

MARIO JAVIER MIRANDA

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Personal

Born: 23 September 1954, Havana, Cuba
Citizen: United States of America

Introduction

Mario Miranda is currently a Professor of Agricultural, Environmental, and Development Economics at The Ohio State University. His research has focused on the modeling of stochastic dynamical systems in agricultural, financial, environmental, and development economics. Areas of application include international economic development, agricultural risk management and insurance, agricultural and environmental policy, food security, commodity pricing, and industrial organization. His research has produced one book, which has been adopted by seven of the top ten ranked doctoral programs in Economics in the world; over 50 peer-reviewed articles, two of which are among the three most frequently cited articles in the field of “agricultural insurance”; and several computational modeling and risk management software packages. He has also won numerous university research and teaching awards.

Professor Miranda served seven years as Director of Graduate Programs in the Department of Agricultural, Environmental, and Development Economics at The Ohio State University, ranked by National Research Council as top program in its field in USA. Miranda currently serves as an Associate Editor of the Journal of Economic Dynamics and Control, the Journal of Computational Economics, and the Journal of Risk Analysis and Crisis Response. He has served as a consultant to the World Bank, U.S. Agency for International Development, the Food and Agriculture Organization of the United Nations, the Chicago Board of Trade, numerous private corporations, and several branches of the U.S. Department of Agriculture, including the Economic Research Service, Risk Management Agency, Federal Crop Insurance Corporation, and the Office of the Chief Economist. He has acquired extensive international experience, having worked on major research projects or taught graduate-level courses in Bolivia, China, Colombia, Costa Rica, Ghana, Honduras, Italy, Mexico, Morocco, Nicaragua, Peru, and Tanzania. Miranda holds a dual Ph.D. in Economics and Industrial Engineering from the University of Wisconsin – Madison.

Education

- Ph.D. Economics and Operations Research, University of Wisconsin-Madison, 1985
- M.S. Economics, University of Wisconsin - Madison, 1984
- B.A. Mathematics, College of Wooster, 1976

Employment

- Professor, Department of Agricultural, Environmental, & Development Economics, The Ohio State University, 1998-Present.
- Visiting Research Scholar, Development Research Group, The World Bank, 2012.
- Assistant/Associate Professor, Department of Agricultural, Environmental, & Development Economics, The Ohio State University, 1988-1998.
- Assistant Professor, School of Business Administration, University of Connecticut, 1986-1988.
- Post-Doctoral Fellow, Mathematics Research Center, University of Wisconsin-Madison, 1985-1986.

Editorial Service

- Associate Editor, Journal of Economic Dynamics and Control, 2000-2015.
- Associate Editor, Computational Economics, 1998-present.
- Associate Editor, Journal of Risk Analysis and Crisis Response, 2010-present.
- Associate Editor, American Journal of Agricultural Economics, 1996-2001.

Honors

- Named Andersons Professor of Agricultural Finance and Risk Management, The Ohio State University, 2006-2013.
- Outstanding Teaching Award. College of Food, Agricultural, and Environmental Sciences, The Ohio State University, 2001.
- Outstanding Research Award. Ohio Agricultural Research and Development Center, 1999.
- Rodney F. Plimpton Outstanding Teacher Award. College of Food, Agricultural, and Environmental Sciences, The Ohio State University, 1998.
- Gamma Sigma Delta Research Award of Merit, The Ohio State University, 1997.
- Harold O. Wilson Prize for Mathematics, The College of Wooster, 1976.
- Phi Kappa Phi, 1990.
- Sigma Delta, 1985.

Book

- Miranda, Mario J. and Paul L. Fackler. 2002. *Applied Computational Economics and Finance*. Cambridge, MA: MIT Press.

Articles in Peer Reviewed Journals (selected)

- Glauber, Joseph W. and Mario J. Miranda. 2015. "The Effects of Southern Hemisphere Crop Production on Trade, Stocks and Price Integration." Forthcoming in *Food Price Volatility and its Implications for Food Security and Policy*, Matthias Kalkuhl, Joachim von Braun, Maximo Torero, eds. Springer-Verlag.
- Farrin, Katie and Mario J. Miranda. 2015. "A Heterogeneous Agent Model of Credit-Linked Index Insurance and Farm Technology Adoption." *Journal of Development Economics* 116(5):199-211.
- Wu, Ruohan and Mario J. Miranda. 2015. "Exports, Innovation and Production Growth: A Dynamic Heterogeneous Firm Model with Learning and Entry Costs." Forthcoming, *The Journal of International Trade & Economic Development* 24(8):1037-1053.
- Miranda, Mario J. and Kathleen M. Farrin. 2012. "Index Insurance for Developing Countries." *Applied Economic Perspectives and Policy* 34(3):391-427.
- Miranda, Mario J. and Claudio Gonzalez-Vega. 2011. "Systemic Risk, Index Insurance, and Optimal Management of Agricultural Loan Portfolios in Developing Countries." *American Journal of Agricultural Economics* 93(2):399-406.
- Nadolnyak, Denis, Mario J. Miranda, and Ian M. Sheldon. 2010. "Genetically Modified Crops as Real Options: Identifying Regional and Country-Specific Differences." *International Journal of Industrial Organization* 29(4):455-463.
- Daigneault, Adam J., Mario J. Miranda, and Brent Sohngen. 2010. "Optimal Forest Management with Carbon Sequestration Credits and Endogenous Fire Risk." *Land Economics* 86(1):155-172.
- Khalil, Abedalrazq F., Hyun-Han Kwon, Upmanu Lall, Mario J. Miranda, and Jerry R. Skees. 2007. "El Niño-Southern Oscillation-Based Index Insurance for Floods: Statistical Risk Analyses and Application to Peru." *Water Resources Research* 43(10):W10416.
- Vedenov, Dmitry V., Mario J. Miranda, Robert Dismukes, and Joseph W. Glauber. 2006. "Portfolio Allocation and Alternative Structures of the Standard Reinsurance Agreement." *Journal of Agricultural and Resource Economics* 31(1):57-73.
- Katchova, Ani L., Mario J. Miranda, and Claudio Gonzalez-Vega. 2006. "A Dynamic Model of Individual and Group Lending in Developing Countries." *Agricultural Finance Review* 66(2):251-265.
- Miranda, Mario J. 2005. "Teaching Computational Economics in an Applied Economics Program." *Computational Economics* 25(3):229-254.
- Vedenov, Dmitry V., Mario J. Miranda, Robert Dismukes, and Joseph W. Glauber. 2004. "Economic Analysis of Standard Reinsurance Agreement." *Agricultural Finance Review* 64(2):119-134.
- Katchova, Ani L. and Mario J. Miranda. 2004. "Two-Step Econometric Estimation of Farm Characteristics Affecting Marketing Contracts Decisions." *American Journal of Agricultural Economics* 86(1):88-102.

- Miranda, Mario J. and Dmitry V. Vedenov. 2001. "Innovations in Agricultural and Natural Disaster Insurance." *American Journal of Agricultural Economics* 83(3):650-655.
- Vedenov, Dmitry V. and Mario J. Miranda. 2001. "Numerical Solution of Dynamic Oligopoly Games with Capital Investment." *Economic Theory* 18(1):237-261.
- Makki, Shiva S., Luther G. Tweeten, and Mario J. Miranda. 2001. "Storage-Trade Interactions under Uncertainty: Implications for Food Security." *Journal of Policy Modeling* 23(2):127-140.
- Miranda, Mario J. 1998. "Numerical Strategies for Solving the Nonlinear Rational Expectations Commodity Market Model." *Computational Economics* 11(1/2):71-87.
- Miranda, Mario J. and Xiongwen Rui. 1997. "Maximum Likelihood Estimation of the Nonlinear Rational Expectations Asset Pricing Models." *Journal of Economic Dynamics and Control* 21(8-9):1493-1510.
- Miranda, Mario J. and Joseph W. Glauber. 1997. "Systemic Risk, Reinsurance, and the Failure of Crop Insurance Markets." *American Journal of Agricultural Economics* 79(1):206-215.
- Makki, Shiva S., Luther G. Tweeten, and Mario J. Miranda. 1996. "Wheat Storage and Trade in an Efficient Global Market." *American Journal of Agricultural Economics* 78(4):879-90.
- Rui, Xiongwen and Mario J. Miranda. 1996. "Solving Nonlinear Dynamic Games via Orthogonal Collocation: An Application International Commodity Markets." *Annals of Operations Research* 68(1-4):89-108.
- Miranda, Mario J. and Joseph W. Glauber. 1995. "Solving Stochastic Models of Competitive Trade and Storage by Chebychev Collocation Methods." *Agricultural and Resource Economics Review* 24(1):70-77.
- Miranda, Mario J. and Gary D. Schnitkey. 1995. "An Empirical Model of Asset Replacement in Dairy Production." *Journal of Applied Econometrics* 10(S):S41-S55.
- Miranda, Mario J., Frank Novak, and Mel Lerohl. 1994. "Acreage Response under Canada's Western Grains Stabilization Program." *American Journal of Agricultural Economics* 76(2):270-76.
- Miranda, Mario J. and Joseph W. Glauber. 1993. "Estimation of Dynamic Nonlinear Rational Expectations Models of Primary Commodity Markets with Private and Government Stockholding." *Review of Economics and Statistics* 75(3):463-70.
- Miranda, Mario J. and Joseph W. Glauber. 1993b. "Intraseasonal Demand for Fall Potatoes under Rational Expectations." *American Journal of Agricultural Economics* 75(1):104-112.
- Miranda, Mario J. and Joseph W. Glauber. 1991. "Providing Crop Disaster Assistance through a Modified Deficiency Payment Program." *American Journal of Agricultural Economics* 73(4):1233-1243.
- Miranda, Mario J. 1991. "Area-Yield Crop Insurance Reconsidered." *American Journal of Agricultural Economics* 73(2):233-242.

- Miranda, Mario J. and Joseph W. Glauber. 1990. "The Effects of Price Supports on the Valuation of Options on Agricultural Futures Markets." *Review of Futures Markets* 9(1):108–125.
- Glauber, Joseph W., Peter G. Helmberger, and Mario J. Miranda. 1989. "Four Approaches to Commodity Market Stabilization: A Comparative Analysis." *American Journal of Agricultural Economics* 71(2):326–337.
- Miranda, Mario J. and Peter G. Helmberger. 1988. "The Effects of Commodity Price Stabilization Programs." *American Economic Review* 78(1):46–58.
- Lowry, Mark N., Joseph W. Glauber, Mario J. Miranda, and Peter G. Helmberger. 1987. "Pricing and Storage of Field Crops: A Quarterly Model with Application to Soybeans." *American Journal of Agricultural Economics* 69(4):740–749.

Workshops and Short-Courses (since 2010)

- Miranda, Mario J. and Dmitry V. Vedenov. "Applied Computational Economics." One-day pre-conference workshop offered at the Triannual Conference of the International Association of Agricultural Economists, Milan, Italy, August 8-14, 2015.
- Miranda, Mario J. "Quantitative Methods for Agricultural and Environmental Policy Analysis." Two-week course offered at the University of Ghana – Legon Campus, Accra, Ghana, June 8-19, 2015.
- Vedenov, Dmitry V., Mario J. Miranda and Randall Romero-Aguilar. "Applied Computational Economics." One-day pre-conference workshop offered at the Annual Meeting of the Applied and Agricultural Economics Association, Minneapolis, MN, July 26, 2014.
- Miranda, Mario J. "Applied Computational Economic Dynamics." Two-week course offered at the University of Ghana – Legon Campus, Accra, Ghana, January 27 – February 7, 2014.
- Miranda, Mario J. "Applied Computational Economic Dynamics." Three-week course offered at the Renmin University of China International Summer School, Beijing, China, July 3-19, 2013.
- Miranda, Mario J. "Applied Computational Methods for Economic Dynamics – Part II." One-week course offered to the Central Bank of Costa Rica, San Jose, Costa Rica, April 8-12, 2013.
- Miranda, Mario J. "Applied Computational Methods for Economic Dynamics – Part I." One-week course offered to the Central Bank of Costa Rica, San Jose, Costa Rica, Dec 3-9, 2012.
- Miranda, Mario J. and Dmitry V. Vedenov. "Applied Computational Economics." One-day pre-conference workshop offered at the Annual Meeting of the Agricultural and Applied Economics Association, Pittsburgh, PA, July 23, 2011.
- Miranda, Mario J. "Computational Economic and Finance." Two-week course offered at the International Summer School in Economics, University of Los Andes, Bogota, Colombia, June 15-25, 2010.

- Miranda, Mario J. "Agricultural Index Insurance and Weather Derivatives." One-day Workshop offered to the Masters in Microfinance Graduate Program, University of Bergamo, Bergamo, Italy, May 21, 2010.
- Miranda, Mario J. and Dmitry V. Vedenov. "Applied Computational Economics." One-day pre-conference workshop offered at the Annual Meetings of the Agricultural and Applied Economics Association, Milwaukee, WI, July 25, 2009.

Computer Application Software

- Miranda, Mario J. and Paul W. Fackler. "CompEcon 2015: A Matlab Toolbox for Analysis of Computational Economic and Financial Models." 1994-2015.
- Miranda, Mario J., Dmitry V. Vedenov, Joseph Glauber, and Robert Dismukes. "SRA-Sim: A Stochastic Dynamic Simulation Model for the Analysis of the U.S. Standard Reinsurance Agreement." 1997-2002.
- Miranda, Mario J., Dmitry V. Vedenov, Gary Schnitkey, and Scott H. Irwin. "AgRisk: Decision Support for Agricultural Risk Management." 1996-2002.
- Miranda, Mario J. and Joseph W. Glauber. "ComSim: A Suite of Stochastic Simulation Programs for the Analysis of Agricultural Policies under Production and Price Uncertainty." 1988-1995.

Invited Paper Presentations (since 2010)

- Miranda, Mario J. "Aplicaciones Innovadoras de Seguros Agropecuarios a Base de Indexados Para Promover el Crédito Agrícola en los Pequeños Productores." Presented at the International Seminar on Catastrophic Agricultural Insurance for Development Banks, Association of Latin American Development Banks (ALIDE), November 4, 2015.
- Miranda, Mario J. "Agricultural Index Insurance - Lessons Learned and Ways Forward." Presented at Food and Agriculture Organization of The United Nations, Rome, Italy, August 3, 2015.
- Miranda, Mario J., Francis Mulangu and Kathleen M. Farrin. "Agricultural Index Insurance and Credit in Africa: Lessons Learned and Ways Forward." Presented at the Climate Change and Multi-Dimensional Sustainability in African Agriculture, Sokoine University of Agriculture, Morogoro, Tanzania, June 3-5, 2015.
- Miranda, Mario J. and Kathleen M. Farrin. "A Heterogeneous Agent Model of Credit-Linked Index Insurance and Farm Technology Adoption." Presented at the Annual Meetings of Allied Social Science Associations, Boston, MA, January 5, 2015.
- Miranda, Mario J. and Randall Romero-Aguilar. "CompEcon: Open Source Software for Dynamic Economic Modelling." Presented at the International Monetary Fund Workshop on Building Tools for Heterogeneous Agents Modeling, Washington DC, December 4, 2014.
- Miranda, Mario J., Joseph W. Glauber and Randall Romero-Aguilar. "Effects of Trends in Chinese Production, Consumption, and Price Support Policies on World Grain

- Price Volatility and Food Security." Presented at the World Bank Conference on Managing Food Price Volatility and Agricultural Trade Policy, Washington, DC, September 19, 2014.
- Miranda, Mario J. "Using Weather Index Insurance to Promote the Efficiency of Agricultural Credit Markets in Developing Countries." Sokoine University of Agriculture, Morogoro, Tanzania, August 4, 2014.
 - Miranda, Mario J. "Coupled Credit and Index Insurance Contracts and Farm Technology Adoption." AFRACA International Fin4Ag Conference on Revolutionizing Finance for Agrivalue Chains, Nairobi, Kenya, July 16, 2014.
 - Romero-Aguilar, Randall and and Mario J. Miranda. "Drivers of World Grain markets in the Short and Long run." Presented at the 2nd International ZEF-IFPRI Workshop on Food Price Volatility and Food Security, Bonn, Germany, July 8, 2014.
 - Glauber, Joseph W. and Mario J. Miranda. "Effects of Southern Hemisphere Production on Stocks, Trade and Prices." Presented at the 2nd International ZEF-IFPRI Workshop on Food Price Volatility and Food Security, Bonn, Germany, July 8, 2014.
 - Miranda, Mario J. and Kathleen M. Farrin. "Coupled Credit and Index Insurance Contracts and Technical Transformation in Developing Countries: A Structural Dynamic Heterogeneous Agent Modelling Approach." Presented to the Department of Agricultural and Applied Economics, University of Georgia, Athens, Georgia, August 14, 2013.
 - Miranda, Mario J. and Kathleen M. Farrin. "Effects of Index Insurance on Aggregate Agricultural Loan Defaults and Technical Transformation." Presented at
 - Peking University, Beijing, China, June 21, 2013.
 - East China Normal University, Shanghai, China, June 24, 2013.
 - China Agricultural University, Beijing, China, June 25, 2013.
 - Research Center for Rural Economy, Beijing, China, July 1, 2013.
 - Central University of Finance and Economics, Beijing, China, July 3, 2013.
 - Chinese Academy of Agricultural Science, Beijing, China, July 4, 2013.
 - Renmin University of China, Beijing, China, July 9, 2013.
 - Miranda, Mario J., Donald F. Larson, and Kathleen M. Farrin. "Differential Effects of Food Security Policies on Subsistence Farmers and the Urban Poor." Presented at the International Food Policy Research Institute - University of Bonn Conference on Food Price Volatility and Food Security, Bonn, Germany, January 31 to February 2, 2013.
 - Miranda, Mario J. "Differential Effects of Food Security Policies on Subsistence Farmers and the Urban Poor." Presented to The World Bank, Development Research Department, Washington, DC, April 19, 2012.
 - Miranda, Mario J. and Kathleen M. Farrin. "Weather Index Insurance for Developing Countries." Presented to The Inter-American Development Bank, Washington, DC, June 27, 2012.
 - Miranda, Mario J. "Asset Liquidity, Savings, and Consumption Smoothing in a Village Economy Exposed to Systemic Income Risk", Presented at the Annual Meetings

- of the Agricultural and Applied Economics Association, Pittsburgh, PA, July 23, 2011.
- Miranda, Mario J. "Summary of Conference Findings", Presented at the Weather Index Insurance Workshop sponsored by the Alliance for Green Revolution in Africa, Cape Town, South Africa, Sep 18, 2010.
 - Miranda, Mario J. "Summary of Conference Findings", Presented at the Designing Index Based Weather Risk Management Programs Workshop, The World Bank, Washington, DC, December 13-15, 2010.
 - Miranda, Mario J. "Overview of Computational Techniques for the Analysis of Dynamic Economic Models", Presented to the Departments of Economics and Finance, University of Bergamo, Bergamo, Italy, May 17, 2010.
 - Miranda, Mario J. "El-Nino Southern Oscillation Index Insurance for Peruvian Agriculture", Presented to the School of Business, Technological University of Monterrey, Guadalajara, Mexico, April 20, 2010.
 - Miranda, Mario J. "Introduction to Computational Economics", Presented to the Department of Economics, University of Guadalajara, Guadalajara, Mexico, April 19, 2010.
 - Miranda, Mario J. "Survey of Modern Portfolio Theory", Presented to the School of Business, Technological University of Monterrey, Guadalajara, Mexico, Apr 21, 2010.
 - Miranda, Mario J. "Systemic Risk, Index Insurance, and Agricultural Contracting in Developing Countries". Presented at the Conference on the Financing Agricultural Value Chains, San Jose, Costa Rica, January 21-23, 2010.
 - Miranda, Mario J. and Claudio Gonzalez-Vega. "Index Insurance and the Optimal Management of Loan Portfolios in Rural Microfinance Institutions in the Presence of Systematic Risk." Presented at the Annual Meeting of the Allied Social Science Associations, Atlanta, GA, January 1-5, 2010.

Major Consulting Assignments - Domestic

- U.S. Department of Agriculture Risk Management Agency, Multiyear Insurance, Inc. and The Iowa Corn Growers Association, Actuarial Certification of Multiyear Plan of Insurance for Corn and Soybean Producers, 2015.
- Hudson Insurance, "Actuarial Assessment of Area Revenue Combo Insurance", 2011.
- U.S. Department of Agriculture Risk Management Agency and FarmRisk, Inc., Actuarial Certification of Livestock Gross Margin for Swine Contract, 2006.
- U.S. Department of Agriculture Risk Management Agency and FarmRisk, Inc., Actuarial Certification of Livestock Gross Margin for Dairy Cattle Contract, 2006.
- U.S. Department of Agriculture Risk Management Agency and FarmRisk, Inc., Actuarial Certification of Livestock Gross Margin for Cattle Contract, 2005.
- U.S. Department of Agriculture Risk Management Agency and AgForce, Inc., Actuarial Certification of Pasture, Rangeland, and Forage Vegetation Temperature-Constrained NDVI Index Contract, 2005.

- U.S. Department of Agriculture Risk Management Agency and AgForce, Inc., Actuarial Certification of Pasture, Rangeland, and Forage Vegetation Seasonal-Constrained Rainfall Index Contract, 2005.
- U.S. Department of Agriculture Risk Management Agency and Iowa Farm Bureau, "Actuarial Certification of Ethanol Insurance Contract," 2004.
- Risk Management Agency and Great American Insurance Co., "Actuarial Rating of Area Yield Indemnity Contract", 2003.
- Risk Management Agency and NAU Insurance, "Actuarial Certification of Group Risk Income Protection Harvest Revenue Option", 2003.
- The Chicago Board of Trade, "Analysis of the Iowa Corn Reinsurance Options Contract", 1994.

Major Consulting Assignments - International

- The Food and Agriculture Organization of the United Nations and the Association of Latin American Development Banks (ALIDE). "Agricultural Credit Insurance in Latin America", 2015.
- The World Bank Agricultural Rural Development Department. "Review of Agricultural and Rural Development Department Research and Development Activities in Weather Risk Management, 2004-2010", 2012.
- The World Bank Agricultural Rural Development Department. "Ghana Agricultural Sector Risk Assessment", 2011.
- The World Bank Agricultural Rural Development Department. "Honduras Agricultural Sector Risk Assessment", 2011.
- U.S. Agency for International Development, PREMIER Project, "Economic and Actuarial Analysis of Catastrophic Drought Insurance for Bolivian Agriculture", 2005-2007.
- U.S. Agency for International Development, Development Alternatives, Inc., and GlobalAgRisk, Inc., "Hedging Weather-Driven Portfolio Risk for Microfinance Institutions in Peru: The El Nino-Southern Oscillation Index Insurance Contract", 2004-2007.
- The World Bank and Agricultural Risk Management Consulting, Inc., "Rainfall Insurance Contracts for Nicaragua", 1998-2001.
- The World Bank and Agricultural Risk Management Consulting, Inc., "Weather-Based Index Insurance: A Feasibility Study for Drought Insurance for Morocco", 2000.

Research Grants (over \$100,000)

- Received \$4,197,188 in extramural funding since joining profession (2015 dollars).
- Miranda, Mario J. and Abdoul G. Sam. "Promoting Financial Inclusion and Technological Transformation among Smallholders in Tanzania via Weather Index Insurance Backed Contingent Credit." U.S. Agency for International Development Innovative Agricultural Research Initiative. Jan 2015 – Dec 2017.

- Miranda, Mario J. and Abdoul G. Sam. *Promoting Adoption of Improved Production Technologies among Smallholders in Ghana*. US Agency for International Development BASIS. Jul 13 - Sep 16.
- Miranda, Mario J. *Public Reserves, Price Volatility, and Sustainability of Multilateral Buffer Stock Agreements*. U.S. Department of Agriculture Office of the Chief Economist. Sep 12 - Dec 13.
- Miranda, Mario J., Gary Schnitkey, and Scott H. Irwin. *Development of AgRisk 2000*. University of Illinois. Oct 98 - Sep 00.
- Miranda, Mario J. *Analysis of Agricultural Risk and Insurance*. U.S. Department of Agriculture Economic Research Service. Jul 97 - Sep 02.
- Miranda, Mario J. and Gary Schnitkey. *AgRisk: A Real-Time Risk Assessment Tool for Farmers*. U.S. Department of Agriculture. Jun 97 - Sep 98.
- Miranda, Mario J. *Actuarial Soundness of Crop Reinsurance Agreement*. U.S. Department of Agriculture Economic Research Service. Sep 96 - Sep 02.
- Miranda, Mario J. *Structural Determinants of U.S. Competitiveness in the World Soybean Complex*. National Institute of Food & Agriculture. Sep 93 - Sep 96.
- Miranda, Mario J. and Thomas Sporleder. *New Uses for Agricultural Products*. National Institute of Food & Agriculture. Jul 89 - Jun 92.