

NICHOLAS BROZOVIĆ

Professional Preparation

Oxford University	Geology	B.A., 1993
University of Southern California	Geological Sciences	M.S., 1996
University of California, Berkeley	Agricultural & Resource Economics	M.S., 2000
University of California, Berkeley	Agricultural & Resource Economics	Ph.D., 2002
University of California, Berkeley	Agricultural & Resource Economics	Postdoc, 2003

Appointments

2014 – present	Director of Policy, Daugherty Water for Food Global Institute, University of Nebraska
2018 – present	Professor, Agricultural Economics, University of Nebraska-Lincoln
2014 – 2018	Associate Professor, Agricultural Economics, University of Nebraska-Lincoln
2012 – 2013	Visitor, Civil & Environmental Engineering, Imperial College, London, UK
2011 – 2014	Associate Professor, Agricultural & Consumer Economics, University of Illinois
2003 – 2011	Assistant Professor, Agricultural & Consumer Economics, University of Illinois

Selected Activities and Recognitions

- *University Administrative Experience:*
 - Lead policy and entrepreneurship programs of the Daugherty Water for Food Global Institute (DWFI), including oversight and mentoring of staff, student interns, and postdoctoral researchers.
 - Convene, facilitate, and manage collaborative multidisciplinary and international engagement on water resource management with staff, faculty, students, and university partners and external partners in profit, non-profit, government and multilateral institutions.
 - Plan and implement institute's strategic and sustainability goals as part of DWFI leadership team.
- *Other Administrative Experience:*
 - Former chair of the W2190 USDA Multistate Research Committee (2010-2011; previously also Vice-Chair and Secretary), *Water Policy and Management Challenges in the West*, with a goal of facilitating collaborative multidisciplinary, multistate research on water resource management.
 - Board member (*ex officio* 2013-2015, full 2015-present) and program manager (2015-present), *International Arid Lands Consortium*, a multinational, multi-institution group that facilitates interdisciplinary research and applied collaborations in arid lands.
 - Member, External Advisory Board, Wells Fargo Innovation Incubator (2018-present).
 - Member, core group, *Groundwater Solutions Initiative for Policy and Practice* (GRIPP), a multinational group that synthesizes and translates lessons learned on technology and governance for groundwater management (2017-present).
 - Co-founder and scientific advisor of a startup company (*Mammoth Trading*) that develops and implements environmental markets in complex regulatory regimes (2014-present).
- *Editorial Activities:* Associate Editor, *Water Resources Research*, 2010-2014; Editorial Board, *Water Economics and Policy*, 2013-2018; Editorial Board, *Water Security*, 2016-present; Guest Editor, *Hydrogeology Journal*, 2012 Special Issue.
- *Selected review activity:*
 - Panel reviewer for NSF, USDA-NIFA, EPA; Proposal reviewer for NSF (Division of Social and Economic Sciences and CAREER), National Institutes for Water Resources/U.S. Geological Survey, USDA SBIR, BARD.
 - External Promotion and Tenure reviewer: Washington State University; Monash University; Southern Illinois University; Imperial College, London; University of Rhode Island; West Virginia University.

- *Selected recognitions:*
 - Listed on the University of Illinois *Incomplete List of Teachers rated as Excellent by their Students* (total 7 times from 2004-2013)
 - Earl & Mildred Hughes Teaching Enhancement Award, University of Illinois (2006)
 - North American Colleges and Teachers of Agriculture, Teaching Award of Merit (2006)
 - American Geophysical Union Editors' *Citation for Excellence in Refereeing, Water Resources Research* (2008)
 - College Faculty Award for Excellence in Teaching, College of Agricultural, Consumer, and Environmental Sciences, University of Illinois (2010)
 - North American Colleges and Teachers of Agriculture, Teacher Fellow Award (2010)
 - College Team Award for Excellence, College of Agricultural, Consumer, and Environmental Sciences, University of Illinois (2011; for the *program in Environmental and Resource Economics* team of 9 faculty)
 - National Great Rivers Research and Education Center Faculty Fellow (2012-2013)

Journal Articles – Last 5 years

- Foster, T., Gonçalves, I., Campos, I., Neale, C., and Brozović, N., 2018, Assessing landscape scale heterogeneity in irrigation water use with remote sensing and in-situ monitoring, *Environmental Research Letters*, DOI: 10.1088/1748-9326/aaf2be.
- Foster, T. and Brozović, N., 2018, Simulating crop-water production functions using crop growth models to support water policy assessments, *Ecological Economics*, v. 152, 9-21.
- O'Keeffe, J., Moulds, S., Bergin, E., Brozović, N., Mijic, A., and Buytaert, W., 2018, Including farmer irrigation behavior in a sociohydrological modeling framework with application in North India, *Water Resources Research*, v. 54 (7), 4849-4866.
- Schoengold, K. and Brozović, N., 2018, The future of groundwater management in the High Plains: evolving institutions, aquifers and regulations, *Western Economics Forum*, v. 16 (1), 47-53.
- Forbes, C.T., Brozović, N., Franz, T., Lally, D.E., and Petitt, D.N., 2018, Water in Society: An interdisciplinary course to support undergraduate students' water literacy, *Journal of College Science Teaching*, v. 48 (1), 36-42.
- Du, E., Cai, X., Brozović, N., and Minsker, B., 2017, Evaluating the impacts of farmers' behaviors on a hypothetical agricultural water market based on double auction, *Water Resources Research*, DOI: 10.1002/2016WR020287.
- Foster, T., Brozović, N., and Speir, C., 2017, The buffer value of groundwater when well yield is limited, *Journal of Hydrology*, DOI: 10.1016/j.jhydrol.2017.02.034.
- Foster, T., Brozović, N., Butler, A.P., Neale, C., Raes, D., Steduto, P., Fereres, E., and Hsiao, T.C., 2017, AquaCrop-OS: An open source version of FAO's crop water productivity model, *Agricultural Water Management*, v. 181, 18-22, DOI: 10.1016/j.agwat.2016.11.015.
- Foster, T., Brozović, N., and Butler, A.P., 2017, Effects of initial aquifer conditions on economic benefits from groundwater conservation, *Water Resources Research*, DOI: 10.1002/2016WR019365.
- Kuwayama, Y. and Brozović, N., 2017, Optimal management of environmental externalities with time lags and uncertainty, *Environmental and Resource Economics*, DOI: 10.1007/s10640-016-0026-2.
- Mieno, T. and Brozović, N., 2016, Price elasticity of groundwater demand: Attenuation and amplification bias due to incomplete information, *American Journal of Agricultural Economics*, DOI: 10.1093/ajae/aaw089.

- O’Keeffe, J., Buytaert, W., Mijic, A., Brozović, N., and Sinha, R., 2016, The use of semi-structured interviews for the characterisation of farmer irrigation practices, *Hydrology and Earth System Sciences*, v. 20, 1911-1924, DOI: 10.5194/hess-20-1911-2016.
- Speir, C., Han, J. and Brozović, N., 2016, Spatial dynamic optimization of groundwater use with ecological standards for instream flow, *Water Economics and Policy*, DOI: 10.1142/S2382624X16500132.
- Young, R.K. and Brozović, N., 2016, Innovations in groundwater management: Smart markets for transferable groundwater extraction rights, *Technology and Innovation*, v. 17, 219-226, DOI: 10.3727/194982416X14520374943220.
- Foster, T., Brozović, N., and Butler, A.P., 2015, Why well yield matters for managing agricultural drought risk, *Weather and Climate Extremes*, DOI: 10.1016/j.wace.2015.07.003.
- Foster, T., Brozović, N., and Butler, A.P., 2015, Analysis of the impacts of well yield and groundwater depth on irrigated agriculture, *Journal of Hydrology*, v. 523, 86-96, DOI: 10.1016/j.jhydrol.2015.01.032.
- Foster, T., Brozović, N., and Butler, A.P., 2014, Modeling irrigation behavior in groundwater systems, *Water Resources Research*, DOI: 10.1002/2014WR015620.
- Demissie, Y., Valocchi, A., Cai, X., Brozović, N., Senay, G., and Gebremichael, M., 2014, Parameter estimation for groundwater models under uncertain forcing data, *Groundwater*, DOI: 10.1111/gwat.12235.
- Honey-Rosés, J., Schneider, D.W., and Brozović, N., 2014, Changing ecosystem services values following technological change. *Environmental Management*, v. 53(6), 1146-1157, DOI: 10.1007/s00267-014-0270-6.
- Palazzo, A., and Brozović, N., 2014, The role of groundwater trading in spatial water management, *Agricultural Water Management*, DOI: 10.1016/j.agwat.2014.03.004.

Book Chapters and Reports – Last 5 years

- Young, R., and Brozović, N., *Agricultural Water Transfers in the Western United States*, 2019, Daugherty Water for Food Global Institute/Mammoth Trading, 22 p.
- Babbitt, C., Gibson, K., Sellers, S., Brozović, N., Saracino, A., Hayden, A., and Hall, M., 2018, *The Future of Groundwater in California: Lessons in Sustainable Management from Across the West*, Environmental Defense Fund/Daugherty Water for Food Global Institute, 120 p.
- Babbitt, C., Hall, M., Hayden, A., Briones, A., Young, R., and Brozović, N., 2017, *Groundwater Trading as a Tool for Implementing California’s Sustainable Groundwater Management Act*, Environmental Defense Fund/Mammoth Trading, 16 p.
- Polzkill, S., Stejskal, A., Wilke, H., Wistrom, A., Gibson, K., Spiels, M., and Brozović, N., 2017, *Paid to Pump: How a tax credit could discourage conservation of the High Plains Aquifer*, Daugherty Water for Food Global Institute Policy Brief, 4 p.
- Awada, T., Brozović, N., and Koelsch, R., 2016, Implications of Climate Change on Nebraska’s Agriculture, Food and Water, in *The Implications of Climate Change for Nebraska: Summary Report of Sector-Based Roundtable Discussions*, Wilhite, D., and Morrow, K. (eds.), School of Natural Resources, University of Nebraska, Lincoln, Nebraska, 55 p.
- Kuwayama, Y., Young, R.K., and Brozović, N., 2016, Groundwater scarcity: Management approaches and recent innovations, in J. Ziolkowska and J. Peterson (eds.), *Competition for Water Resources: Experiences and Management Approaches in the U.S. and Europe*, Elsevier, 480 p.
- Montginoul, M., Rinaudo, J.D., Brozović, N., and Donoso, G., 2016, Controlling groundwater exploitation through economic instruments: Current practices, challenges and innovative approaches,

in A. Jakeman et al. (eds.), *Integrated Groundwater Management*, DOI: 10.1007/978-3-319-23576-9_22.

Brozović, N., 2015, What policy instruments help to manage agricultural groundwater use sustainably? in *Drying Wells, Rising Stakes: Towards Sustainable Agricultural Groundwater Use*, OECD Studies on Water, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264238701-en>.

Brozović, N., and Young, R., 2014, Design and implementation of markets for groundwater pumping rights, in *Water Markets for the 21st Century: What Have We Learned?* (eds. K. Easter and Q. Huang).

Kostel, J.A., Monchak, J., Tomer, M.D., Bingner, R.L., Lentz, A., Ando, A.W., Brozović, N., Raffensperger, J.F., Prabodanie, R., Wohlgezogen, F., Zajac, E., Hey, D., 2014, *Feasibility Assessment of a Nutrient Trading Market in the Big Bureau Creek Watershed*, Final report prepared for U.S. Environmental Protection Agency Targeted Watershed Grant WS-00E71101, 193 p.

Selected Recent Grants and Contracts – Last 5 years

Understanding real-time irrigation behavior to improve energy efficiency in agriculture, N. Brozović (PI), T. Mieno, K. Schoengold, *Nebraska Center for Energy Sciences Research*, \$83,800, 2019.

Wells Fargo Innovation Incubator, Brozović, N., *Alliance for Sustainable Energy*, \$15,000, 2018.

Market-Based Approaches to Drought Management, McCornick, P. (PI), Brozović, N., Nance, M., *USDA-Office of the Chief Economist*, \$50,000, 2018-2019.

Contaminant Sensing and Field Data Platform, S. Ndao (PI), R. Lai, N. Brozović, *Nebraska Department of Economic Development*, \$201,657, 2018-2019.

Developing a Platform to Monitor N Footprint in Agro-Ecosystems, P. Grassini (PI), N. Brozović, J. Rattalino Edreira, K. Gibson, *USDA-NIFA Agriculture and Food Research Initiative*, \$431,197, 2018-2020.

Market-Based Approaches to Drought Management, Brozović, N., *USDA-Office of the Chief Economist*, \$200,000, 2017-2018.

Governing groundwater sustainably: Nebraska's 50-year experiment, N. Brozović (PI), K. Gibson, *World Bank*, \$25,000, 2017.

Water Education Leaders for Secondary Science, C. Forbes (PI), N. Brozovic, J. Griffin, *Nebraska Coordinating Commission for Postsecondary Education, Improving Teacher Quality grant*, \$62,000, 2017-2018.

Water Education Leaders for Secondary Science, C. Forbes (PI), N. Brozovic, J. Griffin, *USDA-NIFA*, \$144,500, 2016-2019.

The state of informal agricultural water trading in the American West, Brozović, N., *USDA-Office of the Chief Economist*, \$40,150, 2016-2017.

Groundwater management in a conjunctive use system with managed flows for protected fish species, T. Foster (PI), N. Brozović, *NOAA*, \$29,300, 2016.

IUSE: Fostering Undergraduate Students' Disciplinary Learning and Water Literacy, C. Forbes (PI), N. Brozovic, T. Franz, *National Science Foundation*, \$299,018, 2016-2019.

Groundwater Availability and Conservation Program Outcomes in the High Plains Aquifer, N. Brozović (PI), K. Schoengold, T. Mieno, *USDA-Economic Research Service*, \$130,000, 2015-2017.

USDA Water for Agriculture Challenge Area: Developing and Promoting Water-, Nutrient-, and Climate-Smart Technologies to Help Agricultural Systems Adapt to Climate and Societal Changes, B. Basso (Lead PD), D. Hyndman, J. Hatfield, P. Robertson, J. Butler, J. Zhao, N. Brozović, J. Winter, J. Rice, J. Parker, and J. Andresen (co-PDs), *USDA-NIFA*, \$4,900,000, 2015-2020.

The Effects of Institutions and Hydrological Conditions on Optimal Management of a Shared Aquifer: a case study of the High Plains, K. Schoengold (PI), N. Brozović, \$395,671, *USDA Hatch Multistate*, 2015-2020.

Selected Recent Presentations

Water markets, incentive-based management, and agricultural technology

2018 – Marseilles, France (World Bank); Phoenix, AZ (Arizona State University); Abu Dhabi, UAE (GFIA keynote); Valley, NE (Valmont/Israeli AgTech Summit); Tunis, Tunisia (World Bank)

2017 – Oxford, United Kingdom (Oxford University); Aspen, CO (Aspen Institute); Washington, DC (World Bank); Washington, DC (USDA)

Groundwater governance

2018 – Bahia, Brazil (Bahia State Government); Washington, DC (OECD/World Bank); Cedar Rapids, IA (NGWA); Rabat, Morocco (World Bank); Stockholm, Sweden (World Water Week)

2017 – Lincoln, NE (World Bank study tour); Buenos Aires, Argentina (Ministry of Agroindustry); Dar es Salaam, Tanzania (African Groundwater Commission); Imperial, NE (Upper Republican Natural Resources District)

Graduate and Postdoctoral Student Advising (*degree, institution, initial and current placement - if different - in parentheses*)

B. Barkley, MS 2015 (Cleveland Federal Reserve Bank); T. Foster, PhD 2014 (Daugherty Water for Food Global Institute; University of Manchester); J. Han, MS 2011 (MIT; New York Life Insurance Company); S. Islam, MS 2010 (National University of Singapore; International Food Policy Research Institute); Y. Kuwayama, PhD 2011 (Resources for the Future); A. Lentz, MS 2011 (Danish Energy Agency); H. Li, MS 2009 (University of Maryland; Ohio State University); T. Mieno, Ph.D. 2014 (University of Minnesota; University of Nebraska-Lincoln); J. O’Keeffe, PhD 2016 (Imperial College, London); A. Palazzo, MS, 2009 (International Food Policy Research Institute; International Institute for Applied Systems Analysis); G. Pitois, MS 2012 (International Food Policy Research Institute; InvestCloud); M. Rabassa, PhD 2008 (World Bank; Pontifical Catholic University of Argentina, Buenos Aires); M.R. Rad PhD 2017 (Yale University; Colorado State University); J. Savage, PhD 2011 (USDA-Economic Research Service); J. Wright, MS 2006 (Universal Scientific, Chicago); R. Young, MS 2014 (Mammoth Trading).