

Biographical Sketch

FRANK A. WARD

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EDUCATION:

Ph.D. Colorado State University, 1978, Economics

M.S. Colorado State University, 1975, Economics

B.S. Colorado State University, 1970, Economics

PROFESSIONAL EXPERIENCE:

Distinguished Achievement Professor, New Mexico State University, 2012 - present

Professor, New Mexico State University, 1988 - present.

Associate Professor, New Mexico State University, 1983 to 1988.

Assistant Professor, New Mexico State University, 1978 to 1983.

SUMMARY OF RECENT WORK:

Dr. Ward is Distinguished Achievement Professor of water economics and policy in the department of Agricultural Economics and Agricultural Business at New Mexico State University. His research and teaching has emphasizes conservation, valuation, and economically efficient use of water resources with emphasis on irrigated agriculture. It also includes policy planning, program formulation for water resources development, analysis of river basins, transboundary water sharing, and institutional strengthening. Additional contributions lie in economic evaluation of policies for development and allocation of water, including development of methods to conduct economic appraisals; formulating interdisciplinary approaches to investigations of water policy issues; concepts and methods of valuing key ecological assets. Dr. Ward has conducted river basin assessments that integrate hydrologic, agronomic, institutional, and economic linkages to support sustainable river basin management and policy analysis. His recent work on integrated river basin analysis has been applied to the Rio Grande and Colorado Basins of North America and to the Tigris-Euphrates (Iraq), Jordan, Nilufer (Turkey), Murray-Darling (Australia), Nile, Amu Darya (Central Asia), Zayandeh-Rud (Iran) and several basins in Afghanistan. He has published extensively on water resources, including more than 80 peer-reviewed journal articles in water resources systems analysis and policy, environmental management, and irrigation economics. He has authored two books on the economics of natural resources and the

environment. He served as associate editor for Water Resources Research from 1991-2000 and the Journal of Hydrology from 2008-2011, Water Resources and Economics from 2012-present, and Water Economics and Policy from 2013-2016.

RELEVANT PEER REVIEWED ARTICLES, SELECTED RECENT, SINCE 2008

A.A. Gohar, A. Cashman, A., and F.A. Ward (forthcoming). Managing Food and Water Security in Small Island States: New Evidence from Economic Modelling of Climate Stressed Groundwater Resources. Journal of Hydrology

F.A. Ward, F.A., B.H. Hurd, and S. Sayles, 2018. Water currents in New Mexico: A global reach, Western Economics Forum. Western Agricultural Economics Association: 16(1) 13-21.

Jalilov, S.M., Amer, S.A., Ward, F.A., 2018. Managing the water-energy-food nexus: Opportunities in Central Asia. Journal of Hydrology, 557: 407-425.

S. Acquah and F.A. Ward, F.A., 2017. Water policy interventions for food security in Afghanistan. International Journal of Water Resources Development: 1-22.

S. Acquah and F.A. Ward, Optimizing Adjustments to Transboundary Water Sharing Plans: A Multi-Basin Approach. Water Resources Management, 31(15): 5019-5042 (2017).

Salman, D., Amer, S.A., Ward, F.A., 2017. Protecting food security when facing uncertain climate: Opportunities for Afghan communities. Journal of Hydrology, 554: 200-215.

F. A. Ward, "Policy Challenges Facing Agricultural Water Use: An International Look," Water Economics and Policy, Volume 2, No 3 (2016), 14 pages.

A Obeed Al-Azawi and F.A. Ward, "Groundwater Use and Policy Options for Sustainable Management in southern Iraq," International Journal of Water Resources Development, 2016.

F. A. Ward and T. L. Crawford, "Economic Performance of Irrigation Capacity Development to Adapt to Climate in the American Southwest," Journal of Hydrology, 540, September 2016.

M.T. Kahil, F.A. Ward, J. Albiac, J. Eggleston, and D. Sanz, "Hydroeconomic modeling with Aquifer-River Interactions to Guide Sustainable Basin management," Journal of Hydrology, 539, August 2016, pages 510-524.

S-M Jalilov, M. Keskinen, O. Variz, S. Amer, F.A. Ward, "Managing the Water-Energy-Food Nexus: Gains and Losses from New Water Development in the Amu Darya River Basin," Journal of Hydrology, 539, August 2016, pages 648-661.

B. Habteyes, H.A.E. Hasseen El-bardisy, S.A. Amer, V. R. Schneider, and. F.A. Ward, "Mutually Beneficial and Sustainable Management of Ethiopian and Egyptian Dams in the Nile Basin," *Journal of Hydrology*, 519 (2015), 1235-1246.

F. A. Ward and N. Becker, "Cost of Water for Peace and the Environment in Israel: An Integrated Approach," *Water Resources Research*, September 2015. [10.1002/2014@S016783](https://doi.org/10.1002/2014@S016783)

Gohar, S. A. Amer, and F.A. Ward, "Irrigation Infrastructure and Water Appropriation Rules for Food Security," *Journal of Hydrology*, 520 (2015), 85-100.

Becker, N., and Ward, F. A., "Adaptive Water Management in Israel: Structure and Policy Options." *International Journal of Water Resources Development*. July, 2014

D. Salman, S. Amer, and F.A. Ward, "Water Appropriation Systems for Adapting to Drought in Iraq," *Journal of the American Water Resources Association*, April, 2014.

F.A. Ward, "Economic Impacts on Irrigated Agriculture of Water Conservation Programs in Drought," *Journal of Hydrology*, January 2014, pp. 114-127.

A. Nikeoui and F. A. Ward, "Pricing Irrigation Water for Drought Adaptation in Iran," *Journal of Hydrology*, October 2013, pp 29-46.

Jalilov, S, S. Amer, and F.A. Ward, "Water, Food, and Energy Security: An Elusive Search for Balance in Central Asia," *Water Resources Management*, July, 2013, pp 3959-3979.

Gohar, A.A. and F.A. Ward, "Mitigating Impacts of Water Supply Shortage on Egyptian Agriculture Through Water Trading: A Catchment Scale Analysis," *Water Policy*, April, 2013.

Jalilov, S., F.A. Ward, and S. A. Amer, "Reducing Conflict in Development and Allocation of Transboundary Rivers," *Eurasian Geography and Economics*, May 2013, pages 78-109.

Gohar, A.A., F.A. Ward, and S.A. Amer, "Economic Performance of Water Storage Capacity Expansion for Food Security," *Journal of Hydrology* 484 (2013), 16-25.

Ward, F.A., S. Amer, and F. Ziaee (2013), "Water Allocation Rules in Afghanistan for Improved Food Security," *Food Security: The Science, Sociology and Economics of Food Production and Access to Food*, February, Volume 5, Issue 1, pp. 35-53.

Ward, F.A. (2013), "Forging Sustainable Transboundary Water Sharing Agreements: Barriers and Opportunities," *Water Policy*, January.

Ward, F.A. and M. Pulido-Velazquez (2012) , Economic Costs of Sustaining Water Supplies: Findings from the Rio Grande, *Water Resources Management*, June.

Dagnino, M., and F. A. Ward (2012), Economics of Agricultural Water Conservation: Empirical Analysis and Policy Implications, *International Journal of Water Resources Development*, December 2012.

Nikouei, A., M. Zibaei, and F.A. Ward (2012), "Incentives to Adopt Irrigation Water Conservation Measures for Wetlands Preservation: An Integrated Basin Scale Analysis," *Journal of Hydrology*, 464–465, 216–232.

Ward, F. A. (2012), Cost Benefit and Water Resources Policy: A Survey, *Water Policy*, 14(2), 250-280.

Ramirez, O. A., F. A. Ward, R. Al-Tabini, and R. Phillips (2011), Efficient Water Conservation in Agriculture for Growing Urban Water Demands in Jordan, *Water Policy*, 13(1), 1-24.

Gohar, A. A., and F. A. Ward (2011), Gains from Improved Irrigation Water Use Efficiency in Egypt, *International Journal of Water Resources Development*, 27(4), 735-758.

DeMouche, L., S. Landfair, and F. A. Ward (2011), Water Right Prices in the Rio Grande: Analysis and Policy Implications, *International Journal of Water Resources Development*, 27(2), 291-314.

Ward, F. A. (2010), Financing Irrigation Water Management and Infrastructure: A Review, *International Journal of Water Resources Development*, 26, 321-349.

Torell, G. L., and F. A. Ward (2010), Improved Water Institutions for Food Security and Rural Livelihoods in Afghanistan's Balkh Basin, *International Journal of Water Resources Development*, 26(4), 613-637.

Gohar, A. A., and F. A. Ward (2010), Gains from Expanded Irrigation Water Trading in Egypt: An Integrated Basin Approach, *Ecological Economics*, 69, 2535-2548.

Ward, F. A., and M. Pulido-Velazquez (2009), Incentive Pricing and Cost Recovery at the Basin Scale, *Journal of Environmental Management*, 90, 293-313.

Ward, F. A. (2009), Economics in Integrated Water Management, *Environmental Modelling and Software*, 24, 948-958.

Gürlük, S., and F. A. Ward (2009), Integrated Basin Management: Water and Food Policy Options for Turkey, *Ecological Economics*, 68, 2666-2678.

Brinegar, H., and F. A. Ward (2009), Basin Impacts of Irrigation Water Conservation Policy, *Ecological Economics*, 69, 414-426.

Ward, F. A., and M. Pulido-Velazquez (2008), Efficiency, Equity, and Sustainability in a Water Quantity-Quality Optimization Model for the Rio Grande Basin, *Ecological Economics*.

Ward, F. A., and M. Pulido-Velazquez (2008), Water Conservation in Irrigation Can Increase Water Use, *Proceedings of the National Academy of Sciences of the U.S.A.*, 105(47), 18215-18220.

Ward, F. A., M. J. Kealy, G. Guy, and L. Manning (2008), Efficient Conservation Measures in Irrigated Agriculture to Sustain Urban and Environmental Water Demands, *Review of Agricultural Economics*, 30(3), 425-434.

BOOKS (Commercially Published)

Ward, F.A. 2006. *Environmental and Natural Resource Economics*. Prentice-Hall.

Ward, F.A. and D.J. Beal. 2000. *Valuing Nature with Travel Cost Models*. Edward Elgar (UK).

CONTRACTS AND GRANTS (since 2006)

Preparation of a Scientific Paper for Economic analysis of Agriculture in the Gila Basin, New Mexico, New Mexico Interstate Streams Commission, 2015-16, \$16,000, PI.

Sustainable Water Resources for Irrigated Agriculture in a Desert River Basin Facing Climate Change and Competing Demands: from Characterization to Solutions, 2015-2020, \$5 million, Co PI.

Economics of Irrigation in the Gila Basin, New Mexico," New Mexico Interstate Streams Commission, 2014, \$69,000; PI

Monitoring and Forecasting Climate, Water, and Land Use for Food Production in Iraq, US Geological Survey, 2010-13, approximately \$210,000 per year (\$25,000 per year for NMSU); PI.

Monitoring and Forecasting Climate, Water, and Land Use for Food Production in Afghanistan, US Geological Survey, 2008-13, \$220,000 per year (\$25,000 per year for NMSU); PI.

"Afghanistan Water, Agriculture, and Technology Transfer," Funded by USAID for \$20 million, 2008-11. NMSU was lead institution. Partner institutions are Colorado State University, University of Illinois, and Southern Illinois University; Co-PI.

"Development of a Database for New Mexico Water Right Prices," Funded by the New Mexico Water Resources Research Institute, \$30,000, 2008-09.

“Economically Sustainable Agricultural Water Conservation Policies in the Rio Grande Basin,” Funded by U.S. Congress - Rio Grande Basin Initiative, for \$200,000, 2004-07, PI.

“Economics of Agricultural Water Conservation Programs in the Colorado Basin, Texas,” Funded by the City of San Antonio and Lower Colorado River Authority, TX, for \$190,000, 2006-2008, PI.

ASSOCIATE EDITOR FOR PEER-REFEREED JOURNALS:

Water Economics and Policy, 2013-current

Water Resources and Economics, 2012-current

Journal of Hydrology, 2008-2011

Water Resources Research, 1991-2000.