Michael G. Jacobson

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Professional Profile

Michael G. Jacobson is Professor of Forest Resources at Penn State. His work integrates forest economics, agroforestry, bioenergy, and water-energy-food systems, with emphasis on how economic, institutional, and ecological factors shape sustainable land use. He directs Penn State's Water-Energy-Food Nexus Initiative in Africa and has led interdisciplinary networks and projects supported by the National Science Foundation, Belmont Forum, USDA, and other organizations. His current work focuses on traditional dryland agroforestry systems, drought resilience, and the relationships among local knowledge, collective governance, and landscape change.

Areas of Expertise

Agroforestry and traditional dryland systems | Forest economics and finance | Water-energy-food systems | Drought vulnerability and resilience | Bioenergy and the bioeconomy | International forestry and rural development | Natural-resource extension and technology adoption

Current Appointments

2012-present Professor of Forest Resources, Department of Ecosystem Science and Management, Penn State

2024-present Affiliate Professor, Mohammed VI Polytechnic University (UM6P), Morocco

2018-present Affiliate Professor, African Studies, Penn State

2018-present Director, Penn State Water-Energy-Food Nexus Initiative in Africa

2018-present Global Fellow, College of Agricultural Sciences, Penn State

Education

1997 Ph.D., Forest Economics, North Carolina State University

1990 Master of Environmental Management, Duke University

1984 B.A., Economics, University of Connecticut

Selected Previous Appointments

2019-2024 Honorary Professor, School of Agricultural, Earth and Environmental Sciences, University of KwaZulu-Natal, South Africa

2015-2019 Chair, Forest Ecosystem Management Program, Penn State

2007-2024 Extraordinary Professor, Department of Forest and Wood Science, Stellenbosch University, South Africa

2007-2012 Associate Professor of Forest Resources, Penn State

1999-2007 Assistant Professor of Forest Resources, Penn State

1997-1999 Assistant Professor, University of Florida

1992-1993 Director of Information, Tropical Forest Foundation

1990-1992 Research Associate, World Bank, Agriculture Department

1986-1988 Agroforestry Technician and Extension Agent, U.S. Peace Corps, Lesotho

Leadership and Program Development

Director, Penn State Water-Energy-Food Nexus Initiative in Africa | 2018-present

Convened and directed an interdisciplinary faculty network with initial support from the Office of the Provost. Developed collaborations that led to two National Science Foundation awards: the $2 million SustainFood AccelNet

project and the $300,000 Belmont Forum-NSF MADIS project. Leads partnerships involving universities and other organizations in the United States and Africa.

Development of the Center for Applied Systems Analysis, Mohammed VI Polytechnic University | 2025-2026

Worked with Dean Bruno Gerard and colleagues during a sabbatical at UM6P to help develop an interdisciplinary center connecting agricultural and environmental science with economics, policy, and systems analysis. Participated in the Community of Practice on Systems Science for Sustainable Agri-Food Futures.

Chair, Forest Ecosystem Management Program, Penn State | 2015-2019

Led program-level academic planning and administration, including the 2015 Society of American Foresters accreditation review, strategic visioning, and curriculum revisions.

Selected professional leadership. Scientific Panel Co-Chair, World Agroforestry Congress, 2019; President, Association for Temperate Agroforestry, 2009-2012; Co-Chair, IUFRO Extension and Knowledge Exchange Working Party, 2001-2009; and Chair, Northeast Extension Foresters Committee, 2001-2002.

Selected Research Funding

2020-2027 National Science Foundation, AccelNet-Implementation: US-Africa Sustainable Food Systems through Water-Energy-Food Nexus Networking (SustainFood), $2,000,000, Lead PI

2020-2027 Belmont Forum-National Science Foundation, Management of Disaster Risk and Societal Resilience (MADIS), $300,000, Lead PI

2020-2024 Open Philanthropy Foundation, Food Resilience in the Face of Catastrophic Global Events, $3,064,660, Co-PI

2022-2025 USDA, Mid-Atlantic Sustainable Biomass for Value-added Products Consortium (MASBio), $1,445,374, Co-Investigator

2019-2024 Penn State Strategic Initiative, A Systems Approach for Meeting Local and Global Food-Energy-Water Nexus Challenges, $250,000, Co-PI

2022-2024 Pennsylvania Department of Conservation and Natural Resources, Economic Impact of Expanded All-Terrain Vehicles in Pennsylvania, $107,812, Lead PI

2020-2023 Water Research Commission, South Africa, WEF Nexus Implementation in Southern Africa, $140,000, Collaborator

2022-2023 USDA Forest Service, Evaluating the Feasibility of a Pennsylvania Forest Carbon Cooperative, $50,000, Co-PI

2019-2021 USAID PEER, Adoption and Scale-Up of Charcoal Alternatives in Zambia, $199,914, Collaborator

2012-2017 USDA AFRI, Northeast Woody/Warm-season Biomass Consortium (NEWBio), $10,000,000, Co-PI

2012-2015 USDA APHIS, Predicting the Cumulative and Ecological Impacts of Pests and Pathogens in Eastern U.S. Forests, $522,298, Lead PI

2007-2009 Ford Foundation, Rural Livelihood Benefits from Natural Plant Product Ventures in Southern Africa, $180,000, Co-PI

Honors and Distinctions

2020 W. LaMarr Kopp International Faculty Achievement Award, Penn State

2020 Merian Institute for Advanced Studies in Africa Fellowship, University of Ghana

2019-2020 LEAD21 Leadership Development Program

2017, 2019 Carnegie African Diaspora Fellowship, South Africa

1996 Gene Namkoong Fellowship Award, North Carolina State University

Selected Publications

Recent Publications 2022-2026

Konak, A., N. Balta-Ozkan, E. Shrimpton, M. Jacobson, et al. 2026. Operationalizing vulnerability and resilience interdependencies in drought risk management. Sustainability Science. https://doi.org/10.1007/s11625-026-01859-z

Winstead, D., and M. Jacobson. 2026. Modeling neglected and underutilized crops for future food resilience: A regional MaxEnt workflow. Plant-Environment Interactions. https://doi.org/10.1002/pei3.70115

Brouwer, F., A. Rhouma, D. Karthe, et al., and M. Jacobson. 2026. What Nexus? Towards resource nexus standardization. UNU-CRIS and UNU-FLORES Policy Brief No. 1. United Nations University.

Khiri, S., W. Janati, A. El-Mrabet, et al., M. Jacobson, and E. Elmaaiden. 2026. Optimized green extraction of chiral perillaldehyde and multi-targeted molecular docking for advanced anti-aging applications. Food Chemistry Advances. https://doi.org/10.1016/j.focha.2026.101371

Tebkew, M., Z. Asfaw, A. Worku, M. Jacobson, and H. Atinkut. 2025. Comparative financial profitability of agroforestry and cereal monocropping practices in Northwestern Ethiopia. Science of the Total Environment. https://doi.org/10.1016/j.scitotenv.2025.180164

Djenontin, I., B. Daher, J. Johnson, et al. 2025. Coproducing water-energy-food nexus actionable knowledge: Lessons from a multi-actor collaborative learning school in Uganda. Environmental Science and Policy. https://doi.org/10.1016/j.envsci.2025.104028

Sarmah, T., N. Balta-Ozkan, A. Konak, et al., and M. Jacobson. 2025. Usability of agricultural drought vulnerability and resilience indicators in planning strategies for small farms. Climate Services. https://doi.org/10.1016/j.cliser.2025.100569

Johnson, J., M. Jacobson, S. Cole, et al. 2025. Social and ecological factors influencing the management and productivity of smallholder aquacultural systems in Zambia. Aquaculture Research. https://doi.org/10.1155/are/9635984

Ono-Raphel, J., L. du Preez, A. Cherry, and M. Jacobson. 2025. Improving smallholder maize production in KwaZulu-Natal, South Africa. Food and Energy Security 14:70053. https://doi.org/10.1002/fes3.70053

Wahlstrom, M., M. Jacobson, M. Langholtz, T. Volk, and I. Busch. 2025. Mobilizing mine lands for biobased decarbonization strategies. Biofuels, Bioproducts and Biorefining. https://doi.org/10.1002/bbb.2766

Sass, K., A. Konak, M. de Macedo, et al., and M. Jacobson. 2024. Enhancing drought resilience and vulnerability assessment in small farms: A global expert survey. International Journal of Disaster Risk Reduction. https://doi.org/10.1016/j.ijdrr.2024.104616

Thomchick, E., M. Jacobson, and K. Ruamsook. 2024. Bioeconomy bright spots, challenges, and key factors going forward. EFB Bioeconomy Journal. https://doi.org/10.1016/j.bioeco.2024.100068

Tebkew, M., Z. Asfaw, A. Worku, and M. Jacobson. 2024. Contribution of agroforestry practices to income and poverty status of households in Northwestern Ethiopia. Discover Agriculture 2:48.

Winstead, D., and M. Jacobson. 2024. Storable, neglected, and underutilized species of Southern Africa for greater agricultural resilience. Plant-Environment Interactions. https://doi.org/10.1002/pei3.70004

Winstead, D., F. Di Gioia, M. Jauregui, and M. Jacobson. 2024. Nutritional properties of raw and cooked Azolla caroliniana. Food Science and Nutrition 12:2050-2060.

Cialdella, N., M. Jacobson, and E. Penot. 2023. Economics of agroforestry: Links between nature and society. Agroforestry Systems 97:273-277. https://doi.org/10.1007/s10457-023-00829-z

Winstead, D., M. Jacobson, and F. Di Gioia. 2023. Valorizing staple Native American food plants as a food resilience resource. Frontiers in Sustainable Food Systems. https://doi.org/10.3389/fsufs.2023.1117805

Winstead, D., and M. Jacobson. 2022. Food resilience in a dark catastrophe: A new way of looking at tropical wild edible plants. Ambio. https://doi.org/10.1007/s13280-022-01715-1

Winstead, D., and M. Jacobson. 2022. Forest resource availability after nuclear war or other sun-blocking catastrophes. Earth's Future. https://doi.org/10.1029/2021EF002509

Luppold, W., M. Bumgardner, and M. Jacobson. 2022. An analysis of U.S. hardwood log exports from 1990 to 2021. Forest Products Journal. https://doi.org/10.13073/FPJ-D-22-00035

Earlier Selected Publications

Naidoo, D., L. Nhamo, S. Mpandeli, et al. 2021. Operationalising the water-energy-food nexus through the theory of change. Renewable and Sustainable Energy Reviews. https://doi.org/10.1016/j.rser.2021.111416

Jacobson, M., and C. Ham. 2020. The unbroken promise of agroforestry: A case study of improved fallows in Zambia. Environment, Development and Sustainability. https://doi.org/10.1007/s10668-019-00564-5

Jacobson, M., and D. Ciolkosz. 2020. Plantation forestry and pellet production in Kenya. Biomass and Bioenergy. https://doi.org/10.1016/j.biombioe.2020.105519

Toth, G., P. K. R. Nair, M. Jacobson, Y. Widyaningsih, and C. Duffy. 2019. Malawi's energy needs and agroforestry: Impact of woodlots on fuelwood sales. Energy for Sustainable Development.

De Stefano, A., and M. Jacobson. 2018. Soil carbon sequestration in agroforestry systems: A meta-analysis. Agroforestry Systems 92:285-299.

Burkhart, E., M. Jacobson, and J. Finley. 2012. Stakeholder perspectives on wild American ginseng conservation in Pennsylvania. Biodiversity and Conservation 21:3657-3679.

Burkhart, E., and M. Jacobson. 2009. Transitioning from wild collection to forest cultivation of indigenous medicinal forest plants. Agroforestry Systems 76:437-453.

Kilgore, M., J. Greene, M. Jacobson, T. Straka, and S. Daniels. 2007. The influence of financial incentive programs in promoting sustainable forestry on family forests. Journal of Forestry 105:184-191.

Strong, N., and M. Jacobson. 2006. A case for consumer-driven extension programming: Agroforestry adoption potential in Pennsylvania. Agroforestry Systems.

Jacobson, M. 2003. Wood versus water: Timber plantations in semiarid South Africa. Journal of Forestry 101:31-35.

Jacobson, M. 2002. Factors affecting private forest landowner interest in ecosystem management. Environmental Management.

Books and Selected Chapters

Jacobson, M. Traditional Dryland Agroforestry Systems. Book in progress.

Jacobson, M., and G. Pekarcik. 2022. Water-energy-food nexus approaches and initiatives in Africa. In Handbook on the Water-Energy-Food Nexus. Edward Elgar.

Jacobson, M. 2022. Water-energy-food nexus approaches to facilitate smallholder agricultural technology adoption in Africa. In Water-Energy-Food Nexus Narratives and Resource Securities. Elsevier.

McCord, G., D. Kanter, J. Sklarew, G. Wu, and M. Jacobson. 2020. Accelerating sustainable land-use practices. U.S. Deep Decarbonization Action Plan. Sustainable Development Solutions Network.

Jacobson, M., and D. Ciolkosz, eds. 2013. Wood-Based Energy in the Northern Forests. Springer.

Sharma, N., R. Rowe, K. Openshaw, and M. Jacobson. 1992. World forests in perspective. In Managing the World's Forests. World Bank.

Sharma, N., R. Rowe, K. Openshaw, and M. Jacobson. 1991. The Forest Sector: A World Bank Policy Paper. World Bank.

Teaching and Graduate Advising

Current and Recent Courses

2021-present EMGT 830 Ecosystem Economics and Management

2018-present INTAD 577 Global Agricultural Systems

2008-present FOR 440 Forest Conservation and Economics

2025 Systems Thinking in Agriculture, Mohammed VI Polytechnic University

Previously taught Agroforestry, Global Forest Conservation, and other natural-resource courses, including embedded international courses in South Africa, Mozambique, and Morocco.

Selected Graduate Advising

Primary adviser to doctoral and master's students working on agroforestry, bioenergy, forest economics, ecosystem services, smallholder aquaculture, nontimber forest products, and international rural livelihoods. Recent advisees include Lisa Grab (M.S., 2024), Mallory Wahlstrom (M.S., 2023), Jacob Johnson (Ph.D., 2023), Grady Zuiderveen (Ph.D., 2019), and Wei Jiang (Ph.D., 2017).

Selected International Experience

Morocco. Affiliate professor and 2025-2026 sabbatical at UM6P; applied systems analysis, dryland agroforestry, mine-land reclamation, climate action, and student engagement.

Southern Africa. Long-term teaching, research, and institutional partnerships in South Africa, Lesotho, Zambia, Zimbabwe, Malawi, Mozambique, and Namibia; Peace Corps service in Lesotho and sustained affiliations with Stellenbosch and KwaZulu-Natal.

East Africa. Research, training, and WEF-nexus collaboration in Kenya, Uganda, Ethiopia, and Tanzania, including SustainFood collaborative learning schools and work with ICRAF, universities, government agencies, and development partners.

West Africa. MIASA fellowship at the University of Ghana; WEF-nexus programming in Nigeria; curriculum development in Guinea; forest-sector work in Liberia.

North Africa and Mediterranean. Drought-resilience and WEF-nexus work in Morocco, Tunisia, Turkiye, Egypt, and Portugal.

South and Central Asia. Dryland agroforestry research in India; nontimber forest-product livelihoods in Bangladesh; forest-sector and university collaboration in Kazakhstan; forest certification and seed-supply work in Indonesia.

International organizations. Earlier work with the World Bank, USAID, USDA Forest Service, World Agroforestry, FAO-related programs, and other international partners.

Selected Professional Service

2026-2030 Member, University Faculty Senate, Penn State

2023-present College Ombudsman, College of Agricultural Sciences, Penn State

2025 Review Panel Member, National Science Foundation AccelNet

2024-2025 Panel Judge, Harvest for Health Breakthrough Crop Challenge, Foundation for Food and Agriculture Research

2017-2023 Advisory Board Member, African Research Universities Alliance Centre of Excellence in Energy, Stellenbosch University

2008-2020 Associate Editor, Agroforestry Systems

2005-2015 Associate Editor and Editorial Board Member, Small-scale Forestry

Professional Associations

Association for Temperate Agroforestry | International Union of Forest Research Organizations | Society of American Foresters | Forest History Society | Association of Natural Resource Extension Professionals