

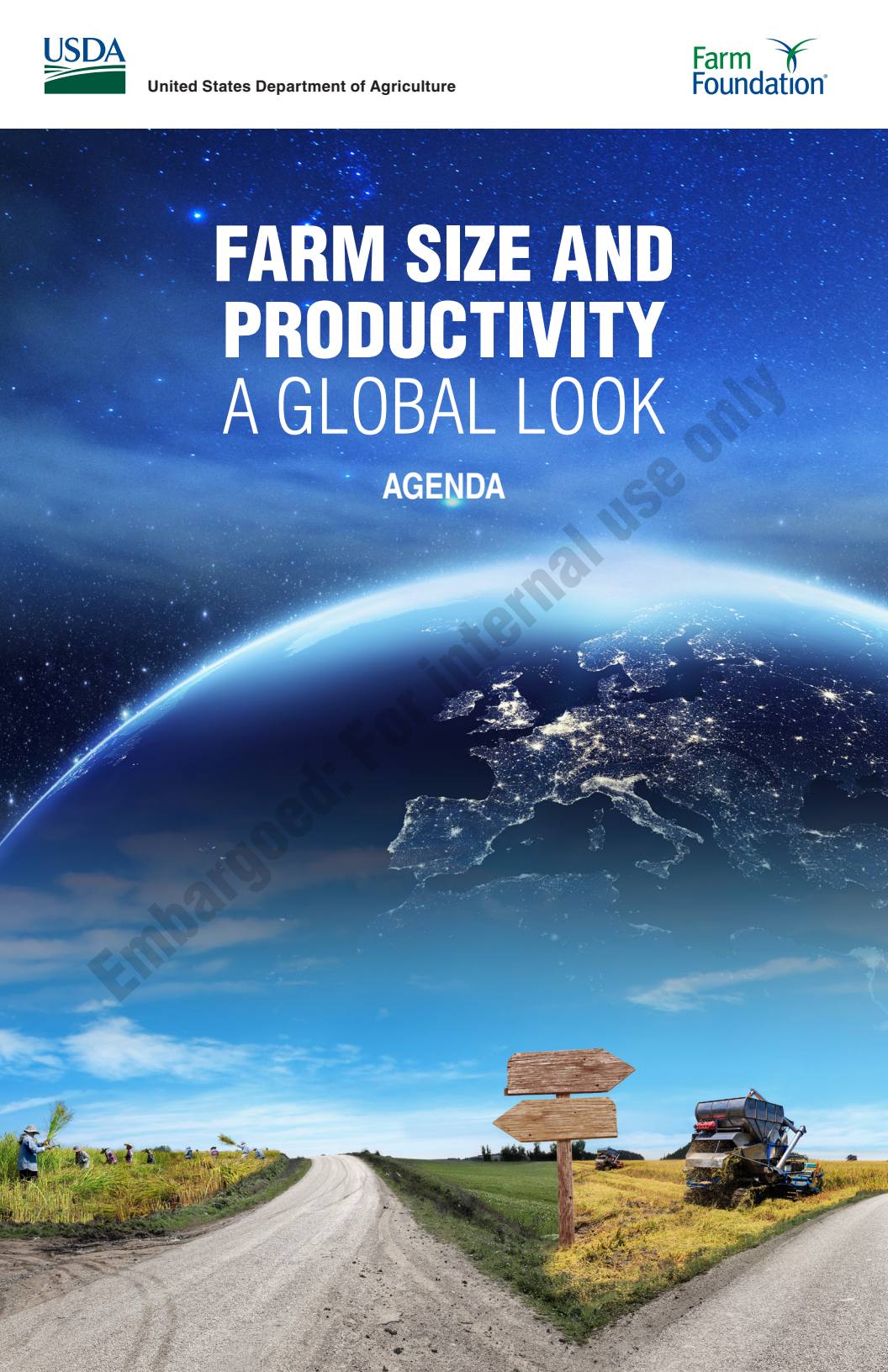


United States Department of Agriculture



FARM SIZE AND PRODUCTIVITY A GLOBAL LOOK

AGENDA



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FARM SIZE AND PRODUCTIVITY

A GLOBAL LOOK

February 2-3, 2017

1st Floor Auditorium,

Patriots Plaza III, 355 E Street, SW, Washington D.C.

Sponsored by the **USDA Economic Research Service**
and **Farm Foundation, NFP**

Conference Organizers:

Keith Fuglie (kfuglie@ers.usda.gov, 202-694-5588)

Nicholas Rada (nrada@ers.usda.gov, 202-694-5202)

Objective

The purpose of the conference is to share new research findings on the relationship between agrarian structure and agricultural productivity. The conference will bring new evidence from different parts of the world, including rich and poor countries, and improved methods to bear on this important question for agricultural development. Several papers move beyond comparisons of land productivity to total factor productivity (TFP), and exploit newly available panels of farms to compare differences by farm size in productivity levels and productivity growth over time. Some studies also explore how specific policies, institutions and behaviors may explain observed productivity differences across farms.



AGENDA

February 2

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| 0830 – 0900 | Arrival & Security Clearance | |
| 0900 – 0930 | Welcome & Introduction | Mary Bohman Nicholas Rada |

SESSION 1

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| 0930 – 1115 | The U.S. & Australia | Gopinath Munisamy |
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| | Tracking Consolidation in U.S. Agriculture | James MacDonald |
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| | Farm Size and Productivity Growth in the United States Corn Belt | Nigel Key |
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| | Exploring the Relationship Between Farm Size and Productivity: Evidence from the Australian Grain Industry | Yu Sheng |
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| 1115 – 1130 | Coffee break | |
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Tracking Consolidation in U.S. Agriculture

James MacDonald (ERS), Robert Hoppe (ERS), and Doris Newton (ERS)

We propose a measure of consolidation that is informative of changes in the locus of production when farm sizes are highly skewed. We then track changes in that measure over 1982-2012 for two aggregates—cropland and harvested cropland—as well as for cropland in each of the 50 states, harvested cropland for 48 specific crops, and animals in 6 livestock commodities. Consolidation—shifts of cropland to larger farms—has been large, widespread across crops, and persistent over time. While consolidation in crops has been steady and persistent, that in livestock has been episodic, occurring in some periods but not others. Livestock consolidation often occurs as part of dramatic industry reorganizations, with extraordinary increases in consolidation.

Farm Size and Productivity Growth in the United States Corn Belt

Nigel Key (ERS)

In recent decades, agricultural production in the U.S. has shifted to larger-scale operations, raising concerns about the economic viability of small and midsized farms. We explore whether economies of scale could have provided an incentive for the consolidation by estimating total factor productivity (TFP) for five size classes of grain-producing farms in the Heartland (Corn Belt). Using quinquennial Agricultural Census data from 1982 to 2012 we also compare TFP growth rates across farms sizes to gain insight into

whether observed productivity differences are likely to persist. Our finding of a strong positive relationship between farm size and TFP suggests that the recent consolidation of agriculture production has contributed to aggregate productivity growth. We estimate the extent to which sectoral productivity growth can be attributed to structural change versus other factors including technological change. We also estimate and compare the effects on aggregate TFP of hypothetical policies that raise the productivity of farms of a particular size.

Exploring the Relationship Between Farm Size and Productivity: Evidence from the Australian Grain Industry

Yu Sheng (ABARES) and Will Chancellor (ABARES)

The effect of farm size on productivity growth remains one of the longest standing debates in agricultural development literature. Using farm level data for the Australian grain industry from 1989 to 2004, we examine this relationship within an Australian context. Our study demonstrates that, after accounting for various observed and unobserved characteristics of farms including farmer education, land use intensity and soil moisture availability, there is a positive relationship between farm size and productivity. Moreover, we demonstrate that the farm size-productivity disparity is likely to diminish as farms use contract services to replace self-owned capital, suggesting that the hiring of plant and machinery ('outsourcing') helps to lift the productivity of the small.



SESSION 2

1130 – 1240 The E.U. & Ukraine **Chenggang Wang**



Common Agricultural Policy Reforms and Productivity Growth of Crop Farm in the European Union

**Raushan
Bokusheva**

Are Mega-Farms the Future of Global Agriculture: Exploring the Farm-Size Productivity Relationship for Large Commercial Farms in Ukraine

Klaus Deininger

1240 – 1330 Lunch

SESSION 3

1330 – 1440 Brazil & Mexico

Alejandro Nin-Pratt



Large and Small Farms Excel in Brazil

Steven Helfand

Inverse Productivity or Inverse Efficiency? Evidence from Mexico

Justin Kagin

1440 – 1455 Coffee break

European Union

Raushan Bokusheva (OECD) and Lukáš Cechura (Czech University of Life Sciences in Prague)

Changes in the EU Common Agricultural Policy (CAP) have sought to improve economic efficiency in the sector and the competitiveness of farms. This study examines the evolution of TFP growth of crop farms in selected EU member states from 1995 to 2013. Using panel data for crop farms from France, Germany, the United Kingdom, the Czech Republic, Hungary and Poland, we measure TFP growth, and decompose it into three components - technological change, a scale effect and a technical efficiency effect. The effect of agricultural policy on farm performance is evaluated by estimating the impact of subsidies on farm technical efficiency.

Are Mega-Farms the Future of Global Agriculture: Exploring the Farm Size-Productivity Relationship for Large Commercial Farms in Ukraine

Klaus Deininger (World Bank)

With farms cultivating tens or hundreds of thousands of hectares, Ukraine is often used to demonstrate the existence of economies of scale in modern grain production. Panel data analysis for all the country's farms with more than 200 hectares in 2001–2011 suggests that higher yields and profits are due to unobserved factors at rayon (district) and farm level

rather than economies of scale. Productivity growth was driven not by farm expansion but by exit of unproductive and entry of more efficient farms. Higher initial shares of area under farms with more than 3,000 or 5,000 hectares at the rayon level significantly reduce subsequent exit, suggesting that land concentration reduces productivity growth. The paper draws implications for global evolution of farm structures.

Large and Small Farms Excel in Brazil

Steven Helfand (UC Riverside), Nicholas Rada (ERS) and Marcelo Magalhães (UNESP)

Drawing on decadal agricultural census data (1985, 1995/1996, 2006) covering the whole country and all farm types, this study constructs a pseudo-panel of five farm size classes for each county and year in Brazil. Controlling for temperature and precipitation shocks to production, the pseudo-panel is used to examine which farm size class achieved the highest agricultural total factor productivity (TFP), to evaluate the TFP growth distribution, and to identify factors contributing to TFP. The paper finds that while the differences in TFP were relatively small in 1985, the smallest (<5 ha) and largest (>500 ha) farm size classes achieved the fastest TFP growth, resulting in a pronounced U-shape by 2006. Little consistency is found in the effect of technical assistance, credit, or electricity across farm size classes on input, output, or TFP growth. Education is the exception, which raised output and TFP growth among all size classes. Contrary to expectations, greater capital intensity was associated with slower TFP growth for small and medium sized farms, as was special-

ization in chickens, pigs, or horticulture. For the largest farms, specialization was associated with faster TFP growth.

Inverse Productivity or Inverse Efficiency? Evidence from Mexico

Justin Kagin (Kagin's Consulting, Vacaville, CA), J. Edward Taylor (UC Davis) and Antonio Yúnez-Naude (El Colegio de Mexico)

Using a unique panel data set from rural Mexico, we find strong evidence of a neg-

ative relationship between farm size and both productivity and technical efficiency: large farms not only have a lower value of output per hectare than small farms, they also produce further from the efficiency frontier. Our findings suggest that, in spite of the ongoing transformation of agricultural supply chains and economists' recommendations for small farmers to exit crop production, there may be sustained advantages for smallholder farms. Our analysis offers new insights into inverse-farm size relationship, the productivity–efficiency relationship, and the use of stochastic frontier techniques.



SESSION 4

1455 – 1605 China & Vietnam

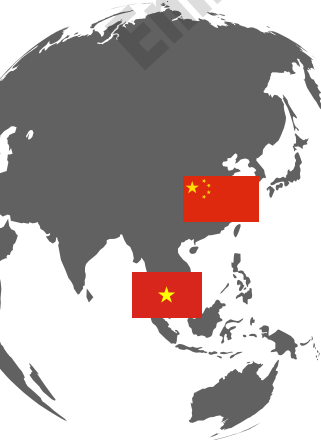
Diao Xinshen

Misallocation, Selection and Productivity: Quantitative Analysis with Panel Data from China

Diego Restuccia

Structural Transformation and Intertemporal Evolution of Real Wages, Machine Use and Farm Size-Productivity Relationships in Vietnam

Yanyan Liu



Misallocation, Selection and Productivity: Quantitative Analysis with Panel Data from China

Tasso Adamopoulos (York University), Loren Brandt (University Toronto), Jessica Leight (Williams College) and Diego Restuccia (University Toronto & NBER)

We use micro panel data from China and a quantitative framework to assess the extent and consequences of resource misallocation in agriculture. An efficient reallocation of inputs to existing farmers in China would increase agricultural output and productivity by 84 percent. Using a summary measure of the implied distortions in the agricultural sector, we estimate a tractable heterogeneous-ability two-sector framework of agriculture and non-agriculture to assess the implications of distortions on selection and productivity across sectors. Eliminating misallocation in agriculture generates substantial reallocation across sectors and an amplification effect on agricultural productivity from a factor gain of 1.84-fold to a 15.5-fold with selection.

Structural Transformation and Intertemporal Evolution of Real Wages, Machine Use and Farm Size-Productivity Relationships in Vietnam

Yanyan Liu (IFPRI), William Violette (Brown University) and Christopher Barrett (Cornell University)

This paper explores the evolution of real agricultural wages, machinery use and the relationship between farm size and productivity in Vietnam during its dramatic structural transformation over the course of the 1990s and 2000s. Using six rounds of nationally representative household survey data, we find strong evidence that the inverse relationship between rice productivity and planting area attenuated significantly over this period and that the attenuation was most pronounced in areas with higher real wages. This pattern is also associated with sharp increases in machinery use, indicating a scale-biased substitution effect between machinery and labor. The results suggest that rural-factor market failures are receding in importance, making land concentration less of a cause of concern for aggregate food production.



February 3

0830 – 0900 Arrival & Security Clearance

SESSION 5

0900 – 1045

Sub-Saharan
Africa

**Dina Umali-
Deininger**

Agricultural Productivity and
Farm Size in Selected East and
Southern African Countries:
Uganda, Tanzania, and Malawi

**Boris
Bravo-
Ureta**

The Inverse Farm Size
Productivity Relationship:
New Evidence from Sub-Sahara
African Countries

**Sara
Savastano**

Is Small Still Beautiful? The
Farm Size-Productivity Relation-
ship Revisited in Sub-Saharan
Africa (with empirical estimates
from Zambia, Ghana, Kenya,
Tanzania, and Mozambique)

**Thomas
Jayne**

1045 – 1100 Coffee break



Agricultural Productivity and Farm Size in Selected East and Southern African Countries: Uganda, Tanzania, and Malawi

Jacques Julien (University of Connecticut) and Boris Bravo-Ureta (University of Connecticut; University of Talca, Chile)

This study examines the inverse relationship hypothesis (IR-H) regarding farm size and productivity using Total Factor Productivity (TFP) measures derived from Stochastic Production Frontier models. We use nationally-representative LSMS-ISA panels from Malawi (2011, 2013), Tanzania (2009, 2011, 2013) and Uganda (2012, 2011, 2013). The empirical models incorporate an expanded set of regressors to capture agroecological and environmental attributes, as well as climatic variables that are typically ignored. An important issue concerns likely errors in land measurement and this is addressed by making use of two alternative measures of farm size: 1) area as reported by farmers; and 2) GPS measurements undertaken by enumerators. Due to the short time span of the panels, the study focuses on comparing land and TFP across farms. The findings show that the smallest farm size groups exhibit the highest average TFP for Uganda and Tanzania consistent with the IR-H. In contrast, average TFP in Malawi is higher for the larger farm size classes. The results suggest relatively low levels of technical efficiency in the three countries.

The Inverse Farm Size Productivity Relationship: New Evidence from Sub-Sahara African Countries

Pasquale Lucio Scandizzo (University Rome "Tor Vergata") and Sara Savastano (World Bank)

In this paper we revisit the IR from different angles. From the empirical point of view we estimate the IR using cross-country, panel data, and quantile regressions in SSA countries. Our leitmotif is a theoretical model that link the IR to management quality, efficiency, and option value of land. Compared to previous studies, the contribution of our paper is threefold. First we overcome the statistical and measurement biases by testing the IR with the LSMS-ISA data, national representative geo-referenced surveys of five sub-Saharan African countries (Malawi, Niger, Nigeria, Tanzania and Uganda). We control for many exogenous common and comparative geo-spatial measures of land quality, infrastructure and access to markets, climate conditions, soil conditions and topography. We replicate the analysis with the longitudinal Rural Household Survey data from Ethiopia to control for omitted variable, cross sectional and short panel biases. Second, we construct a theoretical model that relates farmer's productivity, unobserved ability, and real option value of land to account for farmers' heterogeneity in the IR. Third, we corroborate our results with quantile regression, an empirical estimation rarely used in the IR framework. We test the IR throughout the entire productivity distribution of farmers using both cross section

and panel data. This model specification allows us to account for unobserved heterogeneity by estimating the sign of the relationship at different points of the distribution of farms' productivity. The results of the quantile regressions, in both cross sectional and panel framework, suggest that productivity is not independent from the distribution of the population considered, but behaves differently according to whether the units considered are low or high performing. In particular, we found out that the IR exhibits signs' switches across the entire distribution of farm size, between countries located in different agro-ecological zones, over time, and based on management ability, farmers' heterogeneity and unobserved ability.

Is Small Still Beautiful? The Farm Size- Productivity Relationship Revisited in Sub- Saharan Africa (with empirical estimates from Zambia, Ghana, Kenya, Tanzania, and Mozambique)

Thomas Jayne (Michigan State University), Milu Muyanga, Godwin Debrah, Ayala Wineman (Michigan State University), Chewie Nkonde (University of Zambia) and Jordan Chamberlin (CIMMYT)

The study makes three contributions to the inverse relationship (IR) between farm size and productivity in Ghana, Tanzania, Kenya, Zambia and Mozambique. First, we argue that assertions of an IR

are meaningful only with reference to a specific range of farm sizes tested. Most recent studies examine the IR hypothesis over an exceedingly narrow range of farm sizes which cannot guide major policy debates in Africa about the productivity implications of the rise of relatively large farms in Africa. Our study includes a significant number of farms cultivating between 10 and 100 hectares, which account for a growing share of the total farmed area in many countries. Second, we examine the IR hypothesis using several different measures of productivity that are arguably more meaningful than standard IR measures such as yield or output value per hectare. Third, we account for fixed costs, which on a per hectare basis are often higher for small farms, and examine the implications of valuing labor at shadow wages vs. community agricultural wage rates. In some cases, we are able to control for unobserved plot-level fixed effects, which clarifies the extent to which the IR simply reflects plot characteristics (e.g. soil quality) that are not adequately accounted for in other studies.



SESSION 6

1100 – 1210 India & Bangladesh

David Spielman

Too Small to be Beautiful: The Farm Size and Productivity Relationship in Bangladesh

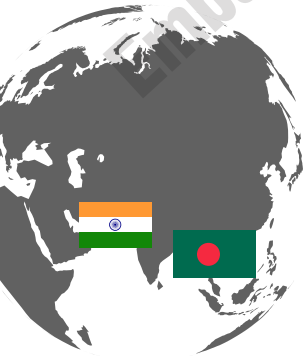
Madhur Gautum

Input Transaction Costs, Mechanization, and the Mis-allocation of Land: The Irrelevance of the IR

Mark Rosenzweig

1210 – 1300 Final remarks & next steps
Lunch

Keith Fuglie



Too Small to be Beautiful: The Farm Size and Productivity Relationship in Bangladesh

Madhur Gautum (World Bank) and Mansur Ahmed (World Bank)

This paper tackles the issue of the farm size and productivity, at the small end of the vast distribution of global farm sizes. Bangladesh also offers several unique features which, together with availability of a rare household level panel dataset on agricultural production and the application of recent advances in estimation methods (specifically employing the stochastic frontier approach to jointly estimate the production frontier and technical inefficiency for unbiased and consistent estimates), allow overcoming several of the limitations identified in the literature on establishing and testing the inverse relationship. Using the model, the paper also investigates how the current policy environment may be influencing technical efficiency to help identify policy priorities to promote productivity growth.

Input Transaction Costs, Mechanization, and the Mis-allocation of Land: The Irrelevance of the IR

Andrew Foster (Brown University) and Mark Rosenzweig (Yale University)

We assess whether and how the redistribution of farmland changes the average return on land (efficiency). We first show that information on output per acre by land size is insufficient to infer how a redistribution of land would change overall farm efficiency, as such a measure ignores inputs costs which can vary by land scale. We then show that information on the variation in profits per unit of land by land size is also insufficient for identifying the gains and losses from increasing or decreasing farm size, as what matters is the relationship between the marginal return to land and land size. Indeed, we show that the existence of an inverse relationship (IR) between profits per acre and farm size can be consistent with an efficiency enhancing redistribution of land that increases or decreases farm scale.



BIOGRAPHIES

Hosts

Mary Bohman is Administrator of the Economic Research Service. Mary joined ERS in 1997 and has served as Director of the Agency's Resource and Rural Economics Division, Deputy Director for Research in the Market and Trade Economics Division (MTED), and Chief of MTED's Europe, Africa, and Middle East Branch. Other public-sector positions held include details to the White House Office of Science and Technology Policy and to USDA's Under Secretary for Farm and Foreign Agricultural Services. From 1990 to 1997 she was on the Agricultural Sciences faculty at the University of British Columbia. Mary first worked in agriculture and rural development as a Peace Corps Volunteer for cooperative development in Togo, West Africa in the early 1980s. Mary received her Ph.D. from the Department of Agricultural Economics, University of California, Davis and her B.S. from the School of Foreign

Service, Georgetown University. Mary is a member of the Agricultural & Applied Economics Association, the Association of Environmental and Resource Economists, and the International Association of Agricultural Economists. She serves as Co-Chair of the Global Steering Committee for the Global Strategy for Agricultural and Rural Statistics under the United Nations Statistical Commission.

Nicholas Rada is a Research Economist in the Food Security and Development Branch (FSDB) of ERS' Market and Trade Economics Division (MTED). His work has focused on international agricultural productivity growth, international food security, and agricultural development. Current projects employ either national data to estimate regional and global total factor productivity (TFP), or sub-national data (household, provincial, or state) to evaluate agricultural TFP in the rapidly developing economies of Brazil, Russia, India, Indonesia, and China. Central to those evaluations are examinations of

country-specific policies and factors to determine their influence on agricultural productivity. Nicholas joined ERS in 2009 upon completing his doctoral degree at Oregon State University. Nicholas earned an M.S. in Agricultural Economics and a B.S. in Economics from West Virginia University.

Keith Fuglie works with the Economic Research Service, U.S. Department of Agriculture in Washington, DC, where he has served as Branch Chief and Research Economist specializing in the economics of technological change and science policy. In 2012 Keith was recognized with the USDA Secretary's Honor Award for Professional Service, and in 2014 he received the Bruce Gardner Memorial Prize for Applied Policy Analysis from the Agricultural and Applied Economics Association. During 1997-98 Keith served as senior staff economist on the White House Council of Economic Advisers. Keith also spent ten years with the International Potato Center (CIP) stationed in Indonesia and Tunisia, where he headed CIP's social science research program and was regional director for CIP in Asia. Keith received an MS and PhD in Agricultural and Applied Economics from the University of Minnesota and a BA from Concordia College, Moorhead, Minnesota.

Constance Cullman is President and CEO of Farm Foundation, with responsibility for all program development and operations. She was named to the post in May 2016. Prior to joining Farm Foundation, Cullman was U.S. Government Affairs Leader with Dow AgroSciences. She previously worked at the Corn Refiners Association, USDA's Foreign Agricultural Service, Ohio Farm Bureau Federation, and the Ohio State University College

of Food, Agricultural and Environmental Sciences. Cullman is a graduate of Ohio State, earning her bachelor's degree in agricultural economics, and a master's degree in agricultural economics with an emphasis on international trade and agricultural policy.

Presenters

James MacDonald is Chief of the Structure, Technology, and Productivity Branch of USDA's Economic Research Service. His area of specialization lies in industrial organization, with a focus on empirical research on competition, firm organization, innovation, and industry consolidation. He has sought to apply that focus to U.S. agriculture, with work focusing on consolidation of agricultural production, competition in markets for agricultural commodities, the use of contracts in agriculture, and the organization of farms. A Fellow of the Agricultural and Applied Economics Association, MacDonald received a Ph.D in economics from the State University of New York at Buffalo, and received his undergraduate degree, also in economics, from Siena College.

Nigel Key is an Economist in the Farm Economy Branch in the Resource and Rural Economics Division. Nigel's research evaluates how policy, climate, and other factors influence farm structure, productivity and the environment. His areas of expertise relate to livestock include production contracts, climate change, heat stress, anaerobic digesters, antibiotics, hog production, manure management, and productivity analysis. His other areas of interest include risk management, farm household behavior, crop insurance, land markets, supply response, and structural change. Nigel has been an Economist at

ERS in Resource and Rural Economics Division since 2000. From 2008 to 2009 he served as a Policy Officer at the United Nations Food and Agriculture Organization in Rome. Before joining ERS, Nigel was a Lecturer in the Program in International Policy Studies, at Stanford University. Nigel earned a Ph.D. in Agricultural and Resource Economics from the University of California at Berkeley, an M.S. in International Agricultural Development from the University of California at Davis, and a B.A. in Economics from the University of California at Berkeley.

Yu Sheng is currently a Senior Economist of Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES), Department of Agriculture Australia. He specializes in the estimation and comparison of agricultural productivity across countries, public investment in research and development and its effects on technological progress and its diffusion in agriculture, and the farm-level data analysis. In recent years, his researches have been published in a series of international peer reviewed journals including Canadian Journal of Economics, Journal of International Money and Finance, Energy Economics, Review of International Economics, Review of Income and Wealth, Australian Journal of Agricultural and Resource Economics etc. As a member of the Working Group on Agricultural Productivity Metrics under the G20 Meeting of Agricultural Chief Scientists, Yu Sheng is responsible to liaise the cooperation between ABARES and other international agencies in researches on agricultural productivity. Over the past two years, he had been working with the USDA-ERS, Agriculture and Ag-food Canada and the EU countries to develop the international comparable agricultural total factor productivity. In addition, Yu Sheng is

a member of Farm-level Analysis Expert Group under the direction of the Trade and Agricultural Directorate OECD, and an external consultant of Asian Development Bank (ADB) on regional economic integration and agricultural policies.

Raushan Bokusheva is a Senior Agricultural Policy Analyst at the OECD. Prior to joining the OECD in 2015, she worked as a Senior Researcher and Lecturer at the Swiss Federal Institute of Technology (ETH Zurich) and a Senior Research Associate at the Leibniz Institute for Agricultural Development in Transition Economies in Germany. She graduated and obtained her PhD in Economic Modelling at the Russian State Agricultural University – Moscow Timiryazev Academy. In 2012, she received the ETH Zurich Venia Legendi in Applied and Agricultural Economics. Her areas of research are agricultural productivity and sustainability, economics of climate change and risk management.

Klaus Deininger is a Lead Economist in the agricultural and rural research unit of the World Bank's Development Research Group. His areas of research focus on income and asset inequality and its relationship to poverty reduction and growth; access to land, land markets and land reform and their impact on household welfare and agricultural productivity; land tenure and its impact on investment, including environmental sustainability; and capacity building (including the use of quantitative and qualitative methods) for policy analysis and evaluation, mainly in the Africa, Central America, and East Asia Regions. He is a German national with a Ph.D. in Applied Economics from the University of Minnesota, an MA in Agricultural Economics from the University of Berlin, and an MA in theology from the University of Bonn.

Steven Helfand is Associate Professor of economics at the University of California, Riverside. He was Chair of Latin American Studies at UCR from 2002 to 2006, Director of the UC Education Abroad Program in Brazil from 2006 to 2009, and the 2010-11 recipient of the Distinguished Teaching Award in the UCR College of Humanities and Social Sciences. He specializes in issues related to poverty, inequality, and economic development in Latin America. Most of his recent research examines the role of public policies in reducing poverty in Brazil, including evaluations of land reform policies, agricultural productivity enhancing policies, and conditional cash transfer policies. He is currently working on several projects about productivity, poverty and the future of small farms in Latin America.

Justin Kagin received his PhD in Agricultural and Resource Economics from the University of California at Davis and has worked in developing countries for over 12 years. He is currently the founder and owner of Kagin's Consulting, a development consulting firm that aims to alleviate poverty worldwide and specializes in local-economy wide impact evaluations, small-holder farmers, poverty analysis of excluded groups, nutrition economics, and economic analysis of developing countries. Kagin's Consulting has worked with the Food and Agriculture Organization of the UN, the UN International Labour Organization, the UN Children's Fund, University of California, Davis, Bill and Melinda Gates Foundation, and International Governments and NGOs. Dr. Kagin is also a founder and the director of the Economic Diplomacy and Integrity Forum (EDI) which develops young leaders from Southeast Europe to focus on ethical principles applied to economics, business, and politics. The hope is that these young

leaders will combat corruption, unemployment and poverty in their countries and beyond. He is also the proud husband of Ivona and father of four boys, Jacob, Aron, Isaac, and Benjamin.

Diego Restuccia is a Canada Research Chair in Macroeconomics and Productivity and a Professor of Economics at the University of Toronto in Canada. Professor Restuccia is also a Research Associate at the National Bureau of Economic Research in Cambridge, Massachusetts, USA. Professor Restuccia has taught at the University of Western Ontario and the Wharton School at the University of Pennsylvania. He was also a Senior Economist in the Research Department at the Federal Reserve Bank of Richmond. Professor Restuccia is currently an Editor of the Review of Economic Dynamics. He received his Ph.D. in Economics from the University of Minnesota. He was born in Montevideo, Uruguay; and grew up in Caracas, Venezuela. Professor Restuccia's areas of research include macroeconomics, economic growth and development, and labor economics. His recent research emphasizes the role of resource allocation across heterogeneous production units or sectors in understanding aggregate outcomes. Professor Restuccia's research work has been published in leading journals in economics.

Yanyan Liu is a Senior Research Fellow in the Markets, Trade and Institutions Division at International Food Policy Research Institute (IFPRI) and an Adjunct Associate Professor in the Dyson School of Applied Economics and Management at Cornell University. She received a joint PhD in economics and agricultural economics from Michigan State University in 2006. Prior to joining IFPRI in 2009, she worked for RTI International, and for

the Development Research Group at the World Bank. Her research has focused on program impact evaluation, microfinance, microinsurance, and economic transformation. Her work has been published in journals such as *Journal of Applied Econometrics*, *Journal of Risk and Insurance*, the *American Journal of Agricultural Economics*, *World Bank Economic Review*, and *World Development*.

Boris Bravo-Ureta, originally from Chile, is Professor of Agricultural and Resource Economics at the University of Connecticut. He served as Executive Director of the Office of International Affairs for 10 years and is currently the Director of the Learning for International Development (LID) Program. He is an Adjunct Professor of Agricultural Economics at the University of Talca in Chile. He has worked primarily on the economics of agricultural production with a focus on productivity and technical efficiency in the USA and in a number of countries throughout Africa and Latin America. Bravo-Ureta has served as a consultant/researcher with various organizations including: Inter-American Development Bank; World Bank; USAID; USDA; FAO; ILO; INRA; Central American Bank for Economic Integration; US Dep. of Education; US State Dep.; Chilean Ministry of Agriculture; Ministerio de Economía Familiar Comunitaria, Ministerio de Agricultura y Ganadería, and Ministerio de Recursos Naturales in Nicaragua; Ministerio de Agricultura-Dominican Republic; Secretaría de Agricultura y Ganadería, and PRONADERS in Honduras; Chemonics International; and TechnoServe.

Sara Savastano is assistant professor in economics at the University of Rome Tor Vergata currently on leave. From January 2016 she is Senior Economist at the

Development Economic Research Group of the World Bank. She currently serves as the secretary general of the International Consortium on Applied Bioeconomy Research (ICABR). After working, from 2001 to 2005 at the Development Research Group of the World Bank, she served as an Economist at the Public Investment Evaluation Unit of the Italian Ministry of Economy and Finance until 2008. Her research focuses on option value theory, investment analysis, development economics, rural development and agriculture, agriculture efficiency and productivity analysis. She has been consultant to FAO, World Bank, IFPRI and several Italian Ministries, and agencies. She holds a PhD in Economics from the University of Rome Tor Vergata.

Thomas Jayne is University Foundation Professor of Agricultural, Food, and Resource Economics at Michigan State University. His career has been devoted to working with African colleagues to improve rural livelihoods in Africa. He has mentored dozens of young African professionals and played a major role in building MSU's partnerships with African research institutes, directing several grants from the Gates Foundation focusing on building sustainable research capacity in Africa. He currently serves on the advisory boards of several initiatives dedicated to building institutional capacity in sub-Saharan Africa, including the Regional Network of Agricultural Policy Research Institutes in Eastern and Southern Africa, and was recently appointed as Co-Director of Michigan State University's Alliance for African Partnership to build long-term inter-disciplinary research partnerships between MSU and African research and policy organizations. Over the past decade, Jayne has received six distinguished research excellence awards from

various professional and academic organizations, including the 2009 Outstanding Article Award in Agricultural Economics.

Madhur Gautam is a Lead Economist with the Agriculture Global Practice at the World Bank. He has a Ph.D. in Agricultural Economics from the University of Maryland. He has worked in many parts of the World Bank over the past 25 years including Development Economics (Research), Agricultural Policies Division, Independent Evaluation Group, and Operations unit in Africa and South Asia. The primary focus of his current work is agricultural and food policy analysis and development strategy. In addition to leading major evaluations, including the review of the Highly Indebted Poor Countries (HIPC) Debt Relief Program, he has authored and contributed to numerous reports, policy notes and journal papers on a range of topics including agriculture productivity growth, research and extension, rural finance, food price volatility, risk management, social safety nets, rural poverty, structural transformation, forestry, and broadly agriculture and rural development policy.

Mark Rosenzweig is the Frank Altschul Professor of International Economics and Director of the Economic Growth Center at Yale. Before that he served as the Director of the Center for International Development at Harvard University. He is a development economist who pioneered in the use of microeconomic methods for studying the causes and consequences of economic development and the role of human capital. Rosenzweig was Co-Editor of the Handbook of Family and Population Economics and of the newest Handbook of Development Economics. Rosenzweig also served as Editor-in-Chief of the Journal of Development Economics. He is a Fellow of the Econometric Society,

a Fellow of the Society of Labor Economists, a Fellow of the American Academy of Arts and Sciences, and a Yangtze River Scholar. Rosenzweig earned B.A., M.A. and Ph.D. degrees from Columbia University.

Moderators

Gopinath (Gopi) Munisamy is the Director of the Market and Trade Economics Division of USDA's Economic Research Service. He oversees a program of economic research and analysis on U.S. and global economic and policy factors affecting the structure and performance of agricultural markets and trade. Before joining ERS, he was Professor in the Department of Applied Economics at Oregon State University, and he also chaired the Executive Committee of the International Agricultural Trade Research Consortium. Gopi has published research on international trade, economic growth and development, including the impact of agricultural policies and trade liberalization. His publications and presentations have an international reach. He has taught courses on agricultural markets, trade and applied econometrics at Oregon State University. Gopi received a Ph.D., in Agricultural and Applied Economics from the University of Minnesota. He holds Bachelor's and Master's degrees from India.

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