry, Inorganic Chemistry, Optics, Fluid Mechanics, Analysis, Algebra, English, Algorithms.

RESEARCH EXPERIENCES AND KEY PROJECTS

PhD researcher

- Interactive Climate Visualization Dashboard (Shiny App)** December 2024 – May 2025
Tools: R Shiny, Shinysemantic, JavaScript, HTML/CSS, leaflet, plotly [GitHub]
 - Developed interactive web application for climate vulnerability visualization in Burkina Faso.
 - Created dynamic maps, trend analysis dashboards, and data exploration tools for researchers and policymakers.
 - Implemented user-friendly interface for complex climate data interpretation and decision support.
- Evolution of Precipitation in Burkina Faso Between 1981-2014 and 2025-2050 Using 27 CMIP6 from NEX-GDDP-NASA and CHIRPS Data** January 2024 - March 2024
Tools: [Python, R, CDO, QGIS, ncd4, tidyverse, raster] [GitHub]
 - Calculate climatology and characterize the three agro-ecological zones of Burkina Faso.
 - Analyze precipitation patterns using ETCCDI metrics (e.g., R20mm, PrcpTot, CDD, CWD, R95p)
 - Produce detailed maps of precipitation changes and conduct an in-depth analysis of trends through time series and anomalies.
- Livelihood Survey in Gaoua, Léo, and Kongoussi (Burkina Faso)** April 2022 – May 2023
Tools: KoboCollect, Mendeley, RStudio, LaTeX, QGIS [GitHub]
 - Train and supervise a team of about a dozen enumerators to collect data from households.
 - Clean and organize collected data, conduct thorough data analysis, and draw conclusions.
 - Produce a detailed report for local authorities, as well as a scientific article for publication in a peer-reviewed journal.

Junior researcher

- Spatial Analysis of Outgoing Longwave Radiation and Trend Analysis of Weather Patterns in Tahiti (French Polynesia)** July 2018 – January 2019
Tools: Ferret, NCO, CDO, Mendeley, RStudio, QGIS [GitHub]
 - Characterize the weather and climate patterns of the island of Tahiti to assess its wind and solar potential.
 - Conduct an in-depth analysis of the data (k-means method), including statistical evaluations and relevant graphical representations.
 - Use R, CDO, and Ferret programming languages for calculations and graphical representations.

CONFERENCES

- **4th Euro-Mediterranean Conference for Environmental Integration (EMCEI)** [🌐] November 2022
Oral presentation on Natural disasters in the Sahel Sousse, Tunisia
- **6th Euro-Mediterranean Conference for Environmental Integration (EMCEI)** [🌐] May 2024
Oral presentation on Livelihood Vulnerability Index (LVI) empirical validation in the Sahel Marrakech, Morocco
- **2nd Climate Change Research and Resilience Conference (2CR2)** [🌐] April 2025
Oral presentation on Climate variability in the Sahel Djibouti, Djibouti

PUBLICATIONS

[C]=CO-AUTHOR, [F]=FIRST AUTHOR

- [F1] Coly et al. (2024). **Assessing climate change vulnerability and livelihood strategies in Burkina Faso including insecurity paradigm: a focus on rain-fed agriculture households.** *Environment Development and Sustainability*. DOI:<https://doi.org/10.1007/s10668-024-05442-3>
- [F2] Coly et al. (2023). **Learning from history of natural disasters in the Sahel: a comprehensive analysis and lessons for future resilience.** *Environmental Science and Pollution Research*, Vol. 31, pp. 40704–40716. DOI: <https://doi.org/10.1007/s11356-023-28989-6>
- [C.1] Yonaba et al. (2024). **Rainfall estimation in the West African Sahel: comparison and cross-validation of top-down vs. bottom-up precipitation products in Burkina Faso.** *Geocarto International*, Vol. 39, Issue 1. DOI: <https://doi.org/10.1080/10106049.2024.2391956>
- [C.2] Zorom et al. (2023). **Metapopulation Modeling of Socioeconomic Vulnerability of Sahelian Populations to Climate Variability: Case of Tougou, Village in Northern Burkina Faso.** *Mathematics*, Vol. 11, Issue 21. DOI: <https://doi.org/10.3390/math11214507>

SKILLS

- **Programming languages:** R (data wrangling, visualizations, statistical modeling), Python, JavaScript, C
- **Software:** STATA, Mendeley, Microsoft Office, Kobocollect, XStat, Ubuntu (Linux), Matlab, TexStudio (LaTeX)
- **Project management:** GitHub, proposal writing, interdisciplinary collaboration, student mentoring
- **Scientific communication:** Conference presentations, peer-reviewed publications, visual communication
- **Research:** Synthesis, Critical thinking, Interdisciplinary and Multicultural collaboration, Mentoring, Teaching
- **Data management:** Organization, Rigour in testing and analysis, Effective management of large datasets.
- **Remote sensing & GIS:** Google Earth Engine, Satellite data analysis, NDVI analysis, QGIS, ArcGIS, ArcMap

PROFESSIONAL TRAINING AND WORKSHOP

- **World Bank Group Partner Training / IRD and ACE Regional workshop** July 2023
Abidjan / Côte d'Ivoire
 - Regional training workshop on bias correction in climatic, hydrological, and agronomic data.
- **Results-Based Management WASCAL Competence Center** March 2023
Ouagadougou / Burkina Faso
 - WASCAL Training on Monitoring and Evaluation (M&E) and accountability.
- **Climate Data Analysis Training Online** January - April 2023
Trieste / Italy
 - ICTP Workshop on Climate Data and Seasonal Forecast Analysis - Trieste (Online)
- **Machine Learning in Climate Online** December 2022 - February 2023
University of Luxembourg Competence Center
 - ECMWF MOOC - Weather and Climate Applications

LANGUAGES

English C1	French	Spanish
TOEIC Score: 870 / 990	Excellent level	Basic level (High school)
Test date: October 2023		
Speexx certified (C1.1) : May 2025		

EXTRACURRICULAR ACTIVITIES

Scrabble	Taekwondo	Volley-Ball	Travel
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REFERENCES

Pr Harouna Karambiri Director of research, Thesis supervisor International Institute for Water and Environmental Engineering (2iE) harouna.karambiri@2ie-edu.org	Dr Roland Yonaba Lecturer International Institute for Water and Environmental Engineering ousmane.yonaba@2ie-edu.org	Dr Malicki Zorom Lecturer International Institute for Water and Environmental Engineering malicki.zorom@2ie-edu.org
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