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CURRICULUM VITAE

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Title: Distinguished Professor

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EDUCATION

Ph.D., 1978, Economic History, University of Pennsylvania

Undergraduate Economics, University of Iowa, 1/72-5/72

B.A., 1969, History, Carleton College, Northfield, Minnesota

Asian History, University of Singapore, 6/67-2/68

EXPERIENCE

Distinguished Professor, Department of Agriculture, Food and Resource Economics, Rutgers University, July 2005 to present

Adjunct Professor, Department of Agricultural and Resource Economics, Kasetsart University, Bangkok, Thailand 2010 to present.

Visiting Scholar, Department of Agriculture and Resource Economics and Energy Biosciences Institute, U. of California, Berkeley 2008-2009

Chair, Department of Agriculture, Food and Resource Economics, Rutgers University, September 2005 to 2008

Professor, Department of Agriculture, Food and Resource Economics, Rutgers University, 1998 to June 2005.

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Director of the Graduate Program in Food and Business Economics, Rutgers University, 2001-2005

Adjunct Professor and Advisor, Ph.D. Program, Center for Chinese Agricultural Policy, Chinese Academy of Sciences. January 2003 to December 2005.

Visiting Professor of Public and International Affairs, Woodrow Wilson School, Princeton University. February to July 2003.

Research Fellow, Rural Development Research Consortium. University of California, Berkeley. October 2002 to present.

Visiting Research Fellow, Economic Research Service, USDA. July 1999 to June 2000.

Guest Professor, Economics and Trade College, Zhejiang Agricultural University, Hangzhou, Zhejiang, People's Republic of China. May 1995.

Visiting Fellow, Economic Growth Center, Yale University, July 1992 to June 1993.

Associate Professor, Department of Agricultural Economics and Marketing, Rutgers University, January 1986 to 1998.

Graduate Director, Department of Agricultural Economics and Marketing, Rutgers University, September 1989 to 1990.

Full Member of the Graduate Faculty of the Department of Economics, Rutgers University, 1987 to present.

Research Associate, Private Sector Innovation and Technology Transfer, Agricultural and Applied Economics Department, University of Minnesota, 1984 to 1986.

Research Associate, Asian Agricultural Research Project, Agricultural and Applied Economics Department, University of Minnesota, November 1980 - 1984.

Associate, Bangladesh, Agricultural Development Council, Inc. Conducted research on the economics of agricultural research, technology assessment, irrigation policy and the pricing of agricultural inputs and outputs for Bangladesh Ministry of Agriculture and Bangladesh Planning Commission. Managed a small research grant and scholarship program, November 1978 - October 1980.

Lecturer, Economics Department, Rutgers University, Spring, 1978.

Instructor, Economics Department, University of Pennsylvania, Fall, 1977.

Peace Corps Volunteer, Rajasthan, India, 1969-71. Village level agricultural extension work with farmers and local officials to spread the use of modern farming techniques.

AWARDS AND HONORS

Carleton College, Northfield, MN. Alumni Association Distinguished Achievements Award 2019

Senior Foreign Expert by the Chinese Ministry of Science and Technology affiliated with Beijing Institute of Technology. February 1, 2018 to January 31, 2019.

International Excellence Award 2014, School of Environmental and Biological Sciences, Rutgers, the State University of New Jersey.

Blue Ribbon Expert Panel on Development, Council on Food, Agricultural and Resource Economics (C-FARE), Agricultural and Applied Economics Association 2012 to 2016.

President, 2008 to Present. International Consortium for Applied Bioeconomy Research (ICABR).

Quality of Communication Award at the 2012 Agricultural & Applied Economics Association (AAEA) Annual Meetings, Seattle, USA for C.A. Carter, G.C. Moschini, I. Sheldon (eds.) Genetically Modified Food and Global Welfare (Frontiers of Economics and Globalization, Volume 10, Emerald Group Publishing Limited, U.K 2011 which included Pray, C.E., L. Nagarajan, J. Huang, R. Hu and B. Ramaswami (2011). "The impact of Bt cotton and the potential impact of biotechnology on other crops in China and India."

Quality of Communication Award at the 2010 Agricultural & Applied Economics Association (AAEA) Annual Meetings, Denver, Colorado D. Spielman and R. Pandya (eds.) Millions-Fed. Published by IFPRI. Washington DC, U.S.A., which included Pray, C.E., and L. Nagarajan (2009). "Pearl Millet and Sorghum Improvement in India: Role of Seed Markets and Crop Improvement for Arid Lands".

Special Service Award 2004, Association for International Agriculture and Rural Development, National Association of State Universities and Land-Grant Colleges.

Award for Outstanding Scientific Progress, Ministry of Agriculture of China, 1999 for publications on Agricultural R&D Policy (with Jikun Huang, Scott Rozelle, and Ruifa Hu).

Leader, one-month team residency with Jikun Huang and Scott Rozelle for research on the Chinese agricultural research system at the Rockefeller Foundation, Bellagio Study and Conference Center. July 1999.

Visiting Fellow, Economic Growth Center, Yale University, July 1992 - June 1993.

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Thesis selected as one of the five best Ph.D. theses in 1978/79 by American Economic History Association.

Fulbright Fellowship for dissertation research in London and Pakistan, 1975-76.

NDEA Title VI Fellowship, 1972-75.

FIELDS OF CONCENTRATION

Science and Technology Policy

Agricultural Policy

Economic Development

PUBLICATIONS AND PAPERS

Books and Monographs

N. Chandrasekhara Rao, Carl E. Pray and Ronald J. Herring (eds) *Biotechnology for a Second Green Revolution in India: Socioeconomic, Political, and Public Policy Issues* Academic Foundation Press: New Delhi. 2018.

Fuglie, Keith O., Paul W. Heisey, John L. King, Carl E. Pray, Kelly Day-Rubenstein, David Schimmelpfennig, Sun Ling Wang, and Rupa Karmarkar-Deshmukh. *Research Investments and Market Structure in the Food Processing, Agricultural Input, and Biofuel Industries Worldwide*. ERR-130. U.S. Dept. of Agriculture, Econ. Res. Serv. December 2011.

Huang, J., R. Hu., R. Chen, J. Mi, S. Rozelle, and C. Pray. *Economic Impacts of Transgenic Biotechnology: 10 Years of Bt Cotton* China Science Press, Beijing. 2010 (in Chinese)

Carl E. Pray and Keith O. Fuglie. *Private Investments in Agricultural Research and International Technology Transfer in Asia* ERS Agricultural Economics Report No. 805. November 2001. <http://www.ers.usda.gov/publications/aer805/>

Robert E. Evenson, Carl E. Pray, and Mark Rosegrant *Agricultural Research and Productivity Growth in India*. Washington: International Food Policy Research Institute. 1999.

Robert E. Evenson and Carl E. Pray. *Research and Productivity in Asian Agriculture*. Ithaca: Cornell University Press, 1991.

Vernon W. Ruttan and Carl E. Pray, eds. *Policy for Agricultural Research*, Boulder and London: Westview Press, 1987.

Anderson, J.R., Herdt, R.W., Scobie, G.M., Pray, C.E. and Jahnke, H.E. *International Agricultural Research Centers: A Study of Achievements and Potential*. Agricultural Economics

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Bulletin No. 32, Department of Agricultural Economics and Business Management, University of New England, Armidale, on [microfiche](#), 1987. pp. 738.

Refereed Journal Articles

Birner, Regina, Thomas Daum and Carl Pray, “Who drives the digital revolution in agriculture? A worldwide review of supply-side trends, players and challenges.” *Applied Economic Perspectives and Policy* forthcoming 2021.

Anderson, Jock R., Regina Birner, Latha Nagarajan, Anwar Naseem and Carl E. Pray, “Private Agricultural R&D: Do the Poor Benefit?” *Journal of Agricultural & Food Industrial Organization* 18(2), 1-12. 2021.

Anderson, Jock R., Latha Nagarajan, Anwar Naseem, Carl E. Pray and Thomas A. Reardon , “New Corona Virus, Food Security and Identifying Policy Options”, *Więś i Rolnictwo* 2020, 4(189), 77-88 [Village & Agriculture, Poland].

Jinyang Cai, Weiqiong Chen Jikun Huang Ruifa Hu Carl E. Pray. “The Evolving Structure of Chinese R&D Funding and its Implications for the Productivity of Agricultural Biotechnology Research.” *Journal of Agricultural Economics* Volume71, Issue2, Pages 287-304 June 2020.

Sanjib Bhuyan, Carl Pray. “Role of interest groups in technology policy: a case study of policies on agricultural biotechnology in India.” *Indian Journal of Economics and Development*. September 2019, Vol 7 (9), 1-17.

Haiyan Deng, Ruifa Hu, Carl Pray, Yanhong Jin. “Determinants of Firm-level Lobbying and Government Responsiveness in Agricultural Biotechnology in China.” *Review of Policy Research* December 2019.

Jaim José da Silva Júnior, José Maria Jardim da Silveira, Andréa Leda Ramos de Oliveira, Caroline Nascimento Pereira, Carolina Bueno Silveira, and Carl Esek Pray, " Investments in agricultural research and development: recent transformations in Brazil." *Revista Brasileira de Inovação*. 18 (1), p. 89-120, 2019

Haiyan Deng, Ruifa Hu, Carl Pray, Yanhong Jin. “Perception and Attitude toward GM Technology among Agribusiness Managers in China as Producers and as Consumers.” *Sustainability* vol. 11(5), pages 1-17, March, 2019.

Latha Nagarajan, Anwar Naseem, Carl Pray “Contribution of policy change on maize varietal development and yields in Kenya.” *Journal of Agribusiness in Developing and Emerging Economies* 14 May 2019

Jinyang Cai, Zuting Zheng, Ruifa Hu, Carl E Pray and Qianqian Shao, “Has International Aid Promoted Economic Growth in Africa?” *African Development Review* Volume 30, Issue 3 September 2018, Pages 239-327

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Carl Pray, Latha Nagarajan, Anwar Naseem “The Role of Multinational Corporations in the Supply of Agricultural Production Technology China & India.” *World Food Policy* Volume 4, Issue 2, Spring 2018

Carl Pray, Jikun Huang, Ruifa Hu, Haiyan Deng, Jun Yang, and Xenia K. Morin “Prospects for cultivation of genetically engineered food crops in China.” *Global Food Security*, Volume 16, March 2018, Pages 133-137

Yanhong Jin, Yahong Hu, Carl Pray, Ruifa Hu, "Impact of government science and technology policies with a focus on biotechnology research on commercial agricultural innovation in China", *China Agricultural Economic Review*, 2017 Vol. 9 Issue: 3, pp.438-452.

Haiyan Deng, Ruifa Hu, Jikun Huang, Carl Pray, Yanhong Jin, Zhonghua Li, "Attitudes toward GM foods, biotechnology R&D investment and lobbying activities among agribusiness firms in the food, feed, chemical and seed industries in China", *China Agricultural Economic Review*, 2017. Vol. 9 Issue: 3, pp.385-396.

Steven Haggblade, Bart Minten, Carl Pray, Thomas Reardon and David Zilberman “The Herbicide Revolution in Developing Countries: Patterns, Causes, and Implications.” *The European Journal of Development Research* pp 1–27. First Online: 29 May 2017

Paul Vincelli, Douglas Jackson-Smith, Michael Holsapple, Michael A Grusak, Matthew Harsh, Theodore Klein, James Lambert, B Markus Lange, David M Lodge, Jill McCluskey, Angus Murphy, Marian L Neuhouser, Carl Pray & Susan Weller “National Academies report has broad support” letter in *Nature Biotechnology* 35, 304–306 2017

Latha Nagarajan, Anwar Naseem and Carl Pray “The Political Economy of Genetically Modified Maize in Kenya.” *Agbioforum* 2016.

Carl E. Pray and Samuel Ledermann. “Genetically Engineered Crops and Certified Organic Agriculture for Improving Nutrition Security in Africa and South Asia.” *World Review of Nutrition and Diet*, 115, 175-183, 2016

N. Chandrasekhara Rao, Carl E. Pray and Ron J. Herring. “Biotechnology for a Second Green Revolution in India: Socioeconomic, Political, and Public Policy Issues.” *Agbioforum* 2015. 18(2) 126-141.

Latha Nagarajan, Carl E. Pray, and Anwar Naseem. “Empirical analysis on the impact of private sector R&D on cotton productivity in India.” *Agbioforum* 2015. 18(2) 182-192

Anwar Naseem, Carl E Pray and James F. Oehmke. “Technical convening on smallholder agricultural transformation.” *Food Security* 2015. 7 (6): 1337-1340.

Carl E. Pray and Keith O. Fuglie. “Agricultural Research by the Private Sector” *Annual Review of Resource Economics* 2015. 7:18.1–18.25

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Carl Pray and Latha Nagarajan, "The Transformation of the Indian Agricultural Input Industry: Has It Increased Agricultural R&D?" *Agricultural Economics* Vol. 45 (s1), pp 145-156, November 2014.

Orachos Napasintuwong and Carl Pray, "Adoption of drought-tolerant rice in Thailand: Participatory varietal selection and implications for breeding programs" *Journal of Development and Agricultural Economics*. Vol.6(9), pp. 394-404, September 2014

Carl Pray and Latha Nagarajan, "Role of Biotechnology in Stimulating Agribusiness R&D Investment in India." *Agbioforum*. 2013: Vol.16(2): 104-111.

Keith Fuglie, Paul Heisey, John King, Carl E. Pray and David Schimmelpfennig "The Contribution of Private Industry to Agricultural Innovation" *Science* 23 November 2012: 1031-1032.

Guanming Shi, Wenhui Zhang, and Carl E. Pray "Effectiveness of Intellectual Property Protection: Survey Evidence from China" *Agricultural and Resource Economics Review*. 2012 41(3):1-10

Guanming Shi and Carl E. Pray "Modeling Agricultural Innovation in a Rapidly Developing Country: The Case of the Chinese Pesticide Industry" *Agricultural Economics* 2012. 43:377-388

Huanguang Qiu, Jikun Huang, Carl Pray and Scott Rozelle. "Consumers trust in government and their attitudes towards genetically modified food: empirical evidence from China." *Journal of Chinese Economics and Business Studies* Jan 11, 2012

Bharat Ramaswami, Carl E. Pray, and N. Lalitha "The Spread of Illegal Transgenic Cotton Varieties in India: Biosafety Regulation, Monopoly, and Enforcement" *World Development* 2012 40 (1)177-188

Ari Novy, Ledermann, S., Pray, C., & Nagarajan, L. Balancing agricultural development resources: Are GM and organic agriculture in opposition in Africa? *AgBioForum*, 14(3), 142-157.2011 Available on the World Wide Web: <http://www.agbioforum.org>.

Carl E. Pray, Nagarajan L., Li L., Huang J., Hu R., Selvaraj K., Napasintuwong O., Babu R.C. Potential Impact of Biotechnology on Adaption of Agriculture to Climate Change: The Case of Drought Tolerant Rice Breeding in Asia. *Sustainability*. 2011; 3(10):1723-1741

Ruifa Hu, Qin Liang, Carl Pray, Jikun Huang, and Yanhong Jin "Privatization, Public R&D Policy, and Private R&D Investment in China's Agriculture." *Journal of Agricultural and Resource Economics*. 2011 36(2):416-432

Carl E. Pray and Latha Nagarajan. "Price Controls and Biotechnology Innovation: Are State Government Policies Reducing Research and Innovation by the Ag Biotech Industry in India?" *AgBioForum*, 13(4), 297-307 2010.

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Huang Jikun, Mi Jianwei, Lin Hai, Wang Zhijun, Chen Ruijan, Hu Ruifa, Rozelle Scott, Pray, Carl. "A Decade of *Bt* Cotton in Farmer Fields in China: Assessing the Direct Effects and Indirect Externalities of *Bt* Cotton Adoption in China." *Science China Life Sciences* 53(8) 981-991 2010.

Karmarkar-Deshmukh, R., & Pray, C.E.. "Private sector innovation in biofuels in the United States: Induced by prices or policies?" *AgBioForum*, 12(1), 141-148. 2009. Available on the World Wide Web: <http://www.agbioforum.org>.

Ruifa Hu, Carl Pray, Jikun Huang, Scott Rozelle, Cunhui Fan, and Caiping Zhang. Reforming Intellectual Property Rights and the *Bt* Cotton Seed Industry in China: Who Benefits from Policy Reform? *Research Policy* 38, 793–801, 2009.

Wang Zijun, Lin Hai, Huang Jikun, Hu Ruifa, Scott Rozelle and Carl Pray
"Bt Cotton in China: Are Secondary Insect Infestations Offsetting the Benefits in Farmer Fields"
Agricultural Sciences in China January 2009, 8(1): 101-105

Jikun Huang, Ruifa Hu, Scott Rozelle and Carl Pray. "Genetically Modified Rice, Yields and Pesticides: Assessing Farm-level Productivity Effects in China." *Economic Development and Cultural Change*. 56:241–263, January 2008.

Laurian Unnevehr, Carl Pray, & Robert Paarlberg. Addressing micronutrient deficiencies: Alternative interventions and technologies. *AgBioForum*, 10(3), 124-134. 2007. Available on the World Wide Web: <http://www.agbioforum.org>.

Carl E. Pray, Robert Paarlberg, & Laurian Unnevehr. Patterns of political response to biofortified varieties of crops produced with different breeding techniques and agronomic traits. *AgBioForum*, 10(3), 135-143. 2007 Available on the World Wide Web: <http://www.agbioforum.org>.

Robert Paarlberg & Carl E. Pray. Political actors on the landscape. *AgBioForum*, 10(3), 144-153. 2007 Available on the World Wide Web: <http://www.agbioforum.org>.

Carl E. Pray, & Jikun Huang. Biofortification for China: Political responses to food fortification and GM technology, interest groups, and possible strategies. *AgBioForum*, 10(3), 161-169. 2007. Available on the World Wide Web: <http://www.agbioforum.org>.

Carl E. Pray and Anwar Naseem. "Supplying Crop Biotechnology to the Poor: Opportunities and Constraints." *Journal of Development Studies* Vol. 43, No. 1, 192–217, January 2007

Jikun Huang, Huanguang Qiu, Junfei Bai, & Carl Pray "Awareness, Acceptance of and Willingness to Buy Genetically Modified Foods in Urban China." *Appetite* 46 (2006), pp: 144-151

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Ruifa Hu, Jie Huang, Carl E. Pray, and Jikun Huang, “The Determinants of Plant Variety Protection Applications in China.” *Journal of Intellectual Property Rights*, Vol, 11, July, 2006. 260-268.

Carl E. Pray, Ramu Govindasamy and Ann Courtmanche (2006) “The Importance of Intellectual Property Rights in the International Spread of Private sector Agricultural Biotechnology.” *The ICFAI Journal of Agricultural Economics*. Vol III, No.3, July 2006, 7-21.

Carl E. Pray, Bharat Ramaswami, Jikun Huang, Prajakta Bengali, Ruifa Hu and Huazhu Zhang (2006) “Costs and Enforcement of Biosafety Regulation in India and China. *International Journal of Technology and Globalization*. Vol.2, Nos.1/2. 2006. 137-157.

Marnus Gouse, Carl Pray, David Schimmelpfennig & Johann Kirsten. (2006). Three seasons of subsistence insect-resistant maize in South Africa: Have smallholders benefited?. *AgBioForum*, 9(1), 15-22. Available on the World Wide Web: <http://www.agbioforum.org>.

Jie Huang, Ruifa Hu, Carl E. Pray, and Jikun Huang. “Application for Protection of New Plant Variety in China and the Determinant Factors.” (in Chinese) *Chinese Rural Economy*. Vol 5, 2005 (Serial No.245) pp. 47 – 53.

James. F. Oehmke, Carl E. Pray, & Anwar Naseem, “Preface: Innovation and dynamic efficiency in agricultural biotechnology.” *AgBioForum*, 8(2&3), 2005 pp. 50-51. Available on the World Wide Web: <http://www.agbioforum.org>.

Carl E. Pray, James F. Oehmke, & Anwar Naseem, “Innovation and Dynamic Efficiency in Plant Biotechnology: An Introduction to the Researchable Issues.” *AgBioForum*, 8(2&3), 2005. pp. 52-63. Available on the World Wide Web: <http://www.agbioforum.org>.

Margaret Brennan, Carl E Pray, Anwar Naseem, and James F. Oehmke, An Innovation Market Approach to Analyzing Impacts of Mergers and Acquisitions in the Plant Biotechnology Industry *AgBioForum*, 8(2&3), 2005. pp. 89-99. Available on the World Wide Web: <http://www.agbioforum.org>.

Carl E. Pray and Anwar Naseem, Intellectual Property Rights on Research Tools: Incentives or Barriers to Innovation? Case Studies of Rice Genomics and Plant Transformation Technologies *AgBioForum*, 8(2&3), 2005. pp. 108-117. Available on the World Wide Web: <http://www.agbioforum.org>

Carl E. Pray, Prajakta Bengali, and Bharat Ramaswami. “Costs and Benefits of Biosafety Regulation in India: A Preliminary Assessment.” *Quarterly Journal of International Agriculture* 44 (2005), No. 3: 267-289

Jikun Huang, Ruifa Hu, Scott Rozelle and Carl Pray. 2005. Debate over GM Rice Trial in China: Responses, *Science*, 310 (2005) pp. 231-233.

Jikun Huang, Ruifa Hu, Scott Rozelle, Carl Pray “Insect-Resistant GM Rice in Farmers’

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Fields: Assessing Productivity and Health Effects in China.” *Science*. Vol 308 (April 29, 2005) pp 688-690.

Marnus Gouse, Carl E. Pray, Johann Kirsten, David Schimmelpfennig “A GM Subsistence Crop in Africa: The Case of Bt White Maize in South Africa” *International Journal of Biotechnology*. Vol. 7 (1,2,3) 2005. pp.84-94

Marnus Gouse, Carl Pray, and David Schimmelpfennig, “The Distribution of Benefits from Bt Cotton Adoption in South Africa.” *Agbioforum*. 7(4). 2005 pp 187-194

Ferdous Hossain, Carl E. Pray, Yanmei Lu, Jikun Huang, Cunhui Fan, and Ruifa Hu, “GM Cotton and Farmer’s Health in China: An Econometric Analysis of the Relationship between Pesticide Poisoning and GM Cotton Use in China.” *International Journal of Occupational and Environmental Health*. 10(3) 2004 pp 307-314

David Schimmelpfennig, Carl E. Pray, and Margaret Brennan “The Impact of Seed Industry Concentration on Innovation: A Study of U.S. Biotech Market Leaders.” *Agricultural Economics*. Vol. 30(2004) 157-167.

Jikun Huang, Ruifa Hu, Cuihui Fan, Carl E. Pray, and Scott Rozelle. “Bt Cotton Benefits, Costs, and Impacts in China.” *AgBioForum*. Vol.5 (2003) pp 153-166.

Jikun Huang, Ruifa Hu, Carl E. Pray, Fangbin Qiao, Scott Rozelle “Biotechnology as an Alternative to Chemical Pesticides: A Case Study of Bt Cotton in China.” *Agricultural Economics*. Vol. 29 (2003). Pp. 55-67.

David Gisselquist, Carl Pray, John Nash “Deregulating Technology Transfer in Agriculture: Impact on Technical Change, Productivity, and Incomes.” *World Bank Research Observer*. Vol.17, no.2 (Fall,2002). pp. 237-265

Jikun Huang, Ruifa Hu, Scott Rozelle, Fangbin Qiao and Carl E. Pray. “Transgenic Varieties and Productivity of Smallholder Cotton Farmers in China.” *Australian Journal of Agricultural and Resource Economics*. 46:3, (September, 2002).pp.367-387.

Carl E. Pray, Jikun Huang, Ruifa Hu, and Scott Rozelle. “Five Years of Bt Cotton in China - the Benefits Continue.” *The Plant Journal* 31 (4), 2002. pp 423-430.

Jikun Huang, Carl Pray, and Scott Rozelle. “Enhancing the Crops to Feed the Poor.” *Nature* 418 (August 2002) pp. 678-684.

Bharat Ramaswami and Carl E. Pray. “Dissemination of Private Hybrids and Crop Yields in the Semi-Arid Tropics of India.” *Indian Journal of Agricultural Economics*. 57 (1) 2002. pp. 39-51.

Jikun Huang, Scott Roselle, Carl E. Pray, and Qinfang Wang. "Plant Biotechnology in China" *Science* Vol.295. (25 January 2002). pp 674-677.

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Bharat Ramaswami, Carl E. Pray, and Tim Kelley. "The Impact of Economic Reforms on R&D by the Indian Seed Industry." *Food Policy* 26 (6) 2001.pp. 587-598.

Carl E. Pray. "Public/Private Sector Linkages in Research and Development: Biotechnology and the Seed Industry in Brazil, China and India." *American Journal of Agricultural Economics*. 83(3) August 2001.pp 742-747.

Carl E. Pray and Bharat Ramaswami. "Technology, IPRs, and Reform Options: A Case Study of the Seed Industry with Implications for Other Input Industries." *The International Food and Agribusiness Marketing Review Special Issue*. Vol. 2 (3/4) 2001. pp. 407-420.

Carl E. Pray, Jikun Huang, Danmeng Ma, and Fangbin Qiao "Impact of Bt Cotton in China" *World Development* Vol.29, No.5, pp.813-825, 2001.

Carl E. Pray. "Public and Private Collaboration on Plant Biotechnology In China." *AgBioForum* Volume 2, Winter 1999. <http://www.agbioforum.missouri.edu>.

Carl E. Pray and Dina Umali-Deininger. "Private Agricultural Research: Will It Fill the Gap?" *World Development*, Vol.26. No.6.1998. 1127-1148.

Scott Rozelle, Carl E. Pray and Huang Jikun. "Agricultural Research Policy in China: Testing the Limits of Commercialization-led Reform." *Comparative Economic Studies*, Vol.39. No.2.Summer, 1997. 37-71.

Carl E. Pray and Jock Anderson. "The Agricultural Research System of the Former Soviet Union: Past and Future." *Journal of International Development*, Vol.9. 1997.pp. 517-527

C. Ramasamy, T. R. Shanmugam, and Carl Pray. "Priority Setting for Rice Research in Southern India - An Ex-Ante Approach." *Indian Journal of Agricultural Economics*, Vol 52. No. 1. January-March, 1997.

Hu Ruifa, Huang Jikun, Carl Pray, and Scott Rozelle. "Problems in the Current Chinese Agricultural Research System" (in Chinese) in *Management World*, No. 3, 1996. pp. 167-183.

Carl E. Pray. "Impact of Privatization of Agricultural Research in Great Britain: An Interim Report." *Food Policy*, Vol.21, No.3, 1996.pp. 305-318.

Michael Westendorf, R. G. Zimbelman, and C. E. Pray. "Science and Agriculture Policy at Land-Grant Institutions." *Journal of Animal Science*, Vol. 73 (1995) pp. 1628-1638.

Carl E. Pray and Robert E. Evenson. "Measuring Food Production (with reference to South Asia)." *Journal of Development Economics*, Vol.44. 1994. pp.173-197.

Carl E. Pray and Mary Knudson. "Impact of Intellectual Property Rights on Genetic Diversity: The Case of U.S. Wheat." *Contemporary Economic Policy. A Journal of the Western Economic Association International*. Vol.12. 1994.pp.102-112.

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Carl E. Pray, Sharmila Ribeiro, Rolf A. E. Mueller and P. Parthasarathy Rao. "Private Research and Public Benefit: The Private Seed Industry for Sorghum and Pearl Millet in India." *Research Policy*, Vol. 20 (1991). Pp.315-324.

Carl E. Pray and Mary Knudson. "Plant Variety Protection, Private Funding and Public Sector Research Priorities." *American Journal of Agricultural Economics*, Vol.73, No.3. 1991. pp.882-886.

Carl E. Pray. "The Potential Impact of Liberalizing Indian Seed Policy." *Food Policy*, Vol.15. July 1990. pp 193-198.

Carl E. Pray and Catherine F. Neumeyer. "Trends and Composition of Private Food and Agricultural Research in the United States." *Agribusiness: An International Journal*, Summer, 1990.

Carl E. Pray and Ruben Echeverria. "Transferring Hybrid Maize Technology: The Role of the Private Sector." *Food Policy*, November 1988. pp. 366-374.

Carl E. Pray. "Mobilizing Support for Agricultural Research: A Case Study of the University of Minnesota." *Agricultural Administration*, Summer, 1988. pp. 165-180.

R. E. Evenson, Carl E. Pray and Grant Scobie. "The Influence of International Research on the Size of National Research Systems." *American Journal of Agricultural Economics*, December 1985. pp. 1074-1079.

Carl E. Pray. "Accuracy of Official Statistics and the Sources of Agricultural Growth in the Punjab 1907-1947." *Indian Economic and Social History Review*, Vol. 21, No. 3, 1984. pp. 313-334.

Carl E. Pray. "The Impact of Agricultural Research in British India." *The Journal of Economic History*, Vol. XLIX, No. 2, June 1984. pp. 429-440.

Carl E. Pray. "Underinvestment and the Demand for Agricultural Research: A Case Study of the Punjab." *Food Research Institute Studies*, Vol. XIX, No. 1, 1983. pp. 51-80. Reprinted in Japanese in *Nobiyuku Nogyo* (Growing Agriculture) in 1984. pp. 1-32.

Carl E. Pray. "Private Agricultural Research in Asia." *Food Policy*, Vol. 8, No. 2, May 1983. pp. 131-140.

Carl E. Pray. "The Green Revolution: An Appraisal." *Economic Impact*, No. 39, 1982. pp. 26-33.

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Book Chapters

Regina Birner and Carl E. Pray, "Bioeconomy" in Serraj R. and Pingali P. (eds) *Agriculture and Food Systems to 2050*. World Scientific Publishing: Singapore. 2018

Birner, R., Naseem, A., Pray, C. and Anderson, J.R. (2018), Fostering Political Will to Drive Agricultural Transformation. Chapter 2 in *Africa Agriculture Status Report 2018: Catalyzing Government Capacity to Drive Agricultural Transformation*. Alliance for a Green Revolution in Africa (AGRA), Nairobi, 22-50.

N. Chandrasekhara Rao, Carl E. Pray and Ronald J. Herring. "Biotechnology for Second Green Revolution in India: Overview of Issues." in N. C. Rao, C. E. Pray and R J. Herring (eds) *Biotechnology for a Second Green Revolution in India: Socioeconomic, Political, and Public Policy Issues* Academic Foundation Press: New Delhi 2018. Pp.42-72.

Latha Nagarajan, Carl E. Pray and Anwar Naseem. "Empirical Analysis on the Impact of Private Sector R&D on Cotton Productivity in India." N. C. Rao C. E. Pray and R J. Herring (eds) *Biotechnology for a Second Green Revolution in India: Socioeconomic, Political, and Public Policy Issues* Academic Foundation Press: New Delhi forthcoming 2018 pp. 271-290.

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Carl E. Pray and Ruben Echeverria. "Private Sector Agricultural Research and Technology Transfer Links in Developing Countries." in David Kaimowitz (ed.) *Making the Link: Agricultural Research and Technology Transfer in Developing Countries*. Boulder: Westview Press, 1990.

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Richard I. Sauer and Carl E. Pray. "Mobilizing Support for Agricultural Research at the Minnesota Agricultural Experiment Station." in Ruttan and Pray (eds.) *Policy for Agricultural Research*. Boulder and London: Westview Press, 1987. pp. 211-234.

Carl E. Pray. "Mobilizing Political Support for Agricultural Research." in Vernon W. Ruttan, *Agricultural Research Policy and Development*. Rome: FAO, 1987. pp. 127-142.

Carl E. Pray. "Agricultural Research in Foodgrains and Nonfood-grains Asia: The Colonial Heritage." in Bruce Greenfields and Margot Bellamy (eds.) *Rural Development: Growth and Inequity*. Aldershot, England: Gower Publishing, 1983. pp. 250-256.

CONFERENCE PRESENTATIONS AND LECTURES

International presentations: (since 2014)

Carl Pray, John McDermott and Ruben Echeverria Virtual Event- Building back better: How can public food and agricultural research institutions be strengthened and rebuilt after the COVID-19 pandemic? FEB 2, 2021 <https://www.ifpri.org/event/virtual-event-building-back-better-how-can-public-food-and-agricultural-research-institutions> Event had 836 live views.

Carl Pray, Haiyan Deng, Yanhong Jin and Yawei Zhao "Impact of Public and Commercial R&D on Agricultural TFP in China." IFPRI-CAES Annual Meeting, Zhejiang University, Hangzhou, China October 18, 2019.

Carl E. Pray, Presidential Welcome to 23rd ICABR Conference on Regulation and Finance of Innovations for a Sustainable Economy. International Consortium of Applied Bioeconomy Research (ICABR) conference. Ravello, Italy June 4–7, 2019

Haiyan Deng and Carl Pray. Possible Benefits from Gene Editing in China under Different Regulatory Scenarios. 23th International Consortium of Applied Bioeconomy Research (ICABR) conference. Ravello, Italy June 4–7, 2019

Carl E. Pray Impacts of Changes in Science Technology Policy: Case Study of the African Seed Industry. University Mohammad IV Polytechnic, Ben Guerir, Morocco. March 22nd, 2019,

Carl E. Pray and Yanhong Jin. The Grape Wine Industry in China with a Focus on Ningxia Province: Impacts, Competitiveness, Marketing Strategies, Technology, and Policy Support. Academia Argentina de la Vid y el Vino. Mendoza, Argentina, March 8, 2019.

Regina Birner and Carl E. Pray. Bioeconomy Trends. Presented at the 30th International Conference of Agricultural Economists. Vancouver, Canada. July 30, 2018.

Haiyan Deng, Ruifa Hu, Carl Pray, and Yanhong Jin. Impact of Government Policies on Private R&D Investment in Agricultural Biotechnology: Evidence from China. Presented at the 30th International Conference of Agricultural Economists. Vancouver, Canada. July 29, 2018.

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Anwar Naseem, Latha Nagarajan and Carl E. Pray. The role of maize varietal development on yields in Kenya. Presented at the 30th International Conference of Agricultural Economists. Vancouver, Canada. July 29, 2018.

Carl E. Pray. Would agriculture in Brazil, China and India have grown faster and more equitably if the governments of those countries had been guided by the New Structural Economics? Conference on New Structural Economics and its Applications to Agricultural Development. Peking University, Beijing, China. October 21-22, 2017

Carl E. Pray. The Role of Multinational Corporations in the Supply of Agricultural Production Technology China & India. Invited Presentation at the 2017 *World Food Policy* Conference Bangkok. January 16 and 17, 2017

Ruifa Hu, Haiyan Deng, Jikun Huang and Carl Pray. Research capacity and challenge of agricultural development in China. Presentation at the 2017 *World Food Policy* Conference Bangkok. January 16 and 17, 2017

Carl E. Pray Global Opportunities and Challenges to GM Crops and Policy Responses. Keynote Speech at the Conference on Chinese Agricultural Biotechnology: Developments, Challenges and Policies. Beijing. November 8, 2016.

Carl E. Pray. China as the Global Leader in Agricultural Research: Implications for Chinese and World Agriculture. Invited Keynote Speech at conference on The Rise of Chinese Agriculture 27-28 October 2016. Victoria University of Wellington, Wellington, New Zealand

Carl E. Pray, Presidential Welcome: Transforming the Bioeconomy: Behavior, Innovation and Science, 20th International Consortium of Applied Bioeconomy Research (ICABR) conference. Ravello, Italy June 27-29, 2016.

Carl E. Pray, Latha Nagarajan, and Anwar Naseem. Barriers and Enablers of GM Food Crop Adoption in Africa: A Case Study of Kenya. International Association of Agricultural Economists. Milan. August 9 to 14, 2015.

Carl E. Pray Governance Issues in Biotech Management in India and China. International Association of Agricultural Economists. Milan. August 9 to 14, 2015.

Carl E. Pray. Political Economy of Genetically Modified (GM) Food Production in China, India & Kenya, and Brazil. 19th International Consortium of Applied Bioeconomy Research (ICABR) conference. Ravello, Italy June 16-19, 2015

Carl E. Pray and Samuel Ledermann. Genetically Engineered Crops and Certified Organic Agriculture for Improving Nutrition Security in Africa and South Asia. 2nd International Hidden Hunger Congress. Universität Hohenheim. Stuttgart, Germany. March 5th, 2015

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Carl E. Pray. Political Economy of Genetically Modified (GM) Food Production in China, India & Brazil presented at Symposium on Genetically Modified Crops in China: Development, Challenges and Policy. Friendship Hotel, Beijing, Friday, January 16, 2015

Carl E. Pray and Latha Nagarajan. Transformation of Agricultural Input Industry and Private Sector Research in India. IEG-IFPRI International Conference on Innovation in Agriculture: Ways Forward. New Delhi, India. December 5 and 6, 2014

Carl E. Pray. Political Economy of Genetically Modified (GM) Food Production in China, India & Kenya. Indian Statistical Institute, New Delhi, India. December 3, 2014.

Carl E. Pray, Latha Nagarajan, and Hemi Shah, and Marnus Gouse, The Role of Bt Maize in Reducing the Exposure of Small Farmers to the Mycotoxin in South Africa Paper presented at the 18th International consortium of applied bio-economy (ICABR) conference, Nairobi, Kenya June 17-20, 2014

Sanjib Bhuyan, Cliff Echols, and Carl E. Pray What Determines Foreign Funding of NGOs participating in the GMO Debate in India? Paper presented at the 18th International consortium of applied bio-economy (ICABR) conference, Nairobi, Kenya. June 17-20, 2014

Presentations in the U.S.A. (since 2014)

Carl Pray, Haiyan Deng, Yanhong Jin and Yawei Zhao. “Impact of public and private R&D on Agricultural TFP in China” Agricultural and Applied Economics Association, Atlanta, July 20, 2019.

Carl Pray, Haiyan Deng, Changxin Yu, Tongpeng Deng, Yanhong Jin “Impact of Chinese Policies on Competitiveness and Innovation of Chinese agricultural input industries” Agricultural and Applied Economics Association, Atlanta, July 20, 2019.

Carl Pray and Regina Birner. Impact of digital agriculture on agricultural input industries. World Bank, Washington DC, June 25, 2019.

A. Lam, M. Murray, H. Blum, K. Torcivia, Y.H. Jin, and C. Pray. “Understanding the Implications of New Meat and Meat Substitute Technologies on Consumer Decision Making.” Presented at the 22th ICABR (International Consortium on Applied Bioeconomy Research) conference at the World Bank on June 12, 2018.

Y.H. Jin, T.P. Deng, Carl Pray, and Y.Y. Deng. “Did Public Investments and Innovation Policies Increase R&D Innovation and Productivity of Agribusiness Firms?” Presented at the 22th ICABR (International Consortium on Applied Bioeconomy Research) conference at the World Bank on June 15, 2018.

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Latha Nagarajan, Carl Pray and Anwar Naseem. Transformation of the agricultural input industry and private R&D in India 22nd ICABR Conference, World Bank. Washington, DC, June 13, 2018

Carl Pray, Latha Nagarajan, and Anwar Naseem. Regulations, Intellectual Property Rights, Private Sector Innovation and Agricultural Productivity 22nd ICABR Conference, World Bank. Washington, DC, June 13, 2018

Carl E. Pray “Agricultural Biotechnology Policy in China.” Hearing of U.S. China Economic Security Review Commission on U.S.-China Food Policy. U.S. Congress. Washington, DC April 26, 2018.

Carl E. Pray. Technological Innovations in Agrifood Supply Chains: Opportunities for R&D, collaboration and investment in China and India. Berkeley Supply Chain Conference, U.C. Berkeley, California. April 19, 2018.

Carl E. Pray. The Changing Global Private Funding Landscape Focusing on the Roles of Brazil, China and India. ICABR Conference, Berkeley, CA. 2017.

William A. Masters and Carl E. Pray. Priority Setting in Agricultural Research for Poverty Reduction, Nutrition Improvement and Resilience, Agricultural and Applied Economics Association, Chicago July 31, 2017.

Haiyan Deng; Ruifa Hu, Carl E. Pray and Yanhong Jin, How Important are Economic Factors and Agribusiness Managers’ Acceptance of GM Products in the Approval of GM Crops in China? Agricultural and Applied Economics Association, Chicago August 1, 2017.

Carl E. Pray as President of the International Consortium on Advanced Bioeconomy Research Response to the NAS report Genetically-Engineered (GE) Crops: Experience and Prospects, National Academy of Sciences Auditorium. Washington, DC. December 7, 2016

Carl E. Pray. The Future of the Bioeconomy. Presentation at conference on The Bioeconomy: Technological and Policy Path Forward September 30th – October 1, 2016. Rutgers University, New Brunswick, NJ.

Latha Nagarajan, Anwar Naseem and Carl E. Pray. Role of Policy Change in Adoption of Improved Varieties in sub-Saharan Africa. Presented at the Agricultural and Applied Economics Association Meetings, Boston, Mass. August 1, 2016.

Y.H. Jin, C. Pray, R.F. Hu, Y. Hu. Private R&D and Its Productivity in China’s Agriculture. Presented at the annual meeting of Agricultural and Applied Economics Association, Boston, August 2016.

Latha Nagarajan, Anwar Naseem, and Carl E. Pray Transformation of agricultural input industries and the contemporary agricultural transformation in Africa. Presented at the annual meeting of Agricultural and Applied Economics Association, Boston, August 2016.

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Carl E Pray. Ending Hunger (SDG 2) and STI: Role of Biotechnology. First annual Multi-stakeholder Forum on Science, Technology and Innovation for the Sustainable Development Goals (STI Forum) 6 Jun 2016 - 7 Jun 2016. United Nations HQ, New York

Carl E. Pray and Sanjib Bhuyan. The Politics of Disruptive Agricultural Innovation and Sustainability: GMOs and New Breeding Technologies (NBTs) at a conference on Innovation & Sustainability: Lessons from the History of India and Hopes for the Future. June 9-10, 2016 Colorado College, Colorado Springs, Colorado.

Carl E. Pray. Political Economy of Genetically Modified (GM) Food Production in China Cornell U., Ithaca, New York. February 12, 2016.

Carl E. Pray. Panel on *Africa's Future... Can Biosciences Contribute?* at the Center for Strategic and International Studies, Washington DC. November 3, 2015. <http://csis.org/multimedia/video-analyses-africas-future-can-biosciences-contribute>

Carl E. Pray. Political Economy of Genetically Modified (GM) Food Production in China. Economics Department, Iowa State University, Ames IA. October 1, 2015

Carl E. Pray. Transformation of the agricultural input industry and private R&D in Asia, Africa and Brazil. Agriculture and Applied Economics Association annual meetings. San Francisco. CA. July 25 – 28, 2015.

Carl E. Pray. Political Economy of Genetically Modified (GM) Food Production in China, India & Brazil. Presentation at Berkeley Bioeconomy Conference. U. of California, Berkeley California, April 1 and 2, 2015.

Carl E. Pray. Political Economy of Genetically Modified (GM) Food Production in China, India & Kenya. Presented at Cornell International Institute for Food, Agriculture and Development Seminar. Ithaca, New York, October 29, 2014.

Carl E Pray, Latha Nagarajan, Anwar Naseem, and Rohit Singla. Impact of Private Sector R&D and Biotechnology on Cotton Productivity in India. NC 1034 Conference, U. of California, Davis, March 28 and 29. 2014

Carl E Pray and Latha Nagarajan GM Traits, Seed Industry Structure and Biotech Policies in Developing Countries. Berkeley Bioeconomy Conference, U. of California, March 26 and 27, 2014

Conference Organization and Management

Carl E. Pray led the organization of the annual International Consortium of Applied Bioeconomy Research, 2020 and then helped transfer the conference from in person to online October 12 – 21, 2020.

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Carl E. Pray and Anwar Naseem led the organization of the Rutgers University Policy Research Consortium Listening Session National Press Club, Washington D.C. Oct. 28-29, 2019 for approximately 100 USAID leaders.

Carl E. Pray led the organization of the annual International Consortium of Applied Bioeconomy Research 2015 – 2019 in Italy (3 times) Berkeley. CA. and the World Bank in Washington DC.

Carl E. Pray organized an international symposium Genetically Modified Food Crops in Asia and Africa: Opportunities, Barriers and Constraints at the School of Environmental and Biological Sciences, Rutgers University. September 18 and 19, 2014.

Carl E. Pray led the project to shift the annual International Consortium of Applied Bioeconomy Research from Italy to Nairobi, Kenya for the 18th annual meeting June 17 through 20, 2014.
<http://www.economia.uniroma2.it/icabr-conference/index.php?p=19>

Carl E. Pray led the organization and planning of the program of the 13th through 17th Annual International Consortium on Agricultural Biotechnology Research in Ravello, Italy (www.economia.uniroma2.it/icabr) June 2009 through 2013.

Carl E. Pray, Co-organizer. NSF-IGERT for Sustainable Fuels Summer Symposium: Bioenergy and Biofuels to “drive” the globe. Rutgers, the State University of New Jersey, G.H. Cook Campus, New Brunswick, NJ. June 2 - 4, 2010

Carl E. Pray and David Zilberman organized the conference “The Biofuel Situation and Policies in Developing Countries” U.C. Berkeley, CA, May 7 and 8, 2009

Carl E. Pray and David Zilberman organized a conference “Agricultural Biotech in Developing Countries” U.C. Berkeley, January 23rd and 24th, 2009 (www.berkeleybioeconomy.org)

Carl E. Pray led the organization and planning the program of the 12th Annual International Consortium on Agricultural Biotechnology Research in Ravello, Italy (www.economia.uniroma2.it/icabr/2008) JuNe 2008.

Carl E. Pray organized two symposia for the Center for Innovation Studies at Rutgers:
March 27, 2008 “Improving Technology Transfer at the University: Lessons from Social Scientists and from Practitioners.”

April 28, 2008 “Jersey Roots, Global Reach: Innovation and Economic Development in South Asia and New Jersey: Opportunities and Constraints.”

Carl E. Pray and Anwar Naseem organized a conference entitled “Innovation and Dynamic Efficiency in Agricultural Biotechnology.” October 14-15, 2004 at the Economic Research Service of USDA, 1800 M Street NW, Washington, DC
yatt Regency in New Brunswick, NJ. February 28, 2003 and March 1, 2003.

Carl E. Pray and Fred Gould organized conference on “Resistance Management for Bt-Crops in China: Economic and Biological Considerations.” North Carolina State University, Raleigh, NC, April 28, 2002

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Carl E. Pray, Jikun Huang and Scott Rozelle organized International Workshop on “Plant Biotechnology Policy in China: Initial Findings, Research Methods, and Research Priorities.” Center for Chinese Agricultural Policy, Chinese Academy of Sciences, Beijing July 18-20, 2001

Carl E. Pray organized Conference on *Indian Intellectual Property Rights: Continuity and Change*. Global Programs: Rutgers University. April 24, 1998.

Carl E. Pray and Ira Gang planned and ran one day seminar on Current Economic Research on South Asia. Rutgers University. April 1997.

Carl E. Pray organized workshop at the World Bank on Chinese agricultural research. August 1995.

Carl E. Pray, David Gisselquist and Jitendra Srivastava organized a two-day seminar at the World Bank on barriers to the transfer of plant varieties, with June, 1995.

Carl E. Pray and Vernon W. Ruttan developed and managed University of Minnesota's annual two-week Agricultural Research Policy short course. 1983-1986.

Published Reports, Nonrefereed Publications, and Unpublished Papers (since 2001)

Regina Birner, Thomas Daum and Carl Pray Farming 4.0: Harnessing Opportunities and Managing Threats of Digitalization in Crop and Livestock Farming and in the Agricultural Input Industries. World Bank draft August 2019 pp 86.

Carl Pray, Latha Nagarajan, Anwar Naseem and Jock R. Anderson. Policies to Encourage Private Agribusiness to Contribute to Innovation and Agricultural Productivity in Developing Countries. Background paper for World Bank Book on Agricultural Productivity. October 2018. pp. 53.

Carl E. Pray Agricultural Biotechnology Policy in China. Testimony at the Hearing of U.S. China Economic Security Review Commission on U.S.-China Food Policy. April 26, 2018 pp. 9.

Carl E. Pray, William A. Masters, and Sabrina Ayoub. Impacts of Agricultural Research on Poverty, Malnutrition and Resilience. Report prepared for USAID/Bureau for Food Security, Office of Agriculture, Research and Policy. April 2017. pp. 52.

Michael L. McGahuey, Suzanne M. Poland and Carl E. Pray Final Report: External Strategic Review of the International Fertilizer Development Center (IFDC). USAID. Feed the Future. November 2016. pp. 51.

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David Gisselquist, Mick Mwala, Latha Nagarajan, Carl Pray, David Spielman, Harun-Ar-Rashid, Louis Sène, Gert-Jan Stads Private sector agricultural technology transfer into Bangladesh, Kenya, Senegal, Tanzania, and Zambia, IFPRI 2013 <http://www.asti.cgiar.org/pdf/private-sector/PS-5-country-study.pdf>

Carl E. Pray and Latha Nagarajan Innovation and Research by Private Agribusiness in India IFPRI Discussion Paper 01181, IFPRI, Washington, DC. May 2012 <http://www.ifpri.org/sites/default/files/publications/ifpridp01181.pdf>

Carl Pray, David Gisselquist, and Latha Nagarajan Private Investment in Agricultural Research and Technology Transfer in Africa. Conference Working Paper 13. December 2011. <http://www.asti.cgiar.org/pdf/conference/Theme4/Pray.pdf>

Carl E. Pray and David Zilberman. “The Emerging Global Biofuel Industry: The Biofuel Situation and Policies in Developing Countries.” *Agricultural and Resource Economics Update*. V. 12, no. 5. May/June 2009.

Scandizzo, P.L., Zilberman, D., Pray, C.E. (2009). A personal memorial: Vittorio Santaniello: Founder of the international consortium on agricultural biotechnology research (ICABR). *AgBioForum*, 12(1), 4-7. Available on the World Wide Web: <http://www.agbioforum.org>.

Clare A. Narrod, Carl E. Pray, and Marites Tiongco “Technology Transfer, Policies, and the Role of the Private Sector in the Global Poultry Revolution” IFPRI Discussion Paper No. 00841 <http://www.ifpri.org/pubs/dp/IFPRIDP00841.pdf>. December 2008

Jikun Huang, Carl E. Pray and Scott Rozelle “Bt cotton benefits, costs and impacts in China” Working Paper 202, Institute of Development Studies, University of Sussex, Sussex, U.K. September 2003

Carl E. Pray and Anwar Naseem. “Economics of Agricultural Biotechnology Research.” ESA Working Paper 03-07 Rome: U.N. Food and Agriculture Organization. 2003. http://www.fao.org/es/esa/wp/ESAWP03_07.pdf. A background paper for the 2003 *State of Food and Agriculture* Report of the Food and Agriculture Organization of the United Nations. 2003.

Carl E. Pray and Anwar Naseem. “Biotechnology R&D: Policy Options to Ensure Access and Benefits to the Poor.” ESA Working Paper 03-08 Rome: U.N. Food and Agriculture Organization. 2003. http://www.fao.org/es/esa/wp/ESAWP03_08.pdf. A background paper for the 2003 *State of Food and Agriculture* Report of the Food and Agriculture Organization of the United Nations. 2003.

Eduardo Trigo, Greg Traxler, Carl Pray, and Ruben Echeverria. *Agricultural Biotechnology and Rural Development in Latin America and The Caribbean: Implications for IDB Lending*. Sustainable Development Department. Technical Paper Series. InterAmerican Development Bank. Washington, DC. 2001.

Research and Institutional Grants

Economic Research Service, USDA Cooperative Agreement. Private Sector Research in China. \$24,000. December 2017 to December 2018.

Economic Research Service, USDA Cooperative Agreement. Private Sector Research in India. \$21,000. September 2015 to December 2017.

A Green Revolution for Africa (AGRA) Early Generation Seed studies in Africa. \$50,000. January 2016 to June 2016.

USDA/USAID. A research strategy to understand the impacts and impact pathways of food, agricultural and nutrition policies in Feed the Future (FtF) countries. We received approximately \$3.5 million between December 2014 and October 1, 2018. USAID has recently agreed to provide \$2 million for the next two years.

Bill and Melinda Gates Foundation. ICABR Meeting in Nairobi June 18 -20, 2014 on the Bioeconomy and Development. \$110,000. November 2013 to October 2014.

Natural Science Foundation of China. Co-PI with Ruifa Hu and Yanhong Jin. Enhancing the competitiveness of the Chinese agricultural biotech industry in China and Globally: An analysis of strengths, constraints, and benefits of Chinese agricultural biotechnology. January 2013 to December 2017. RMB 3,000,000 (\$480,000)

Templeton Foundation. Assessing Barriers to GM Food Crop Production and Innovation in China, India and East Africa. June 2012 to December 2014. \$275,000.

Economic Research Service, US Department of Agriculture. Private Agricultural R&D in Brazil and Argentina Sept. 2011 to July 31, 2012. \$54,000

International Crops Research Institute on the Semi-Arid Tropics. “Developing Monitoring and Evaluation Systems for Seed Alliance Activities in Sub-Saharan Africa” November 2009 to February 2011. \$60,000.

Bill & Melinda Gates Foundation “Measuring the Ex-Ante Impact of Water Efficient Maize for Africa” Subcontract with Kansas State University as the primary contract. March 2009 – February 2011. Rutgers subcontract \$172,000.

Bill & Melinda Gates Foundation. “Measuring Private Research and Innovation in South Asia and Sub-Saharan Africa.” February 2, 2009 to September 2011. \$ 499,000.

Rockefeller Foundation “Evaluating Rockefeller Foundation Research and Technology Transfer Projects on Drought Tolerant Rice in Asia.” January 1, 2008 to December 31, 2010. \$560,000.

Economic Research Service, USDA. “Globalization of Private Sector Agricultural Research” September 2007 to August 2009. \$100,000

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Rutgers Academic Excellence Fund Grant. “Rutgers Center for Innovation Studies” with David Finegold, Clinton J. Andrews, and Michael Geselowitz, July 1, 2007 to June 30, 2008. \$50,000

Rockefeller Foundation “Evaluating Research on Drought Tolerant Rice in Asia: Design Phase.” September 2006 to August 2007. \$60,000.

Rockefeller Foundation. “Economic, socio-economic and health effects of adoption of Bt white maize in South Africa: Subsistence and commercial farming” with J.F. Kirsten, Agricultural Economics, University of Pretoria. Wally Marasas, The Medical Research Council of South Africa, Promec Unit, South Africa and David Schimmelpfennig USDA-ERS. October 2003 – Dec.2005. \$120,000.

International Food Policy Research Institute. “Costs and Efficiency of Biosafety Regulations of Insect Resistant Cotton, Maize and Rice in China” with CCAP, Beijing. November 2003 to October 2004. \$44,000

Economic Research Service, USDA. “Plant Biotechnology Regulations and Policy in India: Are They Serving Farmers and Consumers?” July 2003 – June 2005. \$42,000 with the Indian Development Foundation.

Monsanto Research Foundation. “Measuring the Impact of Bt. Cotton in China in the Four Years of Commercial Use.” July 2001 to August 2002. \$52,000.

Rockefeller Foundation. “Diffusion and Adoption of Agricultural Biotechnology in South Africa: Spillovers, Private Sector Research, and Public Benefits” with J.F. Kirsten, Agricultural Economics, University of Pretoria. David Schimmelpfennig USDA-ERS. February 2001 to May 2002. \$97,000.

Initiative for the Future of Agriculture and the Food System. USDA “Innovation and Dynamic Efficiency in Agricultural Biotechnology.” With Anthony Artuso, Margaret Brennan and others. Sept.2000 to August 2003 (extended to October 2004). \$900,000.

Rockefeller Foundation. Biotechnology Policy Planning in China with Jikun Huang Scott Rozelle. Sept 2000 to August 2001. \$92,000

World Intellectual Property Organization. The Importance of Intellectual Property Rights in the International Spread of Agricultural Biotechnology. October 2000 to July 2001. \$35,000.

Rockefeller Foundation. Proposal to Measure the Impact of Transgenic Cotton on Farmers and Policy Implications August 1999 to July 2000. with Jikun Huang. \$45,000.

USDA, Economic Research Service, Impact of Patent Concentration on the Rate of Innovation in the U.S. Plant Biotech Industry. June 1999 to December 2000. \$55,000.

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Rockefeller Foundation. Commercialization of China's Research and Extension System. April 1998 to May 1999, \$50,000. With Huang Jikun and Scott Rozelle.

USDA, Economic Research Service: Public and Private Research and Technology Transfer. 6/2/98 – 10/31/98. \$26,000.

USDA, Economic Research Service: Public Plant Breeding Programs. 9/4/97-12/31/98. \$5,000.

World Bank: Research Committee. Funding the Chinese Agricultural Research System. August 1996 to July 1997. \$39,500. Principal Investigator.

World Bank. Research Committee. Barriers to Agricultural Technology Transfer, December 1995 to July 1997. \$180,000. Co-principal investigator. 33% of project.

USDA Cooperative Agreement. Private Agricultural Research in Asia. May 1996-December 1997. \$41,900. Co-principal investigator. 50% of project.

USDA Cooperative Agreement Case Study of Collaborative Research: Genetic Enhancement of Maize Project. \$20,000. Co-principal investigator. 10% of project.

Rockefeller Foundation. Seed Industry Policies as a Constraint to Agricultural Technology Transfer. June 1996 to present. \$70,000. Co-principal investigator. 10% of project.

Rockefeller Foundation. Rice Research in China. June 1995-June 1996. \$80,000. Co-principal investigator. 33% of project.

Rockefeller Foundation. Cost of Rice Biotechnology Research in India. July 1992-June 1993. \$30,000. Principal Investigator

PROFESSIONAL MEMBERSHIPS

American Agricultural Economics Association

International Association of Agricultural Economists

American Association for the Advancement of Science

PERSONAL INFORMATION

Born - February 22, 1947; United States citizen; married

Languages: English, Hindi and Urdu