Curriculum Vitae

Randall S. Ritzema, Ph.D.

E-mail: randall.s.ritzema@gmail.com
Skype: randall.ritzema
Mobile: +1-219-671-1101

PROFESSIONAL EXPERIENCE:

Research Program Scientist *Lincoln, NE, USA (Mar 2022 – Present)*
Daugherty Water for Food Global Institute,
University of Nebraska
Manage research projects, and develop and conduct research, addressing water security and food security, with a focus on the developing world.

Theme Leader- Water and Air *Kathmandu, Nepal (Sep 2020 – Dec 2021)*
International Centre for Integrated Mountain Development (ICIMOD)
Led the Water and Air Theme at ICIMOD, an intergovernmental research and knowledge sharing centre for the Hindu Kush Himalaya region. The Water and Air Theme houses competencies for developing solutions to water and air resource issues in mountain contexts; across scales; and from physical, institutional, ecological and socioeconomic perspectives, with a particular focus on four competency strands: climate change and hydrology, watershed and springshed management, cryosphere, and air resources.

- Provided intellectual and innovation leadership through setting strategic directions for the theme, enhancing and developing thematic competencies, and initiating innovative research.
- Supervised, managed, and mentored 25 scientific and administrative staff, consultants, and PhD scholars. Theme human resource management included recruitment and retention, capacity development and mentoring, performance management, and team coordination and dynamics. Allocated staff and associated thematic competencies among ICIMOD's regional programmes.
- Encouraged infusion of knowledge and expertise into regional programmes, including methodologies, conceptual frameworks, analytical tools, best practices and research questions.
- Ensured quality control and elevated scientific rigor of thematic research outputs and knowledge products to strengthen the evidence base for ICIMOD policy and practice recommendations.
- Allocated and administered annual theme budget to support thematic goals and staff development.
- Supported institutional and thematic resource mobilization and partnership development efforts.
- Encouraged internal transdisciplinary cooperation with other themes and regional programmes.

Associate Professor *Bourbonnais, IL, USA (Aug 2018 – Jun 2020)*
Martin D. Walker School of Engineering
Olivet Nazarene University
Faculty member in an ABET-accredited undergraduate engineering program.

- Taught courses within the Civil Engineering and Environmental Engineering concentrations, as well as core engineering topics such as technical communications, design of experiments, and dynamics.
- Mentored senior engineering design groups.
- Advised over 30 students in the Civil Engineering and Environmental Engineering concentrations.

- Drafted recommendations for redeveloping Civil and Environmental Engineering concentration curricula based on Civil and Environmental Engineering Fundamentals of Engineering exam content, ABET program criteria, and desired professional outcomes.

Scientist- Systems Analysis *Hanoi, Vietnam (Jan 2015 – Mar 2018)*
International Livestock Research Institute (ILRI) *Addis Ababa, Ethiopia (Nov 2013 – Dec 2014)*
Research-for-development via systems approaches in livestock-inclusive agricultural systems.

- Led the Livestock-Water Interaction (LWI) activity set within the Livestock and Environment Flagship of the recently-initiated CGIAR Research Program on Livestock Agri-food Systems (LIVESTOCK CRP). Activities focused on developing a robust conceptual framework that characterized and quantified livestock-water interactions across globally diverse production systems and agroecologies, and that translated research findings into intervention, technology, and policy recommendations.
- Developed and applied conceptual frameworks and analytical platforms to characterize agricultural and livelihood systems in Southeast Asia and East and West Africa, and to assess productivity and effects on poverty and food security of possible intervention options.
- Developed partnerships with national agencies, international research institutes and development organizations in Southeast Asia region.
- Represented ILRI as Science Focal Point for the CGIAR Research Program on Water, Land and Ecosystems (WLE). Role was to identify and catalyze potential linkages between WLE and both ILRI and the LIVESTOCK CRP.
- Contributed to development of rapid household-level survey and analysis approaches for a variety of household welfare and environmental indicators, and implemented this approach in Vietnam, Laos, and Cambodia. Trained national partners in implementation of a digital household survey tool.
- Led or supported resource mobilization efforts for livestock systems research, with a primary focus on enhancing ILRI engagement in Southeast Asia.

Postdoctoral Fellow- Environmental Modeling *Addis Ababa, Ethiopia (2012 – 2013)*
International Water Management Institute

- Developed and applied an integrated systems modeling platform to assess water, sediment, and economic impacts of various rainwater management strategies across the Blue Nile Basin in the highlands of Ethiopia, within the Nile Basin Development Challenge (NBDC), a program of the CGIAR Challenge Program on Water and Food.
- Held interim project leader responsibilities during management transition of the NBDC Project 4: "Assessing and anticipating the consequences of innovation in rainwater management systems".
- Implemented modeling that translated outputs from the Soil Water Assessment Tool (SWAT) into an integrated assessment of basin land and water resources.

Associate Engineer *Sacramento, CA, USA (2010 – 2012)*
CH2M Hill, Inc.

- Performed modeling analyses for water resource development projects in California to assess water supply reliability and environmental impacts from proposed projects, changes in operational paradigms, and climate change.
- Held technical lead responsibilities in the development of a large-scale systems dynamics simulation model of the intertied federal and state water systems in California.
- Supported successful and timely delivery of modeling results for USBR Central Valley Project Integrated Resource plan, with high client satisfaction.

Affiliate Research Scholar *Davis, CA, USA (2009 – 2010)*
International Rice Research Institute (IRRI) *Luang Prabang, Lao PDR (2006 – 2009)*

- Designed, implemented, and managed an applied hydrology-focused program within a collaborative international research project in northern Lao PDR. The project, seeking linkages between poverty, water availability, and rice production in the Lao uplands, was led by IRRI and funded by the CGIAR Challenge Program on Water and Food.
- Performed hydrologic watershed modeling and accompanying integrated resource analysis. Watershed modeling efforts utilized MIKE SHE, an integrated, distributed, physics-based hydrology software package, along with ArcGIS and other systems simulation and optimization modeling, to enable estimation of economic impacts from proposed land use and water management interventions.
- Conducted field research via participatory appraisals, streamflow and climate field data collection methods, land use mapping and GIS analysis.
- Incorporated training and capacity-building in hydrologic and land use field data collection methods for national partners.

Water Resource Systems Engineer *Sacramento, CA, USA (2002 – 2004)*
CH2M Hill, Inc.

- Performed modeling analyses for water resource development projects in California to assess water supply reliability and environmental impacts of proposed projects.
- Provided modeling support for an environmental impact assessment for an East Bay Municipal Utilities District surface water diversion project that was approved and built.
- Extensively utilized CALSIM II, the industry standard simulation model of the inter-tied state and federal water systems in California.

Research Assistant *Davis, CA, USA (2000 – 2002)*
University of California-Davis
Team member of the CALVIN project, a large-scale engineering-economic optimization model of the entire inter-tied federal and state water system of California.

- Analyzed the benefits of an ideal water market in the San Joaquin Valley and San Francisco Bay Area. Results indicated significant potential to alleviate agricultural water scarcities and groundwater overdraft in the region.
- Contributed to analysis of the statewide water system.

Field Coordinator *Pasadena, CA, USA (1996 – 1999)*
The Mustard Seed, Inc.

- Supported the director of a non-profit relief and development agency, as well as field offices in various locations in Indonesia, Papua New Guinea, and India, in various activities related to field operations.
- Oversaw emergency relief logistics, field accounting system design and reporting, and ongoing communication with field directors.

Principal *Mendi, Papua New Guinea (1995 – 1996)*
Mustard Seed Trade School

- Facilitated a vocational training program that provided carpentry skills for male youth from rural backgrounds in the highlands of Papua New Guinea.

- Managed all facets of the program's operation, including management of national staff, program assessment, community relations, and financial oversight.

EDUCATION & CERTIFICATION:

Ph.D. Biological Systems Engineering (December 2010)
Major: **Environmental Resource Systems Analysis**
Dissertation: *Linkages between rice, land, and water in rice landscapes of upland Lao PDR: An agroecosystem and integrated hydrologic modeling analysis*
University of California-Davis, USA / International Rice Research Institute (IRRI)

M.Sc. International Agriculture Development (September 2002)
University of California-Davis, USA

M.Sc. Civil and Environmental Engineering (Water Resources) (March 2002)
Thesis: *Water management strategies for the San Joaquin Valley and Bay Area: an engineering-economic optimization study*
University of California-Davis, USA

B.Sc. Engineering (Mechanical), Professional Flight minor, Cum Laude (May 1994)
LeTourneau University, Longview, TX, USA

Commercial Pilot / Instrument Rating: Airplane, Single-Engine Land (May 1994)

Engineer-In-Training Certification (May 1994)

SCHOLARLY ACTIVITIES:

Peer-Reviewed Journals

Burra, D. D., L. Parker, N. T. Than, P. Phengsavanh, C. T. M. Long, R. S. Ritzema, F. Sagemueller and S. Douxchamps (2021). "Drivers of land use complexity along an agricultural transition gradient in Southeast Asia." Ecological Indicators **124**: 15.

van Wijk, M., J. Hammond, L. Gorman, S. Adams, A. Ayantunde, D. Baines, A. Bolliger, C. Bosire, P. Carpena, S. Chesterman, A. Chinyophiro, H. Daudi, P. Dontsop, S. Douxchamps, W. D. Emera, S. Fraval, S. Fonte, L. Hok, H. Kiara, E. Kihoro, L. Korir, C. Lamanna, C. T. M. Long, G. Manyawu, Z. Mehrabi, D. K. Mengistu, L. Mercado, K. Meza, V. Mora, J. Mutemi, M. Ng'endo, P. Njingulula, C. Okafor, T. Pagella, P. Phengsavanh, J. Rao, R. Ritzema, T. S. Rosenstock, T. Skirrow, J. Steinke, C. Stirling, J. Gabriel Suchini, N. Teufel, P. Thorne, S. Vanek, J. van Etten, B. Vanlauwe, J. Wichern and V. Yameogo (2020). "The Rural Household Multiple Indicator Survey, data from 13,310 farm households in 21 countries." Scientific Data **7**(1): 46.

Epper, C. A., B. Paul, D. Burra, P. Phengsavanh, R. Ritzema, C. Syfongxay, J. C. J. Groot, J. Six, E. Frossard, A. Oberson and S. Douxchamps (2020). "Nutrient flows and intensification options for smallholder farmers of the Lao uplands." Agricultural Systems **177**: 102694.

Ritzema, R. S., S. Douxchamps, S. Fraval, A. Bolliger, L. Hok, P. Phengsavanh, C. T. M. Long, J. Hammond and M. T. van Wijk (2019). "Household-level drivers of dietary diversity in transitioning agricultural systems: Evidence from the Greater Mekong Subregion." Agricultural Systems **176**: 102657.

Ritzema, R. S., R. Frelat, S. Douxchamps, S. Silvestri, M. C. Rufino, M. Herrero, K. E. Giller, S. Lopez-Ridaura, N. Teufel, B. Paul and M. T. van Wijk (2017). "Is production intensification likely to make farm households food-adequate? A simple food availability analysis across smallholder farming systems from East and West Africa." Food Security **9(1)**: 115-131.

Frelat, R., S. Lopez-Ridaura, K. E. Giller, M. Herrero, S. Douxchamps, A. A. Djurfeldt, O. Erenstein, B. Henderson, M. Kassie, B. K. Paul, C. Rigolot, R. S. Ritzema, D. Rodriguez, P. J. A. van Asten and M. T. van Wijk (2016). "Drivers of household food availability in sub-Saharan Africa based on big data from small farms." Proceedings of the National Academy of Sciences of the United States of America **113(2)**: 458-463.

Ritzema, R. S. (2014). "Aqueous Productivity: An enhanced productivity indicator for water." Journal of Hydrology **517**: 628-642.

Zhu, T. J., J. R. Lund, M. W. Jenkins, G. F. Marques and R. S. Ritzema (2007). "Climate change, urbanization, and optimal long-term floodplain protection." Water Resources Research **43(6)**.

Tanaka, S. K., T. J. Zhu, J. R. Lund, R. E. Howitt, M. W. Jenkins, M. A. Pulido, M. Tauber, R. S. Ritzema and I. C. Ferreira (2006). "Climate warming and water management adaptation for California." Climatic Change **76(3-4)**: 361-387.

Jenkins, M. W., J. R. Lund, R. E. Howitt, A. J. Draper, S. M. Msangi, S. K. Tanaka, R. S. Ritzema and G. F. Marques (2004). "Optimization of California's water supply system: Results and insights." Journal of Water Resources Planning and Management-Asce **130(4)**: 271-280.

Datasets

Bolliger, A. M., J. Hammond, R. S. Ritzema and M. T. van Wijk (2016). Rural Household Multiple Indicator Survey: Vietnam, Laos, Cambodia. ILRI/CIAT.

Book chapters

van Wijk, M. T., J. Hammond, S. Fraval, J. Wichern, R. S. Ritzema and B. Henderson (2020). The contribution of integrated crop-livestock systems in combatting climate change and improving resilience in agricultural production to achieve food security. Climate change and agriculture. Cambridge UK, Burleigh Dodds Science Publishing Limited.

Ritzema, R. S., R. Frelat, J. Hammond and M. T. van Wijk (2017). What works where for which farm household: rapid approaches to food availability analysis. Integrated Systems Research for Sustainable Intensification of Smallholder Agriculture. I. Öborn, B. Vanlauwe, M. Phillips, R. Thomas and K. Atta-Krah, Earthscan.

van Wijk, M. T., J. Hammond, S. Fraval, R. S. Ritzema, A. M. Bolliger and C. T. M. Long (2016). Including gender equity in a survey tool for rural households. A different kettle of fish? Gender integration in livestock and fish research. R. Pyburn and A. van Eerdewijk. Volendam, LM Publishers.

Staal, S., N. Njiru, T. Nguyen, E. Kihoro, A. Karimov, N. Teufel, M. T. van Wijk and R. S. Ritzema (2016). Site characterization and systems analysis in Central Mekong. Integrated Systems Research for Sustainable

Smallholder Agriculture in the Central Mekong: Achievements and challenges of implementing integrated systems research. L. Hiwasaki, A. Bolliger, G. Lacombe et al. Hanoi, Viet Nam, World Agroforestry Centre (ICRAF) Southeast Asia Regional Program.

Raneri, J., R. S. Ritzema, L. Thi Nga, R. Yang, J. Groot, C. Kae, A. Bolliger, L. Chau, J. Hammond, M. T. van Wijk and G. Kennedy (2016). A review of efforts to integrate nutrition in systems research. Integrated Systems Research for Sustainable Smallholder Agriculture in the Central Mekong: Achievements and challenges of implementing integrated systems research. L. Hiwasaki, A. Bolliger, G. Lacombe et al. Hanoi, Viet Nam, World Agroforestry Centre (ICRAF) Southeast Asia Regional Program.

Ritzema, R. S. (2013). Methodologies for Characterizing Biophysical Resource Systems in Upland Lao PDR. Addressing water, food, and poverty problems together: Methods, tools and lessons. A sourcebook from the CGIAR Challenge Program on Water and Food,. CGIAR Challenge Program on Water and Food (CPWF). Colombo, Sri Lanka, CGIAR Challenge Program on Water and Food (CPWF): 144.

Conference Proceedings

Ritzema, R. S., R. Plant, B. K. Samson, B. Vongphuthone and S. Pandey (2008). System characterization for integrated resource analysis of rice-based livelihood systems in upland Lao PDR. Fighting poverty through sustainable water use: Proceedings of the CGIAR Challenge Program on Water and Food, 2nd International Forum on Water and Food. E. Humphreys. Addis Ababa, Ethiopia, CGIAR Challenge Program on Water and Food. 1: 155-159.

Samson, B. K., R. S. Ritzema, K. Songyikhangsuthor, T. Keonakhone, B. Vongphuthone and S. Pandey (2008). Managing rice landscapes in the uplands for improvement of livelihoods and conserving resources. International Symposium 2008: Interdependencies Between Upland and Lowland Agriculture and Resource Management. Stuttgart, Germany.

Zhu, T., J. R. Lund, M. W. Jenkins, G. F. Marques and R. S. Ritzema (2004). Climate warming adaptation for urbanizing floodplains. World Water & Environmental Resources Congress 2004. Salt Lake City, Utah, ASCE.

Zhu, T., S. K. Tanaka, M. W. Jenkins, J. R. Lund, R. E. Howitt, R. S. Ritzema and I. C. Ferreira Modeling climate warming for water management in California. XIth World Water Congress. Madrid, Spain.

Ritzema, R. S., M. W. Jenkins, A. J. Draper, J. R. Lund, R. E. Howitt, S. K. Tanaka and G. F. Marques (2002). Optimization of California's water system: Results and insights. Environmental & Water Resources Systems Analysis (EWRSA) Symposium. Roanoke, VA, ASCE.

Jenkins, M. W., A. J. Draper, G. F. Marques, R. S. Ritzema, S. K. Tanaka, K. W. Kirby, M. S. Fidell, S. M. Msangi, R. E. Howitt and J. R. Lund (2001). Economic valuation of California's water resources and infrastructure. ASCE Specialty Conference on Water Resources and the Environment. Orlando, FL, ASCE.

Research-Based Technical Reports

Bolliger, A., R. S. Ritzema, J. Hammond, M. T. van Wijk and C. T. M. Long (2016). Report on the Central Highlands of Vietnam Baseline and Benchmarking Smallholder Household Survey. Prepared for CGIAR Research Program on Integrated Systems in the Humid Tropics. Vientiane, Lao PDR.

Pandey, S., H. Bhandari and PN11 Project Team (2010). Rice Landscape Management for Raising Water Productivity, Conserving Resources, and Improving Livelihoods in Upper Catchments of the Mekong and Red River Basins. Project Final Report submitted to the CGIAR Challenge
Program on Water and Food (CPWF). Los Baños, Philippines, International Rice Research Institute.

Lund, J. R., R. E. Howitt, M. W. Jenkins, T. Zhu, S. K. Tanaka, M. A. Pulido, M. Tauber, R. S. Ritzema and I. C. Ferreira (2003). Climate warming and California's water future. Report 03-1. Center for Environmental and Water Resource Engineering at University of California. Davis, CA.

Ritzema, R. S. (2002). Appendix VII, Attachment C: Hydropower in the CALVIN Model. Climate Warming and Future California Water Management. Technical Report. Center for Environmental and Water Resources Engineering at University of California. Davis, CA.

Lund, J. R., M. W. Jenkins, G. F. Marques and R. S. Ritzema (2002). Adaptation to Climate Change in an Urbanizing Floodplain: Adaptation Options and Methodological Approaches. Center for Environmental and Water Resources Engineering at University of California. Davis, CA.

Ritzema, R. S. and M. W. Jenkins (2001). Appendix 2C: San Joaquin Valley and Bay Area Results. Improving California Water Management: Optimizing Value and Flexibility. Center for Environmental and Water Resources Engineering at University of California. Davis, CA.

Ritzema, R. S., S. K. Tanaka, G. F. Marques and M. W. Jenkins (2001). Appendix 2G: Statewide CALVIN Model Results. Improving California Water Management: Optimizing Value and Flexibility. Center for Environmental and Water Resources Engineering at University of California. Davis, CA.

Ritzema, R. S., B. Newlin and B. J. Van Lienden (2001). Appendix H: Infrastructure. Improving California Water Management: Optimizing Value and Flexibility. Center for Environmental and Water Resources Engineering at University of California. Davis, CA.

Fact Sheets

van Wijk, M. T., J. Hammond, J. van Etten, R. S. Ritzema and T. Pagella (2016). The Rural Household Multi-Indicator Survey (RHoMIS): A rapid, cost-effective and flexible tool for farm household characterisation, targeting interventions and monitoring progress towards climate-smart agriculture. CGIAR Research Program on Climate Change; Agriculture and Food Security.

Ritzema, R. S. (2006). Field Measurement of Evapotranspiration: the ETgage, International Rice Research Institute and University of California-Davis.