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Current Position

Associate Research Fellow: Poverty, Gender, and Inclusion Unit, International Food Policy Research Institute (IFPRI), Washington DC 2005, USA. 2024–

Acting Country Representative: International Food Policy Research Institute (IFPRI) - Bangladesh. May - August, 2025

Previous Position

Postdoctoral Research Fellow: Stanford Graduate School of Business & Stanford Woods Institute for the Environment, Stanford University, Stanford, CA 94305 2021-2024

Education

Ph.D. in Economics , University of Virginia	2021
M.A. in Economics , University of Virginia	2016
M.A. in Policy Economics , Williams College	2014
M.S.S. in Economics , University of Dhaka	2011
B.S.S. in Economics , University of Dhaka	2010

References

Sandip Sukhtankar

Dept. of Economics,
University of Virginia
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Erica Plambeck

Graduate School of Business,
Stanford University
elp@stanford.edu

Stephen Luby

Woods Institute for the Environment,
Stanford University
sluby@stanford.edu

Grant Miller

Health Policy,
Stanford University
ngmiller@stanford.edu

Sheetal Sekhri

Dept. of Economics,
University of Virginia
ssekhri@virginia.edu

Daniel Gilligan

Poverty, Gender, Inclusion Unit,
International Food Policy Research Institute
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Research Fields

Development Economics, Environmental Economics, Public Health, Governance & Political Economy, Agricultural Economics, and Trade

Working Papers

Optimizing Spatial Subsidy Allocation for Sustainable Agricultural Mechanization in Bangladesh with Mehrab Bakhtiar (IFPRI), Ben Belton (IFPRI), Akhter Ahmed (IFPRI), Raisa Shamma (IFPRI), Aminul Karim (IFPRI), Sreejith Aravindakshan (CIMMYT)

Agricultural mechanization has emerged as a cornerstone of productivity enhancement and rural economic development

in Bangladesh. Although the government has provided substantial support over the past decade, adoption of mechanized harvesting remains uneven across geographical locations and seasons. Dry-season conditions during the Boro harvest facilitate widespread use of machinery, but the waterlogged, wet-field environments typical of the Aman season create logistical hurdles that curb uptake in many regions. This study critically evaluates the effectiveness and targeting criteria of the state-led development assistance program for agricultural mechanization. Bangladesh's current state-led mechanization assistance program, providing 50 percent subsidies in plain areas and 70 percent in haor and coastal zones, was done on somewhat of an ad hoc basis, yielding uneven uptake and inefficiencies. To identify a more optimal targeting strategy, we developed a two-stage, yield-driven framework: first, we applied LASSO regression to isolate the indicators most strongly associated with yield; then, we performed Principal Component Analysis on these selected variables to construct a mechanization-priority index. This index reveals specific districts that would benefit most from enhanced subsidy rates, demonstrating that an evidence-based reallocation of support can improve both equity and overall productivity. Our results provide policymakers with a transparent methodology for refining subsidy allocations and fostering higher adoption of mechanized agriculture across Bangladesh.

Lead Poisoning from Relocation of Lead-Acid Battery Production for Electric Vehicles from China to Bangladesh with Amrita Kundu (Georgetown) & Erica Plambeck (Stanford)

This paper explores the implications of the pollution haven hypothesis in the context of outsourcing lead-acid battery production from China to Bangladesh and its impact on maternal health. Exploiting the natural variation in exposure to used lead-acid battery (ULAB) recycling and smelting operations in Bangladesh, and leveraging fine-grained satellite and administrative data, we investigate the effects on terminated pregnancies. Our results suggest that women residing within 5 km of the ULAB facilities experience a significant increase of 5-6% (equivalent to approximately 13-16% of a standard deviation) in the likelihood of terminated pregnancies compared to those living further away. Our results underscore the pressing need for stricter regulations and sustainable practices within the battery manufacturing sector. More generally, these findings offer empirical evidence for the adverse health consequences associated with the relocation of pollution-intensive industries.

Dishonesty and Public Goods Provision: A Tale of Tax-Evading Politicians

Elected politicians are instrumental in providing public goods to their constituencies. On one hand, dishonest politicians can expropriate public funds for personal use, thus reducing the funds available for public goods provision. On the other hand, through clientelistic and patronage politics, dishonest politicians can give appropriated funds back to citizens. I study how dishonest politicians affect public goods provision in their constituencies. To identify dishonest politicians, I determine whether they evaded income taxes conditional on their minimum earnings and occupations, using a unique dataset based on the asset disclosures and tax forms candidates submit prior to elections in Bangladesh. Directly comparing constituencies represented by dishonest and honest politicians will not reveal the causal effects on public goods provision and economic development, since constituencies that elect dishonest politicians may systematically differ from the ones that do not. I rely on close elections, in which a dishonest politician narrowly defeats an honest one, and a regression discontinuity design to examine the effects of dishonest politicians on public goods provision and economic progress. Between 2009-10 and 2014-15, I find that in sub-districts that narrowly elected dishonest politicians, 27.3% fewer households received social safety net benefits compared with sub-districts that narrowly elected honest politicians. To analyze the effect between 2014-15 and 2019-20, I use a number of health and infrastructure variables at the sub-district level to develop an index of public goods provision using principal component analysis. I find that constituencies with dishonest leaders have a 0.74 standard deviation lower index value than constituencies with honest leaders

Reducing Emissions and Air Pollution from Informal Brick Kilns: Evidence from Bangladesh with Nina Brooks (BU), Debashish Biswas (ICDDR), M. Rofi Uddin (ICDDR), Sameer Maithel (Greentech), Shoeb Ahmed (BUET), Grant Miller (Stanford), Aprajit Mahajan (Berkeley), Mahbubur Rahman (ICDDR), Stephen P. Luby (Stanford) [NBER Working Paper](#)

We present results from a randomized controlled trial in Bangladesh that introduced operational practices to improve energy efficiency and reduce emissions in 276 "zigzag" brick kilns. 65% of intervention kilns adopted the improved practices. Treatment assignment reduced energy use by 10.3% (p -value ≤ 0.001) and decreased CO₂ and PM_{2.5} emissions by 171 metric tons and 0.45 metric tons, respectively, per kiln per year. Valuing the CO₂ reductions using a social cost of carbon of \$185/MT, we find that the social benefits outweigh costs by a factor of 65 to 1. The

intervention, which required no new capital investment, also decreased fuel costs and increased brick quality. Our results demonstrate the potential for privately profitable, as well as publicly beneficial, improvements to address environmental problems in informal industries.

A Business Case for Human Rights at Work? Experimental Evidence on Labor Trafficking and Child Labor at Brick Kilns in Bangladesh with Nina Brooks, Debashish Biswas, M. Rofi Uddin, Sameer Maithel, Shoeb Ahmed, Grant Miller, Aprajit Mahajan, Mahbubur Rahman, Sania Ashraf, Jessie Burner, Kimberly Babiarz, Jack Shane, Stephen P. Luby [NBER Working Paper](#)

Coercive labor and child labor are highly prevalent in environments with weak state capacity. Recognizing this, we experimentally test a ‘business case’ for improving work conditions and promoting human rights among brick kilns in Bangladesh. Our experiment introduced a production method that increased kiln productivity and net revenue, and we test if these productivity gains improve worker “compensation” (including better work conditions). Because the method requires important changes in worker routines, we also test if providing information to kiln owners about positively incentivizing workers to enhance adoption (and hence revenue) leads to better work conditions. We find no evidence that productivity gains alone reduced labor trafficking or child labor, but adding the information reduced child labor by 25-30% without reducing revenue or increasing costs.

Does Trade with Multinationals Induce Greener Production? Evidence from the Bangladesh Fashion Industry with Kazi Iqbal (BIDS), Kazuki Motohashi (Hitotsubashi), and Haruka Takayama (UAlbany) [IGC Working Paper](#)

There is growing attention to the need for firms to ensure that their suppliers meet production standards (i.e., responsible sourcing). This practice is particularly prevalent in the apparel industry, as buyers—especially multinationals with well-known brands—often require their suppliers to comply with stringent environmental standards. We study how trading with global fashion brands affects the environmental performance of their suppliers in Bangladesh. Using a novel dataset that combines custom data with river water quality data, we find that an increase in the number of exporters to brand multinationals improves the river water quality surrounding these exporters. Our finding highlights the crucial role multinational buyers play in mitigating industrial pollution, particularly in developing countries with weaker regulatory enforcement.

When corruption is the norm: Can signaling environmental compliance reduce bribery? with Nina Brooks (BU), Steve Luby (Stanford), Aprajit Mahajan (Berkeley), Ayesha Ahmed (UC Davis)

Firms in developing countries often operate in structurally informal environments where illicit payments are embedded in the cost of doing business. Using primary data from Bangladesh’s brick kiln industry, we investigate whether signaling regulatory compliance can reduce illicit payments. Approximately 78% of kiln owners report paying bribes, 94% report political donations, and virtually all incur compliance-related payments. We exploit a randomized intervention in which kilns adopting Zigzag 2.0 technology were provided with banners to publicly signal environmental compliance, and estimate the effects using a difference-in-differences framework. While theory suggests signals could increase bribe demands if officials perceive compliant kilns as more profitable, or reduce them if officials value environmental improvements more, our results support the latter. Each additional week of banner display lowers bribe payments by 21.6% and compliance-related costs by 18.7% per 1,000 bricks, with no effect on political donations. The aggregate impact amounts to a 15.4% reduction in total illicit costs per 1,000 bricks per week of banner display. These findings show that credible, persistent compliance signals can alter firm–bureaucrat interactions, curb rent extraction, and enhance productivity even in weakly regulated industries.

The holy dip: Religion, river pollution, and health consequences in India with Kazuki Motohashi (Hitotsubashi) and Sheetal Sekhri (UVirginia)

Despite widespread adherence and increasing scholarly attention, empirical evidence linking religious practices to environmental and public health outcomes remains scarce. This paper provides the first causal estimates of the impact of religious congregations on child mortality, identifying water pollution as the underlying channel. We leverage a regression discontinuity design exploiting spatial discontinuities at district boundaries during India’s Kumbh Mela—the world’s largest religious gathering, drawing over 100 million pilgrims for mass bathing rituals. Results show that villages downstream experience substantial increases in infant mortality, with deaths rising approximately fourfold compared to the overall mean. Using a complementary difference-in-differences approach, we find significant deterioration in water quality, specifically elevated fecal contamination levels during and after the events. Our findings highlight

how large-scale religious rituals, despite their spiritual and communal significance, can generate substantial negative environmental externalities with severe public health consequences. While previous causal studies focused on religious practices and their impacts on economic and behavioral outcomes, our study provides evidence that religious practices involving large congregations can have longer-term negative impacts on public health and the environment.

Work in Progress (Selected)

Subsidizing Mechanization: Causal Impacts of Combine Harvester Allocation on Rice Production in Bangladesh with Mehrab Bakhtiar (IFPRI), Aminul Karim (IFPRI), Ben Belton (IFPRI)

This study evaluates the causal impacts of government-subsidized combine harvester allocations on rice production in Bangladesh. Using a difference-in-differences design with BIHS panel data, we find that mechanized harvesting increased adoption by 17 percentage points, raised yields by 12.2%, reduced labor costs by 38%, and improved farm revenues by 16.6%. Results demonstrate that mechanization subsidies significantly enhance both technical efficiency and farm profitability, offering clear evidence for policy design.

Satellite-Based Measurement of Agricultural Productivity and the Environmental Impact of Brick Kilns in Bangladesh with Mehrab Bakhtiar (IFPRI), Sadat Anowar (IFPRI), Martin Mattsson (NUS), Steve Luby (Stanford), Nina Brooks (Stanford)

This study validates the use of satellite-derived NDVI as a proxy for rice productivity in Bangladesh and quantifies the negative effects of brick kilns on nearby farmland. By merging remote sensing data with survey and official statistics, we show NDVI strongly predicts yields in rainfed systems, while proximity to kilns reduces vegetation health. The findings highlight NDVI's value for scalable crop monitoring and the need for stricter regulation of industrial encroachment on agricultural land.

Mechanization and Rural Employment: Gender-Differentiated Impacts of Agricultural Subsidy in Bangladesh with Mehrab Bakhtiar (IFPRI), Shalini Roy (IFPRI), Agnes Quisumbing (IFPRI), Aminul Karim (IFPRI)

This paper examines the labor market impacts of government-subsidized agricultural mechanization in Bangladesh, using a difference-in-differences design with household panel data. Our initial results show that mechanization increased men's agricultural employment while reducing women's participation, especially in off-farm work. Off-farm opportunities declined overall, with stronger negative effects for women. Findings highlight the gender-differentiated consequences of mechanization, underscoring the need for complementary policies to mitigate adverse effects on women's employment.

NGO Presence and Women's Empowerment: Evidence from Spatial and Temporal Variation of NGO establishment in Rural Bangladesh with Agnes Quisumbing (IFPRI), Jordan Kyle (IFPRI), Sonjida Simi (IFPRI)

This paper examines the impact of non-government organization (NGO) establishment on women's empowerment in rural Bangladesh. Using administrative data on NGO locations and founding years, combined with the Bangladesh Integrated Household Survey (BIHS) rounds of 2011, 2015, and 2018, we exploit spatial and temporal variation in NGO presence to identify causal effects through a difference-in-differences approach. Women's empowerment is measured across multiple dimensions, including decision-making authority, mobility, participation in economic activities, and social capital.

Understanding Gender Norms in the Agricultural System of Bangladesh: A Review and Empirical Insights with Agnes Quisumbing (IFPRI), Jessica Heckert (IFPRI), Sonjida Simi (IFPRI)

This project explores how gender norms shape agricultural systems in Bangladesh. We begin with a comprehensive review of the literature on gender norms and their intersections with rural livelihoods. Building on this, we analyze data from the Bangladesh Integrated Household Survey (BIHS) rounds of 2011, 2015, and 2018 to examine geographic differences and sectoral variations across poultry, livestock, fisheries, and major crops.

Geographic Identification of Food Insecurity and Climate Vulnerabilities in Bangladesh with Akhter Ahmed (IFPRI) and Mehrab Bakhtiar (IFPRI)

This paper develops district-level indices of food insecurity and climate vulnerabilities in Bangladesh to support

targeted policy interventions. Using principal component analysis (PCA), we construct composite measures across three domains of food insecurity—availability, access, and utilization—drawing on data from national surveys and administrative sources. We also generate an environmental and climate risk index based on exposure to droughts, floods, cyclones, tidal surges, salinity intrusion, erosion, and transboundary river dependence. The findings highlight spatial disparities, with southern coastal and Hill Tracts districts facing the greatest vulnerabilities. By mapping these risks, our analysis offers policymakers an evidence-based framework for prioritizing scarce fiscal resources and designing geographically targeted responses to food insecurity and climate shocks.

Impact of community clinics on health outcomes: A natural experiment in Bangladesh with Nina Buchmann (Princeton), and Erica Field (Duke)

This study examines the impact of community clinics on maternal and child mortality in Bangladesh using a quasi-experimental design shaped by the political economy of health policy. The government's 1996 initiative established 13,500 clinics, of which 8,000 operated by 2001 before political changes led to closure, and later revitalization in 2009 with about 14,000 clinics active today. Leveraging this policy shift, we combine administrative data, phone surveys of 6,000 clinics, and panel data from 4,000 households in Barishal. A difference-in-differences analysis shows child mortality declined by about 6 percentage points, especially for children born within 1 km of clinics. We also find a shift from home to clinic births, underscoring how community-based healthcare improves outcomes while political instability undermines progress.

Publications - Journals

Reducing emissions and air pollution from informal brick kilns: Evidence from Bangladesh with Nina Brooks, Debashish Biswas, M. Rofi Uddin, Sameer Maithel, Shoeb Ahmed, Grant Miller, Aprajit Mahajan, Mahbubur Rahman, Stephen P. Luby **Science** 388, eadr7394 (2025). DOI:10.1126/science.adr7394

Building blocks of change: The energy, health, and climate co-benefits of more efficient brickmaking in Bangladesh with Nina Brooks, Debashish Biswas, M. Rofi Uddin, Sameer Maithel, Shoeb Ahmed, Grant Miller, Mahbubur Rahman, Stephen P. Luby, **Energy Research & Social Science** 117 (2024) 103738 DOI

Data driven contagion risk management in low-income countries using machine learning applications with COVID-19 in South Asia with Abu Shonchoy, Towhid Iqram, and Manhal Ali, **Scientific Reports - Nature** 13, 3732 (2023) DOI

An integrated analysis of climate change impacts on economic development and food security in Bangladesh with Onil Banerjee, Selim Raihan, and Nabiul Islam, **Climate Change Economics (World Scientific)** Volume 06, Issue 01 (2015) DOI

Toward 2021: Examining Drivers of Change in Bangladesh with Onil Banerjee, and Mohammed Asaduzzaman, **Bangladesh Development Studies** Volume XXXVIII, March (2015)

Publications - Reports

Food security and nutrition in Bangladesh: Evidence-based strategies for advancement with Akhter Ahmed (IFPRI), Mehrab Bakhtiar (IFPRI) **IFPRI Report October 2024. Washington, DC: International Food Policy Research Institute**

Agricultural mechanization policy in Bangladesh: An assessment of the phase III support program and recommendations for reform with Akhter Ahmed (IFPRI), Mehrab Bakhtiar (IFPRI), Aminul Karim (IFPRI), Ben Belton (IFPRI), Raisa Shamma (IFPRI), Ruhul Amin (IFPRI), Sreejith Aravindakshan (CIMYYT), Timothy Krupnik (CIMYYT) **Climate Change X Agriculture Working Paper 1. Washington, DC: International Food Policy Research Institute**

Research Grants, Awards, and Fellowships

J-PAL's GI Award with Katrina Kosec, Mushfiq Mobarak, Sandip Sukhtankar (\$74,475) 2025-26
International Growth Center (IGC), LSE (co-lead), with Amrita Kundu and Erica Plambeck (£30,000) 2024-25

J-PAL's King Climate Action Initiative Award with Steve Luby et al. (\$400,000)	2022-24
J-PAL's Human Trafficking Research Initiative Award with Grant Miller et al. (\$130,000)	2023-24
International Growth Center (IGC) fund with Haruka Takayama et al. (£10,000)	2023-24
Murata Research Funding, Government of Japan with Haruka Takayama et al. (\$20,000)	2022-24
Sustainability Accelerator, Stanford University with Steve Luby et al. (\$100,000)	2022-2023
Bankard Pre-Doctoral Fellowship, University of Virginia (\$15,000)	2020-2021
Quantitative Collaboration Grant, University of Virginia (\$2,500)	2019-2020
Global Infectious Disease Grant with Amzad Hossain, University of Virginia (\$5,000)	2019
UVA Marshall Jevons Undergraduate Research Award, University of Virginia	2018
Government Initiative award, with Jessica Leight, JPAL (\$40,000)	2015
US Fulbright Scholarship in the field of Economics, Williams College	2013-2014

Research and Professional Experiences

Project Manager, Stanford Impact Lab, Stanford University	2021-2023
Research Assistant, Darden Business School, Batten School of Leadership and Public Policy, and Department of Economics of University of Virginia	2016-2019
Research Associate, Bangladesh Institute of Development Studies	2011-2015
Research Assistant, Innovation for Poverty Action (IPA)	2015
Research Associate, South Asian Network on Economic Modeling	2009-2011

Teaching Experience

Co-Mentor , Mechanical Engineering Capstone, Stanford University	2022-2024
Co-Mentor , Biodesign and Entrepreneurship for Societal Health, Stanford University	2023
Instructor , University of Virginia, ECON 3010, Intermediate Microeconomics	2019
Teaching Assistant, University of Virginia	
ECON 3010, Intermediate Microeconomics; ECON 3720, Introduction to Econometrics	
ECON 2010, Introductory Microeconomics; ECON 3559, Everyday Economics Teaching Assistant, University of Virginia	2016-2020
Lecturer , American International University of Bangladesh, Intermediate Microeconomics	2011-12

Invited Presentations (selected)

EdTech Futures: Bridging Innovation and Impact in Bangladesh, CIRDAP, Dhaka, Bangladesh	Aug 2025
Annual BIDS conference, Dhaka, Bangladesh	Nov 2024
2024 Dhaka Winter Conference on Economics Research, University of Dhaka, Bangladesh	Dec 2024
Asian Evaluation Week (AEW), organized by ADB, Shanghai, China	Sep 2024
RISE conference, IFPRI, Washington DC, USA	Oct 2024
Delivering for Nutrition in South Asia, IFPRI-South Asia, Colombo, Sri Lanka	Nov 2024
Luby Lab, Stanford University; Department of Economics, University of Dhaka; Bangladesh Institute of Development Studies; School of Business, North South University; Global Health Club Seminar, Stanford University; SDSS Research Review, Stanford University	2023
BIDS Annual Conference, Dhaka	Dec 2022
7th Lindau Nobel Laureate Meeting on Economic Sciences, Germany	Aug 2022
Stanford Development Lunch	Feb 2022
Luby Lab, Stanford University	Sept 2021
Southern Economic Association (SEA) 90th Annual Meeting	Nov 2020, 2023

Workshop on the Political Economy of South Asia (WPESA)	Nov 2020
Online Sciathon, a global competition hosted by the Lindau Nobel Laureate Meetings	June 2020
Quantitative Collaboration (QC) virtual poster session, University of Virginia	Apr 2020
Pacific Conference for Development Economics (PacDev), UC-Berkeley	Mar 2020
Urban Economics Association, Federal Reserve Bank, Philadelphia	Oct 2019
1st-3rd World Bank-SANEM Discussion Forum, World Bank, Washington D.C	2017-19
Young Economists Symposium (YES), New York University	Aug 2018
2nd George Washington University Student Research Conference in Economics	Mar 2018
7th South Asian Training program on CGE Modeling at Kathmandu, Nepal	Dec 2014

Professional Activities

Honorary Director, South Asian Network on Economic Modeling (SANEM), Dhaka, Bangladesh	2025-
Member, Global Health Club, Stanford University	2023-2024
Executive Committee Member, Association for Economic & Development Studies of Bangladesh	2023-
Member, Bangladeshi Student Association, Stanford University	2023
President, Graduate Economics Club, Department of Economics, University of Virginia	2017-18
Executive Member, Association of Bangladeshi Students, University of Virginia	2016-17
Student Representative, South Asian Economics Students' Meet (SAESM)	2009-10
Moderator, United Nations National Youth Forum, Bangladesh	2008-10

Refereeing

Journal of Environmental Economics and Management, Agricultural Economics, Food Security, Natural Hazards Review, Bangladesh Development Studies

Advising and Mentoring

Samiha Islam (Placement: Pre-doctoral fellow, Stanford King Center)

Languages

Bengali (native), English (fluent), Hindi (intermediate), Urdu (intermediate), Spanish (beginner)

Computer Skills

STATA, MATLAB, GAMS, ArcGIS, R, Python, LaTeX