Noormah Rizwan

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EDUCATION

Michigan State University　　East Lansing, MI
Ph.D. Agricultural, Food & Resource Economics　　2021 - Expected August 2026
Specialization: Environmental and Resource Economics
Dissertation Title: Adaptation to Natural and Artificial Water Scarcity

Georgetown University　　Washington, DC
M.A. Applied Economics　　2016 – 2017

Lahore University of Management Sciences　　Lahore, Pakistan
B.Sc. (Hons) Economics　　2011 – 2015

RESEARCH

Research Interests: Climate change adaptation; Urban water economics and governance; Agricultural economics; Applied microeconometrics; Spatial data analysis and GIS; Impact evaluation and policy design

Papers Under Review

Noormah Rizwan, Jamshid Jalali, Molly Sears, Sean A Woznicki, Tao Liu, Oskar Marko, Mirjana Radulović. "Irrigation Adoption in a Changing Landscape: A Combined Economic and Hydrological Approach." *(First Review, Water Resources Research)*. (Link)

Abstract: Warmer temperatures and erratic rainfall threaten global water availability. While irrigation adoption is a key risk-mitigation strategy, limited research has examined farmers' likelihood of adopting irrigation under climate change, or the effects of large-scale adoption on future water availability. We take an integrated econometric–hydrologic modeling approach to study how short- and long-term climate fluctuations influence adoption decisions and their implications for future water resources. We simulate future adoption under climate change using discrete choice methods and integrate results of when and where adoption is likely to occur into the Soil and Water Assessment Tool Plus (SWAT+) to assess impacts on water availability. By 2060, irrigation adoption is projected to reach 13% under a "dry" scenario and 5% under a "wet" scenario, up from 1.4% in the baseline. This expansion mitigates rainfall risk but deepens water balance deficits, especially in dry years.

Working Papers

Noormah Rizwan, Molly Sears, Sean A Woznicki, Oskar Marko. "Weathering the Change: Modeling Crop Choices in Response to Climate Variability." *(Job Market Paper)*

Abstract: Agricultural land allocation remains sensitive to climate change. As temperatures rise and precipitation patterns become more variable, farmers switch to crops better suited to the changing climate. While this substitution has tremendous market and welfare implications, quantifying these impacts remains understudied, largely due to limited data on adaptive decisions and challenges in measuring profitability. Using field-level cropping data, we examine how climate change shapes crop choices. First, we estimate a yield–weather model to identify crop-specific thresholds for extreme events and project climate impacts on yields. We then integrate these results into a discrete crop choice model to assess how shifts in yields and profitability influence farmer decisions. We run three simulations: (i) climate change alone, (ii) with yield effects, and (iii) with yield and market effects, where prices adjust to yield shifts. We find that under changing climatic and market conditions; farmers switch away from profitable crops such as maize and soybean to less profitable but more resilient wheat and sunflower. This adaptive substitution generates welfare losses of up to 35%, highlighting the trade-offs between resilience and profitability under climate change.

Noormah Rizwan, James Sears. "Can the Water Mafia Be Good? Evidence from Karachi's Residential Water Market."

Abstract: In this paper, we investigate how households and non-state actors adapt to chronic water scarcity and infrastructural failures in developing countries. In many urban areas, unreliable and inadequate public water supply have given rise to the "water mafia" — non-state actors that extract and sell water, often at high prices, to households disconnected from the piped network. The overall social welfare impact of these actors remains uncertain due to limited microdata on household-level adaptation to piped water scarcity. Leveraging a novel household survey that I designed and implemented in Karachi, Pakistan, I estimate a discrete–continuous model of household water demand and quantify the welfare changes from a counterfactual eliminating the water mafia. Preliminary findings reveal substantial disparities in piped water access, forcing poorer households to rely on illegal water vendors, creating opportunities for the mafia to engage in exploitative behavior.

Policy Publications

Noormah Rizwan, Sania Haider Shikoh, Stephen Davies, Muhammad Saad Moeen, Abdul Wajid Rana, Zeeshan Haider. "Assessing the Economic Cost of Depleting Groundwater in Balochistan: A SAM Multiplier Approach." *(IFPRI Discussion Paper, 2021).* (Link)

Muhammad Saad Moeen, Zeeshan Haider, Sania Haider Shikoh, **Noormah Rizwan**, Amna Ejaz, Stephen Davies, Abdul Wajid Rana. "Estimating the Economic Impacts of the First Wave of COVID-19 in Pakistan using a SAM Multiplier Model." *(IFPRI Discussion Paper, 2021).* (Link)

Abdul Wajid Rana, Stephen Davies, Muhammad Saad Moeen, Sania Haider Shikoh, **Noormah Rizwan**. "Solarization of Electric Tube-wells for Agriculture in Balochistan: Economic and Environmental Viability." *(IFPRI PACE Working Paper, 2020).* (Link)

Daniel Jeongdae Lee, **Noormah Rizwan**. "What Explains Divergent Investment Performances in Asia-Pacific?" *(MPFD Policy Brief, 2018).* (Link)

PROFESSIONAL EXPERIENCE

Research Assistant   Aug 2021 – Present
Michigan State University, East Lansing, MI
Working on a multi-disciplinary project investigating climate adaptation in agriculture, focusing on crop choices and irrigation adoption in Serbia.

Research Analyst   Jul 2019 – Jul 2021
International Food Policy Research Institute, Islamabad, Pakistan
Developed policy-oriented research on agricultural resilience and resource management, providing analysis to support federal and provincial decision-making.

Program Assistant   Oct 2018 – Jan 2019
Punjab Commission on the Status of Women, Lahore, Pakistan
Cleaned and analyzed survey data on women's economic well-being in Punjab, contributing to policy briefs for provincial government.

Intern   Oct 2017 – Jan 2018
UN ESCAP, Macroeconomic and Finance Division, Bangkok, Thailand
Conducted quantitative analysis of investment performance in Asia-Pacific, contributing to a UN policy brief.

MENTORING & TRAINING

Designed and led a week-long training program for undergraduate enumerators in Karachi, covering survey implementation, field protocols, and adaptive interviewing techniques.

Conducted a two-day workshop on data entry and cleaning in Stata, training undergraduate enumerators to produce analysis-ready datasets and apply basic econometric techniques.

POLICY ENGAGEMENT & MEDIA OUTREACH

Directly impacted policy by presenting research to Pakistan's Energy Ministry informing the government's decision to reject of a proposed solar tube-well subsidy through evidence presented to Pakistan's Energy Ministry on groundwater depletion risks.

Presented techinical findings from Valuation of Water Flows into the Indus Delta to policymakers; drew lessons on effective translation of economic research for policy audiences.

Who pays for water? MSU researchers examine Karachi's water mafia, local experts reflect on Michigan's water woes (Link)

CONFERENCE PRESENTATIONS

Universities Council on Water Resources (UCOWR) Conference	July 2025
Agricultural and Applied Economics Association Meeting	July 2025
Association of Environmental and Resource Economists	May 2025
Fate of the Earth, MSU Water Alliance	March 2025
Heartland Environmental and Resource Economics Workshop, UIUC	October 2024
MSU & University of Michigan Energy Environmental Econ Day	August 2024
IFPRI Retreat and Research (RISE) Conference	November 2020

RESEARCH GRANTS

American Institute of Pakistan Studies Short-term Research Grant   2024
Karachi Urban Water Market Survey ($3000)

A. Allan Schmid Fellowship in Institutional Economics (Michigan State University)   2024
Karachi Urban Water Market Survey ($8700)

SCHOLARSHIPS & AWARDS

Fulbright Scholar   2016-2017
Georgetown University

Graduation with Distinction   2015
Lahore University of Management Sciences

TECHNICAL SKILLS AND LANGUAGES

Software: Stata; R; GIS; GAMS
Languages: Urdu, English

REFERENCES

Dr. Molly Sears
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Economics
Michigan State University
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