Tsegaye Tadesse, Ph.D.

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Research Professor
Applied Climatologist and Remote Sensing Expert

QUALIFICATION SUMMARY

- Successful, enthusiastic researcher with 19+ years of post-doctoral experience (39+ years total) in drought and vegetation monitoring, remote sensing, agricultural development, food security, and climate change/variability at national and international levels
- Effective at managing professional teams and collaborating with others to reach objectives
- Proficient at developing partnerships among universities, business, and industry
- Excellent at developing educational programs that connect with many learning groups focused on practical and hands-on learning

CURRENT & PREVIOUS POSITIONS

2019-present	**Research Professor of Applied Climate and Remote Sensing, Geospatial Coordinator**, National Drought Mitigation Center (NDMC), School of Natural Resources, University of Nebraska-Lincoln
2015-2019	**Research Associate Professor/ Climatologist and Remote Sensing Expert, Geospatial Coordinator**, National Drought Mitigation Center (NDMC), School of Natural Resources, University of Nebraska-Lincoln
2005-2015	**Research Assistant Research Professor/ Climatologist and Remote Sensing Expert,** National Drought Mitigation Center (NDMC), School of Natural Resources, University of Nebraska-Lincoln
2002-2005	**Research Associate/Assistant Geoscientist,** National Drought Mitigation Center (NDMC), School of Natural Resources, University of Nebraska-Lincoln
1998-2002	**Graduate Research Assistant**, Department of Agronomy & Horticulture, University of Nebraska-Lincoln
1984-1997	**Meteorologist & Team Leader**, Weather Forecast and Meteorological Communication Team, National Meteorological Services Agency (NMSA), Ethiopia
1982-1984	**Physics Teacher**, Technical School, Ethiopian Air Force Academy, Ethiopia

AREA OF EXPERTISE & RESEARCH INTERESTS

Drought Monitoring & Prediction	Agricultural Development/Food Security	Remote Sensing
Geographic Information Systems	Climate change/Climate variability	Data Mining
Natural Resource Management	Human Impacts on the Environment	Agribusiness
Team Leadership/Development	Judgment/Problem Solving	Risk Management

EDUCATION

Ph.D. Agronomy (Agro-meteorology), University of Nebraska-Lincoln, 2002.

Dissertation title: Identifying drought and its associations with climatic and oceanic parameters using data mining techniques. Dissertation advisor: Dr. Don A. Wilhite.

M.S. Space Studies, International Space University, Strasbourg, France, 1998.
Thesis title: Improving Drought Management through Better Monitoring. Thesis advisors: Dr. Michael J. Rycroft (France) and Dr. Don A. Wilhite (U.S.A.).

B.Sc. Physics (Mathematics minor), Addis Ababa University, Ethiopia, 1982.

GRANTS

Grants funded

- USDA Support of the US Drought Monitor and Hub Activities for 2025-2026 (PI-Mark Svoboda), USDA-OCE (Dept of Agriculture), $1,280,000, 09/30/2025 – 09/30/2026; co-Investigator.
- Building a Global Composite Drought Indicator (GCDI) Hot Spot Early Warning and Information System (PI-Mark Svoboda), Department of Defense - the Air Force, $2,599,1943, 02/28/2022 - 05/31/2026; co-Investigator.
- Optimizing Cover Crop Decisions for Enhanced Productivity, Profitability, Resilience and Environmental Sustainability, Dept of Agriculture-ARS (PI-Brian Wardlow), $264,734, 08/01/2021 - 07/31/2026, Co-Principal Investigator.
- USDA Support for Enhancements to the U.S. Drought Monitor and engaging the USDA Climate Hubs 2024-2025 (PI-Mark Svoboda), Dept of Agriculture-OCE, $1,275,000, 09/30/2024 - 09/30/2025; co-Investigator.
- Implementation of the Collaboration Partnership on Drought Resiliency and Preparedness, United Nations (PI-Mark Svoboda), $218,000, 09/07/20232 - 12/31/2024; co-Investigator.
- USDA Support of the U.S. Drought Monitor and Hub Activities with the National Drought Mitigation Center for the period of 2020 to 2023 (PI-Mark Svoboda), Dept of Agriculture-OCE, $2,375,000, 09/30/2020 - 09/30/2024; co-Investigator.
- USDA Support of the U.S. Drought Monitor and Hub Activities for 2023-2024 (PI-Mark Svoboda), Dept of Agriculture-OCE, $1,275,000, 09/30/2023 - 09/30/2024; co-Investigator.
- Building a Composite Drought Indicator and Monitoring/Early Warning System for Peru (PI-Mark Svoboda), Dept of Agriculture-FAS, $74,974, 12/01/2021 – 11/30/2022, co-Investigator.
- USDA Support for Enhancements to the U.S. Drought Monitor and engaging the USDA Climate Hubs 2022-2023 (PI-Mark Svoboda), Dept of Agriculture-OCE, $1,325,000, 09/30/2022 - 09/30/2023; co-Investigator.
- USDA Support for Enhancements to the U.S. Drought Monitor 2021-2022 (PI-Brian Fuchs), Dept of Agriculture-OCE, $1,275,000, 09/30/2021 - 03/31/2023, co-Investigator.
- Providing Drought Information Services for the Nation (US): the Drought Risk Management Research Center (DRMRC) - (PI-Mark Svoboda), NOAA, $4,043,222; 06/01/2015 – 08/31/2022; Co-Principal Investigator.
- Drought Information Services and Research for Agriculture across the United States, 2020-21 (PI-Brian Fuchs), Dept of Agriculture-OCE, Federal, $800,000, 09/17/202 – 09/30/2021; co-Investigator.
- Development of a Global Evaporative Stress Index Based on Thermal and Microwave LST towards Improved Monitoring of Agricultural Water and Vegetation Stress (PI-Brian Wardlow), NASA, $128,703, 04/01/2017 – 03/31/2021; co-Investigator.

- Drought Information Services for Agriculture Across the United States 2019-20 (PI-Brian Fuchs), Department of Agriculture-OCE, $833,384; 09/30/2019 - 09/29/2020; co-Investigator.
- U.S.-India Partnership: Improving Water Management, Agricultural Production and Food Security in Drought-Prone Areas, US-India Educational Foundation (PI-Christopher Neale), $182,452, 09/01/2016 – 08/31/2020, co-Investigator.
- Drought Risk Management in Southern Africa (PI-Mark Svoboda), World Bank Group, $40,000; 06/07/2019 - 08/15/2020; co-Investigator.
- Development of the MENA Regional Drought Management System (PI-Mark Svoboda), International Center for Bio-saline Agriculture (ICBA), Associations/Foundations, Research, $1,025,440.00, 01/01/16 – 06/30/19; co-Investigator.
- Drought Information Services for Agriculture Across the United States (PI-Brian Fuchs), Department of Agriculture-OCE, Federal, Public Service, $827,501.00, 10/01/16 – 09/30/17; co-Investigator.
- Seasonal Prediction of Hydro-Climatic Extremes in the Greater Horn of Africa under Evolving Climate Conditions to Support Adaptation Strategies (PI-Tsegaye Tadesse), NASA, $987,767; 01/14/2014 – 11/30/2017; Principal Investigator.
- Global Inventory and Comparative Assessment of Drought Risk Modeling Tools (PI-Mark Svoboda), Deltares, $14,187, 06/01/2017 – 10/10/2017, co-Investigator.
- Drought Risk Management for the United States (PI-Micael Hayes), Univ of Oklahoma, $693,696, 09/01/2014 – 08/31/2017, co-Investigator.
- The Quick Drought Response Index (QuickDRI): An Integrated Approach to Maximizing the Use of NASA Data Sets for Rapid Response Drought Monitoring (PI-Brian wardlow), NASA, $1,150,701; 01/14/2012 – 08/01/2017; co-Principal Investigator.
- Hands-on Training on the VegDRI Techniques, Agriculture and Agri-Food Canada (PI-Tsegaye Tadesse), $4,258; 02/06/2017 – 02/10/2017; co-Principal Investigator.
- It is all about TEF: Internationalizing Teaching, Extension and Farming Research in Ethiopia (PI- Mary Willis), Dept of Agriculture-NIFA, $149,579; 09/01/2011 – 08/31/2016; co-Principal Investigator.
- Drought Early Warning and Policy in the Eastern Caribbean, Organization of Eastern Caribbean States (OECS) and the Caribbean Institute of Meteorology and Hydrology (CIMH) – (PI-Brian Fuchs), $49,227; 01/22/2015 – 05/20/2016; Co-Principal Investigator.
- Developing Operational VegDRI Model and Producing Proof-of Concept VegDRI Maps for Canada, Agriculture and Agri-Food Canada (PI- Tsegaye Tadesse), $18,082; 11/09/2015 – 03/18/2016; Principal Investigator.
- Development of the Middle East and North Africa Network of Water Centers (PI-Michael Hayes), Development Alternatives Inc, $542,988; 09/01/2013 – 03/10/2016; co-Investigator.
- Improving U.S. Drought Monitoring - Integrating Soil Moisture Data and Developing a Drought Blends Portal (PI-Michael Hayes), Dept of Agriculture, $150,000; 10/31/2014 – 01/30/2016; co-Investigator.
- Drought Information Service in Support of the National Integrated Drought Information System (NIDIS) (PI-Michael Hayes), Dept of Commerce-NOAA, $739,803, 10/01/2013 – 09/30/2015, co-Investigator.
- Developing the Vegetation Drought Response Index (VegDRI) model and producing Experimental VegDRI Maps for Canada, Agriculture, and Agri-Food Canada (PI-Tsegaye Tadesse), $21,943, 01/30/2014 – 03/28/2014, Principal Investigator.

- Development of a Multi-Scale Remote-Sensing Based Framework for Mapping Drought over North America (PI-Brian Wardlow), Uni. of Maryland, $29,144; 06/22/2012 – 06/21/2013; co-Investigator.
- The Assessment of Climate and Biophysical Data Sets for Input in the Vegetative Drought Response Index (VegDRI) model, Agriculture and Agri-Food Canada (PI-Tsegaye Tadesse), $24,000, 02/21/2013 – 03/28/2013, Principal Investigator.
- Evaluation of FEWS NET Satellite Products for Drought Monitoring in Food Insecure Areas of Ethiopia (PI-Tsegaye Tadesse), Dept of Interior-USGS, $5,755, 11/21/2011 – 02/20/2012, Principal Investigator.
- Incorporating Remote Sensing Information into the US Drought Monitor (PI-Mark Svoboda), Dept of Interior-USGS, $152,608, 02/01/2007 – 12/31/2010, co-Investigator.

PROFESSIONAL SERVICE ACTIVITIES

Doctoral and Masters Students Graduate Committees and Advisee

Ph.D. Completed (12 students)

Ph.D. in Progress (3 students)

Master's Completed (10 students)

***Teaching* - Courses taught:**

NRES/GEOG 312	Introduction to Geospatial Information Technology
NRES/GEOG/AGRO 420/820	Applications of Remote Sensing in Agriculture & Natural Resources
NRES 208	Introduction to Applied Climate Sciences
NRES/AGRO 429A/829A	Food Security: A Global Perspective
NRES 999	Doctoral Dissertation
NRES 996	Research Other than Thesis
NRES 896	Independent Study
ANTH498/898	Advanced Current Topics in Anthropology/Study Abroad
PHYSICS 101	Introduction to College Physics

Professional Societies/Committees / Working Groups

Fellow, African Scientific Institute (2019-present)
Member, American Geophysical Union (2014-present)
Member, American Meteorological Society (2002-present)
Member, National Geographic Society (2002-present)
Representative & coordinator of North America, Ethiopian Meteorological Society (2008-present)
Member, International Editorial Advisory Board (EAB) of the Advances in Knowledge Communities & Social Networks (AKCSN) Book Series (2006-present)
National Phenology Network (NPN) Land Surface Phenology and Remote Sensing Working Group (2009-present)
NASA Soil Moisture Active Passive (SMAP) Satellite Applications Working Group (2009-present).

University Service

Member, University of Nebraska-Lincoln Faculty Senate (2019-present)
Member, the Office of Research and Economic Development's (ORED) Research Advisory Board (2021 – present)

Member, University of Nebraska-Lincoln Chancellor's commission on the status of people of color (2008-2013; 2015-present).
Member, Search committees for the state climatologist (2023- present).
Member, Academic Standards Committee, University of Nebraska-Lincoln (2013-2019).
Member, Research Committee, School of Natural Resources (2006-2009).
Member, Search committees for the position of the Director of High Plains Regional Climate Center (2009).
Member, Search Committee for the Extension Educator (Climate Change & Variability), School of Natural Resources (2009).

PUBLICATIONS

Published Journal Articles (Peer Reviewed, Past 5 years only)

Tadesse, T., Connolly, S., Wardlow, B., Svoboda, M., Zhang, B., Fuchs, B.A., Aslam, H., Asaro, C., Koch, F.H., Bernadt, T. and Poulsen, C., 2025. Development and Evaluation of the Forest Drought Response Index (ForDRI): An Integrated Tool for Monitoring Drought Stress Across Forest Ecosystems in the Contiguous United States. Forests, 16(7), p.1187.

Nigussie, G., Argaw, M., Nedaw, D., Tadesse, T. and Hartmann, A., 2025. Estimating Groundwater Recharge and water balance dynamics in the Akaki catchment of the tropical environment. Environmental and Sustainability Indicators, p.100807.

Shiferaw, A., Birru, G., Tadesse, T., Wardlow, B., Awada, T., Jin, V., Schmer, M., Freidenreich, A. and Iqbal, J., 2025. Geographical Variation in Cover Crop Management and Outcomes in Continuous Corn Farming System in Nebraska. Agriculture, 15(16), p.1776.

Nigussie, G., Argaw, M., Nedaw, D., Tadesse, T. and Hartmann, A., 2025. Analyzing the determinant factors of spatial groundwater availability in the Akaki catchment, Central Ethiopia. Sustainable Environment, 11(1), p.2464392.

Prajapati, V.K., Kaur, R., Prasad, V., Khanna, M., Neale, C.M.U., Hayes, M., Svoboda, M., Swigart, J., Tadesse, T., Sehgal, V. and Rani, A., 2025. Drought declaration potential of seasonally averaged vs. end-of-season composite drought indices: comparative validation over Karnataka state of India. Theoretical and Applied Climatology, 156(1), p.43.

Al-Kilani, M.R., Al-Bakri, J., Rahbeh, M., Knutson, C., Tadesse, T. and Abdelal, Q., 2025. Agricultural drought assessment in data-limited arid regions using open-source remotely sensed data: a case study from Jordan. Theoretical and Applied Climatology, 156(2), p.89.

Shiferaw, A., Tadesse, T., Rowe, C. and Oglesby, R., 2024. Weather Research and Forecasting Model (WRF) Sensitivity to Choice of Parameterization Options over Ethiopia. Atmosphere, 15(8), p.974.

Shiferaw, A., Birru, G., Tadesse, T., Schmer, M.R., Awada, T., Jin, V.L., Wardlow, B., Iqbal, J., Freidenreich, A., Kharel, T. and Khorchani, M., 2024. Optimizing Cover Crop Management in Eastern Nebraska: Insights from Crop Simulation Modeling. Agronomy, 14(7), p.1561.

Sur, C., Nam, W.H., Zhang, X., Tadesse, T. and Wardlow, B.D., 2024. Assessment of agricultural drought status using visible infrared imaging radiometer suite land products. Theoretical and Applied Climatology, pp.1-11.

Kassaye, S.M., Tadesse, T., Tegegne, G., Hordofa, A.T. and Malede, D.A., 2024. Relative and Combined Impacts of Climate and Land Use/Cover Change for the Streamflow Variability in the Baro River Basin (BRB). Earth, 5(2), pp.149-168.

Geremew, B., Tadesse, T., Bedadi, B., Gollany, H.T., Tesfaye, K., Aschalew, A., Tilaye, A. and Abera, W., 2024. Evaluation of RothC model for predicting soil organic carbon stock in north-west Ethiopia. Environmental Challenges, 15, p.100909.

Taravat, A., Abebe, G., Gessesse, B. and Tadesse, T., 2024. Estimation of Sugarcane Yield Using Multi-Temporal Sentinel 2 Satellite Imagery and Random Forest Regression. The International Archives of Photogrammetry, Remote Sensing and Spatial Information Sciences, 48, pp.357-362.

Kassaye, S.M., Tadesse, T., Tegegne, G. and Hordofa, A.T., 2024. Quantifying the climate change impacts on the magnitude and timing of hydrological extremes in the Baro River Basin, Ethiopia. Environmental Systems Research, 13(1), p.2.

Kassaye, S.M., Tadesse, T., Tegegne, G. and Hordofa, A.T., 2024. Integrated impact of land use/cover and topography on hydrological extremes in the Baro River Basin. Environmental Earth Sciences, 83(2), p.49.

Rasiya Koya, S., Kar, K.K., Srivastava, S., Tadesse, T., Svoboda, M. and Roy, T., 2023. An autoencoder-based snow drought index. Scientific Reports, 13(1), p.20664.

Chanyang Sur, Won-Ho Nam, Xiang Zhang, Tsegaye Tadesse & Brian D. Wardlow, 2023. Assessment of an evapotranspiration algorithm accounting for land cover types and photosynthetic perspectives using remote sensing images, GIScience & Remote Sensing, 60:1, DOI: 10.1080/15481603.2023.2279802

Birru, G., Shiferaw, A., Tadesse, T., Wardlow, B., Jin, V.L., Schmer, M., Awada, T., Kharel, T. and Iqbal, J., 2023. Cover crop performance under a changing climate in continuous corn system over nebraska.

Geremew, B., Tadesse, T., Bedadi, B., Gollany, H.T., Tesfaye, K. and Aschalew, A., 2023. Impact of land use/cover change and slope gradient on soil organic carbon stock in Anjeni watershed, Northwest Ethiopia. Environmental Monitoring and Assessment, 195(8), p.971.

Zhang, B., Salem, F.K.A., Hayes, M.J., Smith, K.H., Tadesse, T. and Wardlow, B.D., 2023. Explainable machine learning for the prediction and assessment of complex drought impacts. Science of The Total Environment, 898, p.165509.

Birru, G., Shiferaw, A., Tadesse, T., Schmer, M.R., Jin, V.L., Wardlow, B., Koehler-Cole, K., Awada, T., Beebout, S., Tsegaye, T. and Kahrel, T., 2023. Simulated impacts of winter rye cover crop on continuous corn yield and soil parameters. Agronomy Journal, 115(3), pp.1114-1130.

Kassaye, S.M., Tadesse, T., Tegegne, G. and Tadesse, K.E., 2022. The Sensitivity of Meteorological Dynamics to the Variability in Catchment Characteristics. Water, 14(22), p.3776.

Abebe, G., Tadesse, T. and Gessesse, B., 2022. Estimating Leaf Area Index and biomass of sugarcane based on Gaussian process regression using Landsat 8 and Sentinel 1A observations. International Journal of Image and Data Fusion, pp.1-31.

Schwartz, C., Ellenburg, W.L., Mishra, V., Mayer, T., Griffin, R., Qamer, F., Matin, M. and Tadesse, T., 2022. A statistical evaluation of Earth-observation-based composite drought indices for a localized assessment of agricultural drought in Pakistan. International Journal of Applied Earth Observation and Geoinformation, 106, p.102646.

Abebe, G., Tadesse, T. and Gessesse, B., 2022. Assimilation of leaf Area Index from multisource earth observation data into the WOFOST model for sugarcane yield estimation. International Journal of Remote Sensing, 43(2), pp.698-720.

Abebe, G., Tadesse, T. and Gessesse, B., 2021. Combined Use of Landsat 8 and Sentinel 2A Imagery for Improved Sugarcane Yield Estimation in Wonji-Shoa, Ethiopia. *Journal of the Indian Society of Remote Sensing*, pp.1-15.

Allen, M., Ketchikan, A.K., Mamo, M., Beyene, S., Regassa, T., Abagandura, G.O., Abreha, S., Mucia, A. and Tadesse, T., Experiential Learning in Soil Science: Evaluating Soil Quality in South Wollo, Ethiopia. American Colleges and Teachers of Agriculture (NACTA) NACTA Journal, 65, 196-204.

Ayehu, G.T., Tadesse, T. and Gessesse, B., 2021. Spatial and temporal trends and variability of rainfall using long-term satellite product over the Upper Blue Nile Basin in Ethiopia. *Remote Sensing in Earth Systems Sciences*, *4*(3), pp.199-215.

Bayissa, Y., Melesse, A., Bhat, M., Tadesse, T. and Shiferaw, A., 2021. Evaluation of Regional Climate Models (RCMs) Using Precipitation and Temperature-Based Climatic Indices: A Case Study of Florida, USA. *Water*, *13*(17), p.2411.

Al-Kilani, M.R., Rahbeh, M., Al-Bakri, J., Tadesse, T. and Knutson, C., 2021. Evaluation of Remotely Sensed Precipitation Estimates from the NASA POWER Project for Drought Detection Over Jordan. *Earth Systems and Environment*, *5*(3), pp.561-573.

Bayissa, Y., Moges, S., Melesse, A., Tadesse, T., Abiy, A.Z. and Worqlul, A., 2021. Multi-Dimensional Drought Assessment in Abbay/Upper Blue Nile Basin: The Importance of Shared Management and Regional Coordination Efforts for Mitigation. *Remote Sensing*, *13*(9), p.1835.

Benedict, T.D., Brown, J.F., Boyte, S.P., Howard, D.M., Fuchs, B.A., Wardlow, B.D., Tadesse, T. and Evenson, K.A., 2021. Exploring VIIRS Continuity with MODIS in an Expedited Capability for Monitoring Drought-Related Vegetation Conditions. *Remote Sensing*, *13*(6), p.1210.

Asoka, A., Wardlow, B., Tsegaye, Tadesse, Huber, M. and Mishra, V., 2021. A Satellite-Based Assessment of the Relative Contribution of Hydroclimatic Variables on Vegetation Growth in Global Agricultural and Nonagricultural Regions. *Journal of Geophysical Research: Atmospheres*, *126*(5), p.e2020JD033228. https://doi.org/10.1029/2020JD033228

Osman, M., Zaitchik, B.F., Badr, H.S., Christian, J.I., Tadesse, T., Otkin, J.A. and Anderson, M.C., 2021. Flash drought onset over the contiguous United States: sensitivity of inventories and trends to quantitative definitions. *Hydrology and Earth System Sciences*, *25*(2), pp.565-581.

Published Book Chapters (Peer Reviewed. Past 5 years only)

Ayehu, G.T., **Tadesse, T.,** Gessesse, B., Abera, W., Tibebe, D., Getaneh, Y. and Tamene, L., 2025. Root-Zone Soil Moisture Prediction in Rainfed Systems Using Satellite-Derived Product: The Case of Abbay River Basin in Ethiopia. In *Abbay River Basin: Biophysical Setting, Environmental Degradation, Hydropolitics and Development Potential* (pp. 529-552). Cham: Springer Nature Switzerland.

Wardlow, B.D., Anderson, M.A., **Tadesse, T.,** Svoboda, M.S., Fuchs, B., Hain, C.R., Crow, W.T. and Rodell, M., 2024. Remote Sensing of Drought: Satellite-Based Monitoring Tools for the United States. In Remote Sensing Handbook, Volume VI (pp. 38-86). CRC Press.