

August 4, 2014

Kara Laney, Study Director
National Research Council
National Academy of Sciences

re: Proposed Experts to Join Committee tasked with Study on GE Crops

Dear Ms. Laney:

We, the undersigned 21 scientists, researchers and professionals, are writing to express our concern regarding the proposed panel of committee members, tasked with undertaking the study, "Genetically Engineered Crops: Past Experiences and Future Prospects." We believe that the panel as currently configured does not contain sufficiently diverse expertise to enable the comprehensive and independent appraisal of GE crops that the study aims to carry out.

In another letter sent to NRC earlier today, 64 scientists and researchers identified some significant gaps in the expertise represented on the proposed panel. The panel would greatly benefit from including expertise and experiences in sustainable agriculture, diversified farming systems, and organic and agroecological science research and application. With its emphasis on evaluating the history and experiences of using GE crops, the study needs more expertise (beyond Lawrence Busch) regarding the social scientific and historical dimensions of GE crop introduction and use in both the U.S. and in developing countries, particularly regarding the social effects on farmers and rural communities. Other gaps pertain to taking into account the policy implications of potential path dependency in complex agri-food systems, as well as socially and environmentally sustainable development. Finally, we are concerned that there is insufficient expertise to evaluate all of the health dimensions associated with the cultivation of GE crops in combination with their associated technologies, particularly the occupational and community health issues that are often left out.

We also note a need to diversify the range of institutions represented on the panel, in order to avoid possible analytical "blindspots" that could affect its work. Currently, the panel includes staff and representatives from institutions and agencies that have an established history and institutional orientation toward seeking technological approaches to intensifying agricultural production and prioritizing yield increases over addressing the complex amalgam of factors that contribute to achieving authentic food security. For example, representatives from the biosafety and biotechnology support programs of USAID, IFPRI and USDA, and the Monsanto-affiliated Donald Danforth Plant Science Center come from institutional arrangements that focus in part on the research, development, commercialization, export and/or trade in GE crops, making it potentially more challenging for those committee members to bring an independent, critical eye to their assessment project.

We strongly urge NRC to fill the gaps in disciplinary expertise and to diversify the range of institutional perspectives and orientations represented. To help this process, we suggest below a number of leading scientific experts who can contribute the missing expertise and diversity. We encourage NRC to secure the participation on the committee of at least one expert from *each* of the categories below. We have provided several names in each category, in the event that the first nominee invited from each category is unable to accept the invitation. We note that the committee will hear presentations from the public on September 15-16. We suggest that NRC invite those experts listed below who are not chosen to serve on the committee, to present in September.

We appreciate that it is a difficult process to develop a committee that can tackle such a complicated and ambitious topic as evaluating GE crops not simply in the U.S. but more globally as well. Nonetheless, we believe that NRC will be much better placed to produce the thorough and impartial assessment of GE crops that is needed, by diversifying the committee's composition and input.

Sincerely,*

Molly Anderson, PhD Systems Ecology
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College of the Atlantic, ME

Michael Antoniou, PhD
Head, Gene Expression and Therapy Group
Department Medical and Molecular Genetics
Kings College London School of Medicine, United Kingdom

Philip L. Bereano, Law and Regional Planning
Roster of Experts, Cartagena Biosafety Protocol
Professor Emeritus, Technology and Social Policy
University of Washington

Lisa Bunin, PhD Environmental Sociology
Organic Policy Director
Center for Food Safety

Lynn Carroll, PhD Entomology
Senior Scientist
TEDX, The Endocrine Disruption Exchange

Theo Colborn, PhD Biology
President Emeritus
TEDX, The Endocrine Disruption Exchange

John Fagan, PhD Biochemistry and Molecular Biology
Director
Earth Open Source

Antonio Turrent Fernández, PhD Soil Fertility and Microeconomics
Investigador Titular C Grupo de Maíz
Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias, Mexico

William H. Friedland, PhD Sociology
Professor Emeritus, Research Professor, Department of Sociology
University of California-Santa Cruz

Jeremy Gruber, JD
President
Council for Responsible Genetics

Irwin Goldman, PhD Plant Breeding
Chair and Professor, Department of Horticulture
University of Wisconsin-Madison

Katie Goodall, PhD Plant and Soil Science
Botany Fellow
Wellesley College

Michael Hansen, PhD Ecology and Evolutionary Biology
Senior Scientist
Consumers Union

Jack Heinemann, PhD Molecular Biology
Professor, School of Biological Sciences
University of Canterbury, New Zealand

Alexander Hoepker, PhD Chemistry
Postdoctoral Researcher, Bioengineering
University of California-Berkeley

Alastair Iles, SJD
Professor, Environmental Science, Policy and Management
University of California-Berkeley

Albie F. Miles, PhD Environmental Science, Policy and Management
Assistant Professor of Sustainable Community Food Systems
University of Hawaii, West Oahu

Eva Novotny, PhD Astronomy
Professor (retired) of Astrophysics
University of Cambridge, UNITED KINGDOM

Gerald Smith, PhD Ecology and Evolution
Professor Emeritus, Department of Ecology and Evolution
University of Michigan-Ann Arbor

Thomas Wassmer, PhD Biology
Assistant Professor, Department of Biology
Siena Heights University MI

Jared Zystro, MS Plant Breeding and Plant Genetics
California Research and Education Specialist
Organic Seed Alliance

**Institutional affiliations provided for identification purposes only*

cc: Fred Gould, Committee Chair

Experts proposed for inclusion on NRC Committee tasked with the study of GE crops

SOCIAL SCIENCES

Regulation, Policy, and Society

Charles Benbrook is a Research Professor at the Center for Sustaining Agriculture and Natural Resources at Washington State University, where he is program leader of “Measure to Manage: Farm and Food Diagnostics for Sustainability and Health (M2M)”. The goal of M2M is to develop, refine, validate, and apply analytical systems quantifying the impacts of farming systems, technology, and policy on food nutritional quality, food safety, agricultural productivity, economic performance along food value chains, and on natural resources and the environment. Dr. Benbrook spent the first 18 years of his career working in Washington, D.C., first working for the Executive Office of the President (1979-1980), then as the Executive Director for a U.S. House of Representatives agricultural subcommittee (1981-1983). He was the E.D. of the National Academy of Sciences Board on Agriculture from 1984-1990, and has run a small consulting firm since 1991. He moved to the west in 1997, and served as the Chief Scientist for The Organic Center from 2004 through June of 2012. He has participated as an expert witness in several lawsuits involving pesticides and agricultural biotechnology.

Dr. Benbrook has served as an appointed member on the USDA’s AC 21 agricultural biotechnology advisory committee since 2011, and prior to that, was a member of the Roundup Ready Alfalfa Task Force convened by Secretary of Agriculture Tom Vilsack. He is a member of the AGrEE project advisory committee and a member of the management team developing the PRIME model for ranking relative pesticide risks. Dr. Benbrook earned a BA in Economics from Harvard University in 1971, and MA and PhD degrees in agricultural economics from the University of Wisconsin-Madison in 1979/1980.

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Sheila Jasanoff is the Pforzheimer Professor of Science and Technology Studies at the Harvard Kennedy School of Government at Harvard University. One of the foremost researchers in science and technology studies, Sheila Jasanoff specializes in cross-cultural analyses of the relations between science and technology and law, politics, and culture in democratic societies. Biotechnology features prominently in her research, as seen in her 2005 book *Designs on Nature: Science and Democracy in Europe and the United States*, which looks at the politics and policy of the life sciences in Britain, Germany, the United States, and in the European Union as a whole. She shows how public and private actors in each setting evaluated new manifestations of biotechnology and tried to reassure themselves about their safety. Dr. Jasanoff also has extensive experience with environmental regulation and science policy. Among some of her publications are *The Fifth Branch: Science Advisers as Policymakers* (1990), which established the legitimacy of science policy as a field of research and became a standard reference work on expert science advisory committees; *Science at the Bar: Law, Science, and Technology in America* (1995), which won the American Political Science Association’s Don K. Price Award; and such articles as the much cited and reprinted “Technologies of Humility: Citizen Participation in Governing Science,” in *Minerva* (2003). Dr. Jasanoff is a Fellow of the American Association for the Advancement of Science and served as President of the Society for Social Studies of Science, from which she received the J.D. Bernal Award. She is educated in mathematics (Radcliffe College, A.B., 1963), linguistics (M.A., University of Bonn; Ph.D., Harvard University, 1973), and law (J.D., Harvard Law School, 1976).

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Doug Gurian-Sherman is Senior Scientist and Director of Sustainable Agriculture at the Center for Food Safety in Washington DC. At the Center for Food Safety, Dr. Gurian-Sherman works on important areas of sustainable and industrial agricultural including: Animal factories (Concentrated Animal Feeding Operations), soil, agroecology, public breeding, equitable food systems, and genetic engineering. He was the founding co-director and science director for the biotechnology project at the Center for Science and the Public Interest. He has served as senior scientist for CFS from 2004--2006, and as senior scientist in the Food & Environment Program at the Union of Concerned Scientists from 2006--2014. Previously, Dr. Gurian-Sherman worked at the Environmental Protection Agency where he examined the human health impacts and environmental risk of genetically engineered plants. He also worked in the Biotechnology Group at the U.S. Patent and Trademark Office, and he served on the Food and Drug Administration's inaugural advisory food biotechnology subcommittee. Dr. Gurian-Sherman earned his doctorate degree in plant pathology from the University of California Berkeley. He conducted post-doctoral research on rice and wheat molecular biology at the U.S. Department of Agriculture laboratory in Albany, California.

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Sociology / Political Economy / Rural Communities

Jack Kloppenburg is a Professor in the Department of Community and Environmental Sociology at the University of Wisconsin-Madison. Dr. Kloppenburg specializes in the social impacts of biotechnology and the global controversy over access to and control over genetic resources. Trained in rural sociology and political economy, Kloppenburg applied these lenses to examine the history of crop biotechnology and germplasm development in his seminal work, *First the Seed: The Political Economy of Plant Biotechnology 1492-2000* (1st ed. 1988, 2nd ed. 2004). In his work on "foodsheds," he envisioned the emergence of a sustainable food system founded on local/regional food production, regional reinvestment of capital, local job creation, the strength of community institutions, and direct democratic participation in the local food economy. Dr. Kloppenburg is currently investigating the potential of the growing movement for "food sovereignty" and the possibilities of applying "open source" principles in the biosciences. At UWS, Dr. Kloppenburg serves as Co-Director of the Center for Integrated Agricultural Systems, Director of the GreenHouse Residential Learning Community, and is also affiliated with the Nelson Institute for Environmental Studies and the Agroecology Program. He is also founder and board member of the REAP Food Group, a non-profit organization working for a just and sustainable food system.

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Ryan Galt is an Associate Professor in the Community and Regional Development unit of the Department of Human Ecology at the University of California, Davis and a Provost Fellow of the UC Davis Agricultural Sustainability Institute. His research focuses on the relationships between society and environment with an emphasis on food and agriculture, utilizing the perspectives of political ecology and the political economy of agriculture. He teaches classes in community development, geography, and sustainable agriculture and food systems, including UC Davis' first food systems class. Specific topical interests of Dr. Galt's include: pesticides and agrochemical use, the globalization and localization of fresh produce, governance in agricultural and food commodity chains, and contested understandings of environmental contamination. Galt holds a BA (summa cum laude) in Geography from the University of California-Berkeley, an MSc in Geography from the

University of Wisconsin-Madison, and a PhD in Geography from the University of Wisconsin-Madison.

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Phil Howard is an Associate Professor in the Department of Community Sustainability at Michigan State University. Renowned for taking an innovative approach to data analysis and illustration, Dr. Howard's research emphasizes visualizing structural changes in the food system, and characterizing consumer interests in food ecolabels. He has a PhD in Rural Sociology from the University of Missouri, and is a member of the editorial board of the journal *Agriculture and Human Values*.

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Cultural and Ecological Dimensions of Developing Country Agriculture

Glenn Davis Stone is a Professor of Sociological Anthropology and Environmental Studies at the University of Washington, St. Louis. Applying perspectives from environmental anthropology, political ecology, food studies, and science & technology studies, Dr. Stone is particularly interested in the social and political aspects of agricultural systems; agricultural sustainability; intensification and industrialization; indigenous knowledge; responses to population increase; agricultural biotechnology; and alternative food/farming systems. He has worked on past and contemporary non-industrialized farmers in Africa, India, the Philippines, and North America. A focus of Dr. Stone's present research is on the spread of genetically modified crops in developing countries. After working in a laboratory specializing in transformation of tropical crops, and completing a multi-year, multi-village field study of Andhra Pradesh farmers as GM cotton was being adopted, he is starting a project on indigenous knowledge and technology change among rice and cotton farmers in India and the Philippines (including impacts of "Golden Rice"). Educated at Northwestern University (BA) and the University of Arizona (MA, PhD), Dr. Stone has been on the faculty of Columbia University in New York, a research affiliate at University College of London, and is currently president of Anthropology the Environment Society. He has been awarded the Gordon Willey Prize and fellowships by the School of American Research and the National Endowment for the Humanities.

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Marcia Ishii-Eiteman is a Senior Scientist and director of the Grassroots Science Program at Pesticide Action Network North America (PANNA). Trained as an ecologist, Dr. Ishii-Eiteman worked in Asia and Africa for 14 years before joining PANNA, during which time she worked with communities, local NGOs, government extensionists and university researchers to develop farmer field schools in ecological pest management, community-based rural development projects, women's health programs, and literacy and resource conservation projects. Past research has focused on pesticide exposures and practices among farmers in World Bank development projects in Indonesia and biological control of leafhoppers in rice agroecosystems in Thailand. She holds a PhD in Ecology and Evolutionary Biology from Cornell University and a BA in Women's Studies from Yale University. Dr. Ishii-Eiteman has written extensively on the ecological, social, and political dimensions of food and agriculture and was a lead author of the UN-sponsored *International Assessment of Agricultural Knowledge, Science and Technology for Development* (IAASTD), which

assessed the historical and potential future role of genetically engineered seed, among other technologies, within a sustainable development framework.

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Rachel Bezner-Kerr is an Assistant Professor in the Department of Development Sociology at Cornell University. She is the research coordinator for the Soils, Food, and Healthy Communities Project based in Malawi and has worked with farmer communities on seed-related research in Northern Malawi for over ten years. Within the field of international development, she conducts research on social and environmental inequalities and community-based, participatory research related to agriculture, health, and nutrition. Dr. Bezner-Kerr holds a BS in Cooperative International Development from the University of Toronto, an MSc in Land Resource Science from the University of Guelph, and a PhD in Development Sociology from Cornell University. She was awarded the Julian M. Szeicz Award for Early Career Achievement (2012) Canadian Association of Geographers.

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Global Food Security / Trade / Economics

Jennifer Clapp is a Professor and the Canada Research Chair in Global Food Security and Sustainability at the University of Waterloo, Canada. She is affiliated with both the Balsillie School of International Affairs and the Faculty of Environment at the University of Waterloo. Her published work covers a range of topics at the interface of the global economy, food, and the environment, including the politics of agricultural trade, food aid, agricultural biotechnology, and the role of transnational corporations in global environmental and food governance. Dr. Clapp's recent books include: *Hunger in the Balance: The New Politics of International Food Aid* (Cornell University Press, 2012), *Food (Polity, 2012)*, *The Global Food Crisis: Governance Challenges and Opportunities* (co-edited with Marc J. Cohen, WLU Press, 2009). She holds a B.A. in Economics from the University of Michigan, and a M.Sc. and Ph.D. in International Relations from the London School of Economics. Dr. Clapp was awarded a Trudeau Fellowship in 2013, and received the 2012 Award for Excellence in Food Studies Research from the Canadian Association for Food Studies.

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Timothy A. Wise is the Director of the Research and Policy Program at the Global Development and Environment Institute at Tufts University, and leads its Globalization and Sustainable Development Program. He is also currently an Open Society Fellow. With a background in international development, he specializes in agricultural policy and rural development. Wise is involved in ongoing research in the areas of: Sustainable Rural Development, Beyond Agricultural Subsidies, Mexico Under NAFTA, WTO and Global Trade. He is the co-author of the book (in English and Spanish), *Confronting Globalization: Economic Integration and Popular Resistance in Mexico*, and *The Promise and the Perils of Agricultural Trade Liberalization: Lessons from Latin America*. He is the former executive director of Grassroots International, a Boston-based international aid organization. He holds a Masters in Public Policy from Tufts' Urban and Environmental Policy and Planning Department.

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Sophia Murphy is senior advisor for the Institute of Agriculture and Trade Policy (IATP), specializing in agricultural trade rules, U.S. trade and agriculture policy, and the interests of developing countries in the multilateral trade system. Ms. Murphy has published many reports and articles, including analysis of the effects of international trade rules on development and food security, the impact of corporate concentration in the global food system, trade and poverty-related issues in the global biofuels sector, and a critique of U.S. food aid programs. Sophia has worked with IATP's Trade and Global Governance team since 1997. She joined the Institute from Geneva, where she had worked for two years with the United Nations Nongovernmental Liaison Service. Sophia has a degree in Politics, Philosophy and Economics from Oxford University and a master's from the London School of Economics in Social Policy and Planning in Developing Countries

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M. Jahi Chappell is the Director of Agroecology and Agriculture Policy at the Institute for Agricultural Trade Policy (IATP) in Minneapolis, MN. On his path to IATP, Dr. Chappell has been an industry engineer, agroecologist, science and technology studies postdoc, and assistant professor of environmental science and justice. He has worked with and consulted for groups such as Via Campesina, the Food and Agriculture Organization (FAO), and the urban agriculture nonprofits Growing Hope, and Growing Gardens. In academia, his research in political agroecology combined conservation biology, political economy and ecology, science and technology studies, sociology, and ecological economics to create a unique understanding of the stakes and opportunities within contemporary food systems. He is a leading scholar of the food security policies of the city of Belo Horizonte, Brazil, which served as a basis for Brazil's acclaimed national Zero Hunger programs. The underlying purpose of his work has been and continues to be the construction of a participatory, socially just, ecologically sustainable food system that serves and supports both farmers and citizens. His experiences across sectors and countries has helped him learn how to listen to and work with a wide diversity of groups. Dr. Chappell holds a PhD in Ecology and Evolutionary Biology and a BS in Chemical Engineering, both from the University of Michigan, and conducted postdoctoral research at Cornell University. He is also the current Chair of the Agroecology Section of the Ecological Society of America.

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NATURAL SCIENCES

Weed Ecology

David Mortensen is Professor of Weed and Applied Plant Ecology at Pennsylvania State University and a former Chair of the Program in Ecology. He is an expert in applied plant ecology and ecologically-based pest management to improve the sustainability of land resource management. His research explores the interplay between the ecology of agricultural fields, field edges and forest fragments, taking a landscape perspective. One example assesses approaches to integrating weed management with the goal of reducing reliance on herbicide use. Dr. Mortensen is a co-author of "Navigating a Critical Juncture for Sustainable Weed Management", a leading review article published in *BioScience* in 2012 that summarizes this work. He also researches methods of enhancing weedy plant invasion resistance in northeastern forests. Dr. Mortensen completed undergraduate studies in botany at Drew University, before a MS in botany at Duke University and a PhD in crop science at North Carolina State University.

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Matt Liebman is Professor of Agronomy, and the Henry A. Wallace Endowed Chair for Sustainable Agriculture at Iowa State University. Dr. Liebman was one of the founding members of ISU's Graduate Program in Sustainable Agriculture and served as that program's chair from 2004 through 2007. His research focuses on cropping system diversification, soil amendments, and weed ecology and management. This work includes experiments involving crop rotations, cover crops, green manures, intercrops, conservation strips, animal manures, composts, and insects and rodents that consume weed seeds. He also conducts research examining the environmental impacts of using new crops and native perennial species for biofuel production. Dr. Liebman received a B.A. in biological sciences from Harvard University and a Ph.D. in botany from the University of California, Berkeley. Dr. Liebman was co-author of the book *Ecological Management of Agricultural Weeds*, published in 2001 by Cambridge University Press, and held the Pioneer Agronomy Professorship at ISU from 2001 through 2004. He was selected as a fellow of the American Society of Agronomy in 2009. He was awarded the Sustainable Agriculture Achievement Award from Practical Farmers of Iowa in 2013.

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Entomology / Environmental Science

Hans Herren, President and CEO of the Millennium Institute, is an internationally recognized scientist who lived for 27 years in Kenya, Benin and Nigeria, and worked across Africa in agriculture, health and environmental research and capacity development. As Director of the Africa Biological Control Center of the International Institute of Tropical Agriculture (IITA) in Nigeria, Dr. Herren conceived and implemented the highly successful biological control program against the cassava mealy bug and the green mite that saved the cassava crop, the staple of 200 million Africans and averted Africa's worst-ever food crisis. He thereafter led the International Center of Insect Physiology and Ecology (ICIPE) in Nairobi, where he developed a new research and capacity development paradigm that integrates the key elements of human, plant, animal and environmental health into one development framework. Dr. Herren earned his PhD at the Federal Institute of Technology in Zurich, Switzerland and completed a Post Doctoral research program at University of California, Berkeley. He is the recipient of numerous awards, including The Right Livelihood Award (2013) and The World Food Prize, which he was awarded in 1995. He is also a member of the National Academy of Sciences and the Third World Academy of Sciences, and served as a Co-chair of the *International Assessment of Agricultural Knowledge, Science and Technology for Development* (IAASTD).

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Deborah K. Letourneau is full professor in Environmental Studies at the University of California, Santa Cruz, with research interests in plant-insect interactions, biodiversity, and environmental risk in the context of decision-making in managed systems. Over the past 25 years her research in the western USA, Borneo, Costa Rica, as a Fulbright Fellow in Mexico, Malawi and Colombia, and as a Christensen Research Fellow in Papua New Guinea has emphasized arthropod predators, herbivores and plants in the ecology and conservation of natural forests, biological control in farmer's fields, and risk assessment for novel crop traits. She has written over 80 research articles and book chapters and co-edited three books on topics that include vegetation management for

biological control of insect pests, food webs in organic versus conventional crop fields, trophic cascades in forest habitats, and environmental risks of genetically modified crops.

Dr. Letourneau is a member of the National Research Council's Committee on environmental impacts of genetically modified plants, past Chair of the Agroecology Section of the Ecological Society of America, and editor for the international journal Environmental Biosafety Research. As an Assistant Professor, she was featured in Discover Magazine's 1991 issue on women in science. She spent sabbatical leave during 2009 as a Fulbright Teaching and Research Fellow at the Universidad del Valle, Cali, Colombia co-offering a course on Biodiversity and Agriculture. Letourneau received her Bachelor and Master of Science degrees in Biology and Zoology, respectively, from the University of Michigan, USA, and a PhD in Entomology from the University of California at Berkeley, Division of Biological Control.

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Soil Science / Agronomy / Landscape Ecology

Louise Jackson is the John B. Orr Endowed Chair of Environmental Plant Sciences in the Department of Land, Air, and Water Resources at UC Davis. As a professor and Cooperative Extension Specialist, she studies soil and root ecology in agricultural and grassland ecosystems and more broadly landscape-level ecology, for example, comparison between soils and vegetation along land use gradients. Dr. Jackson is an author of over 100 published studies in these areas. She also has a strong interest the role of biodiversity in agricultural systems and the potential for working-landscapes to play a role in the restoration and conservation of native plants and animals. Dr. Jackson served as co-chair of the global DIVERSITAS agroBIODIVERSITY Network Science Committee for nine years (2004-2013) and is a board member of the International Centre for Research in Organic Food Systems. She is a fourth-generation native Californian and attended UC Santa Cruz for her undergraduate studies in Biology (highest honors). She completed her MS and PhD in Botany at the University of Washington.

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John P. Reganold is the Regents Professor of Soil Science and Agroecology at Washington State University-Pullman. His farming systems research measures the effects of alternative and conventional farming on sustainability indicators: soil health, crop quality, financial performance, environmental quality, and social responsibility. He has successfully conducted his sustainability research on about 100 farms on four continents. Dr. Reganold has assembled multidisciplinary teams, representing soil science, horticulture, agronomy, food science, economics, entomology, plant pathology, sociology, molecular biology, and statistics, to pool their skills in assessing the sustainability of different farming systems. Using his on-farm methodology, Dr. Reganold's teams have been able to answer the following question: Can alternative systems be as or more sustainable than their conventional counterparts? His research has investigated whether organic, biodynamic, and integrated farm systems may mitigate some of the hazardous effects of conventional practices on the environment. Dr. Reganold's on-farm studies have created some of the largest published data sets on alternative and conventional agricultural systems. Such large data sets have had a significant impact on U.S. public policy and farm bills, creating major policy incentives to reduce the use of chemicals in the production of the nation's food.

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R. Ford Denison is Emeritus Professor of Agronomy and Range Science at the University of California, Davis. Currently in retirement, he remains active as an Adjunct Professor of Ecology, Evolution and Behavior at the University of Minnesota. He is also a Fellow in the College of Agriculture, advising Minnesota's 3-site long-term agricultural research network. From 1993 through 2002, Dr. Denison taught crop ecology and conducted research at UC Davis, on topics ranging from agricultural sustainability to the evolution of cooperation between microbes and plants. For most of this time, he directed "the world's youngest 100-year experiment" (LTRAS.ucdavis.edu), tracking the long-term trends that determine agricultural sustainability. His work on symbiotic nitrogen fixation, a possible alternative to nitrogen fertilizers, has led to a patent and publications in journals from *Nature* to *Field Crops Research*. One recent paper, "Darwinian Agriculture: When Can Humans Find Solutions Beyond the Reach of Natural Selection?" points out some limitations both of agricultural biotechnology and of agriculture that mimics natural ecosystems. He has been interviewed on National Public Radio, Science Update (AAAS), and DeutschlandRadio and has been an invited speaker at international meetings and at institutions from Japan's National Agricultural Research Center to the Scripps Institute of Oceanography. He was educated at Harvard, Evergreen, and Cornell, where he earned a PhD in Crop Science, with postdoctoral and sabbatical research at UC Davis, UCLA, Queen's University (Ontario), Welsh Plant Breeding Station (Aberystwyth), and University of Minnesota. His research has been supported by NSF, USDA, and California's Agricultural Experiment Station.

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Ecology / Agroecology / Conservation Biology

Claire Kremen is Professor in the Department of Environmental Science, Policy and Management at University of California, Berkeley. She is an ecologist and conservation biologist whose work focuses on understanding and characterizing the relationship between biodiversity and ecosystem services, and utilizing this information to develop conservation and sustainable management plans, considering both protected areas and the working lands matrix around them. Her current research focuses on exploring the ecological, social and economic benefits, costs and barriers to adoption of diversified farming systems, and on restoring pollination and pest control services in intensively farmed landscapes, using both predictive modeling and field studies. Her work reaches from theory to practice and includes hands-on conservation action such as, for example, the scientific design and establishment of a network of protected areas to protect Madagascar's endemic flora and fauna. Dr. Kremen has won numerous honors, including the prized MacArthur Foundation Fellowship for her contributions to ecology, agriculture and biodiversity and the J.S. McDonnell Foundation 21st Century Fellowship. She also serves as faculty co-director for the new Berkeley Food Institute (BFI), and co-directs the BFI Center for Diversified Farming Systems. Dr. Kremen served as the University representative for the California Department of Food and Agriculture Climate Change Consortium, helping produce a report on *Climate Change Impacts and Strategies for Resilience*.

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Stephen Gliessman is the former Alfred E. Heller Professor of Agroecology at the University of California, Santa Cruz, a position he held for more than 30 years. An internationally recognized leader in the field of agroecology, Dr Gliessman earned his doctorate in plant ecology at UC Santa Barbara, and was the founding director of the UC Santa Cruz Agroecology Program, now the Center for Agroecology and Sustainable Food Systems (CASFS). His teaching focused on agroecology, sustainable agriculture, organic gardening, ethnobotany, California natural history, botany and

ecology. Dr. Gliessman is the author of the groundbreaking textbook *Agroecology: The Ecology of Sustainable Food Systems* (Third Edition, 2014), and numerous other books and articles. In 2008, Dr. Gliessman became the chief editor of the *Journal of Sustainable Agriculture*, relaunched in 2013 as the *Journal of Agroecology and Sustainable Food Systems*.

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Ivette Perfecto is the George W. Pack Professor of Ecology, Natural Resources and Environment at the University of Michigan. Her research focuses on biodiversity and arthropod-mediated ecosystem services in rural and urban agriculture. She also works on spatial ecology of the coffee agroecosystem and is interested more broadly on the links between small-scale sustainable agriculture, biodiversity and food sovereignty. She teaches Our Common Future (a course on globalization) (Environ 270), Food Land and Society (Environ 318) and Field Ecology (SNRE 556). She is co-author of three books, *Breakfast of Biodiversity*, *Nature's Matrix: Linking Agriculture, Conservation and Food Sovereignty*, and the forthcoming *Coffee Agroecology*. Dr. Perfecto received her BS in Biology from Universidad Sagrado Corazón, Puerto Rico, her MS in Ecology from the University of Michigan, and her PhD in Natural Resources from University of Michigan.

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John Vandermeer is the Asa Gray Distinguished University Professor and chair of the Department of Ecology and Evolutionary Biology at the University of Michigan. He has been involved in research in Mexico, Costa Rica, and Latin America for the past 30 years. Currently, he focuses on the ecology of the traditional shaded coffee agroecosystem in southern Mexico, investigating the role of biodiversity in the functioning of agroecosystems, especially the multispecies systems common in tropical areas. He is also interested in the dynamics of rain forest destruction and conservation, with a focus on recent events in Central America and the nature of the conversion process, including sociopolitical as well as ecological forces involved in current debates about rain forest conservation. Dr. Vandermeer has wide experience in researching and teaching agroecological science, and has published extensively on food and agriculture and conservation. His most recent books are "Population Ecology: First Principles" co-authored with Deborah Goldberg, "The Ecology of Agroecosystems", and "Coffee Ecology" written with Ivette Perfecto. He has numerous NSF grants for ecology research and promoting diversity in science education. At Michigan, he is affiliated with the Center for the Study of Complex Systems and the Department of Latin American and Caribbean Studies. Dr. Vandermeer completed his Ph.D. work at the University of Michigan and was a post-doctoral fellow at the University of Chicago.

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Stacy Philpott is the Alfred & Ruth Heller Chair in Agroecology at the University of California, Santa Cruz. Her research interests span agroecology and conservation, tropical ecology, ant ecology, urban agriculture, and biodiversity, in both domestic and international settings. Before arriving at Santa Cruz, Dr. Philpott completed her PhD at the University of Michigan, was a Postdoctoral Fellow at the Smithsonian Institution Migratory Bird Center, and was an Associate Professor in the Department of Environmental Sciences at the University of Toledo.

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V. Ernesto Mendez is a Professor of International Studies, Agroecology, and Rural Development in the Department of Plant and Soil Science at the University of Vermont. He focuses on developing

and applying transdisciplinary approaches that analyze interactions between agriculture, livelihoods, and environmental conservation in tropical and temperate rural landscapes, drawing primarily from the field of agroecology. Most of his work utilizes a Participatory Action Research (PAR) approach in an effort to directly engage communities of research and practice. A native of El Salvador, Dr. Mendez has 15 years of experience working with smallholder farmers in Mexico and Central America, with recent projects focusing on food sovereignty for coffee farmers and cooperatives in Mexico, Nicaragua, and El Salvador. In Vermont, his activities include a landscape agricultural multifunctionality study and a PAR project on agricultural resilience to climate change. At UVM, Dr. Mendez leads the Agroecology and Rural Livelihoods Group (ARLG) and is a faculty member of the new MS in Food Systems program. He serves on the boards of the Community Agroecology Network (CAN, California), Food for Farmers (Vermont), Advising & Interdisciplinary Research for Development and Conservation (El Salvador) and Conservation Research Foundation (Vermont). Dr. Mendez is part of the research collaborative “The Vermont Agricultural Resilience in a Changing Climate,” a long-term initiative that seeks to work with farmers, agricultural service providers, researchers and community organizations to address the impacts of climate change.

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Plant/Crop Breeders

Julie Dawson is an Assistant Professor in the Department of Horticulture at the University of Wisconsin-Madison, where she provides research and extension to support urban and regional food systems, with an emphasis on small scale diversified farms, market gardens and community gardens, and farmer-led research. Previously, Dr. Dawson was a postdoctoral research associate at Cornell University working with farmers to develop varieties of wheat, emmer, and einkorn for organic farming systems. She has also worked at the Institut National de la Recherche Agronomique in France, with Dr. Isabelle Goldringer, where she contributed to the creation of a participatory plant breeding program led by an association of organic and biodynamic farmers, the Réseau Semences Paysannes (farmers' seed network). She received her PhD from Washington State University, working with Dr. Stephen Jones on organic and participatory wheat breeding.

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Kevin Murphy is an Assistant Professor of Plant Breeding in the Department of Crop and Soil Sciences at Washington State University. Dr. Murphy leads the barley and alternative crop breeding program at WSU, whose goal is to increase the genetic- and bio-diversity of cropping systems through the development of new cultivars and ecologically-based production practices. Within barley, Dr. Murphy's team continually work towards the release of climate resilient, disease resistant and high yielding feed, food and malt cultivars. In addition to barley breeding and genetics, his group focuses on quinoa breeding and agroecology for organic systems, buckwheat nutrition, spelt and perennial wheat breeding, amaranth genetics, and proso millet varietal selection and agronomy. General traits/systems of importance across the crops studied include nutritional value, heat tolerance, drought tolerance, resistance to rusts and mildews, intercropping, deficit irrigation, and evolutionary participatory breeding.

Prior to graduate school, Dr. Murphy spent seven years working on and managing farms in Arkansas, Michigan, and Washington State. He received his BS in Biology from Colorado College, and his MS in Crop Science and PhD in Plant Breeding and Genetics from Washington State

University. He recently completed a Fulbright Specialist project, working with rice farmer-breeders in the Philippines.

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Stephen Jones is Director of the Washington State University Research and Extension Center at Mount Vernon. The goal of the Mount Vernon program is to add to the long-term environmental and economic health of farming in western Washington while producing a food crop that is safe and high in nutritional value. The complexities of farming systems in western Washington are acknowledged and non-reductionist approaches are favored.

As a professor and research scientist, Dr. Jones has published extensively on wheat breeding in both conventional and alternative cropping systems, including “Increased Food and Ecosystem Security via Perennial Grains” (*Science* 2010). He supports graduate student research in areas including breeding for traditional and organic farming systems, farmer participatory breeding, converting wheat to a perennial crop, evolution of wheat species, increased water and nitrogen-use efficiencies of crop plants and non-GMO use of wild species for crop improvement. Tools involve classical genetics, cytogenetics, marker technologies and innovative breeding strategies. Dr. Jones received his BS from California State University, Chico (1980) and his MS and PhD in Genetics from the University of California, Davis (1986, 1991).

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Major Goodman is a William Neal Reynolds Distinguished University Professor of Crop Science at North Carolina State University. A native of Johnston, Iowa, Dr. Goodman holds a BS in Math (Iowa State – National Merit Scholarship), and both an MS (H.F. Robinson, corn) and PhD in Genetics from North Carolina State. He was an NSF Postdoctoral Fellow in Piracicaba, Brazil where he studied multiple races of corn. In 1967, Dr. Goodman returned to his alma mater where he joined the Department of Statistics and in 1983, he joined his current department, Crop Science. Under his direction, the maize breeding and genetics program in Crop Science focuses on the improvement of maize through the application of quantitative genetics theory and the incorporation of exotic germplasm in traditional maize breeding. Though Dr. Goodman admits to never having taken a formal course in Plant Breeding, he learned some “tricks of the trade” while working for 9 consecutive summers at Pioneer.

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Bill Tracy is a Professor and the Chair of the Department of Agronomy at the University of Wisconsin-Madison. Dr. Tracy’s program focuses on the improvement of sweet corn through breeding and the discovery of genetic information that will be useful for future sweet corn enhancement. He directs a breeding program that generates commercially useful inbreds and hybrids, making extensive use of tropical and other non-sweet germplasm. Dr. Tracy’s genetic research centers on three areas 1. The relationship between the development of the maize plant and pest resistance. 2. Endosperm mutants and their effects on quality, germination, and cold tolerance. 3. Phylogenetics and evolution of sweet corn. A fourth area of research involves participatory breeding and on farm research for organic crop production.

Dr. Tracy is also well-known for having ‘bred’ several generations of scientists who continue to pursue plant breeding at land grant universities and other institutions across the US and internationally. His teaching and mentorship spans Introduction to Agronomy to Organic Crop

Production, graduate advising in breeding and genetics to K-12 science education. Dr. Tracy has published several influential journal articles, including “Feeding the World Today and Tomorrow: The Importance of Food Science and Technology (2010) in the Comprehensive Reviews in Food Science and Food Safety.

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PUBLIC HEALTH

Epidemiology, occupational and environmental health

Rob McConnell MD is professor of preventive medicine at USC's Keck School of Medicine and deputy director of the Children's Environmental Health Center. He has researched the effects of air pollution on the development and exacerbation of asthma and is the principal investigator for the Children's Health Study, a large prospective cohort study to investigate these relationships. Dr. McConnell has held numerous national and international leadership positions involving multidisciplinary collaborations throughout his career, including extensive science management experience as Deputy Director of the NIH-supported Southern California Environmental Health Science Center and the Southern California Children's Environmental Health Center. He is the former director of a World Health Organization (WHO) regional center for environmental health for Latin America and the Caribbean, where he was a member of advisory committees to the Ministries of Health in the Americas and of the senior management team to the WHO Regional Director for the Americas. He has worked extensively in Latin America, where he made important contributions to understanding the chronic neurological and public health burden of occupational pesticide poisoning in developing countries. Dr. McConnell graduated Phi Beta Kappa from Stanford University and earned his medical degree at UCSF. He did his residency in internal medicine at Montefiore Hospital in the Bronx and then served two years in the CDC's Epidemic Intelligence Service.

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Rachel Morello-Frosch is a professor at the University of California, Berkeley, School of Public Health and the Department of Environmental Science, Policy and Management. She also directs the Doctor of Public Health Program. Her research examines race and class determinants of environmental health among diverse communities in the United States. A focus of her current work is assessing the relationship between social inequality, psychosocial stress and how these factors may interact with chemical exposures to amplify pollution/health outcome relationships and produce environmental health inequalities. Much of her work has examined this question in the context of ambient air pollution and indoor chemical exposures, prenatal exposures and effects on birth outcomes and children's health, often using community-based participatory research approaches for data collection and risk communication. She has also examined ways in which measures of material deprivation (e.g. poverty) and social inequality (e.g. racial residential segregation) may modify observed relationships between pollution exposures and poor perinatal outcomes such as low birth weight and risk of preterm delivery. Finally, in collaboration with scientific colleagues and regulatory scientists, Dr. Morello-Frosch has worked to develop scientifically valid and transparent tools for assessing the cumulative impacts of chemical and non-chemical stressors to address environmental justice goals and improve regulatory decision-making and environmental policy.

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Paul English is state environmental epidemiologist and branch scientific advisor for the Environmental Health Investigations Branch at the California Department of Public Health (CDPH). English has more than 15 years of experience working in environmental public health for the CDPH. He is Principal Investigator of a cooperative agreement with the Centers for Disease Control and Prevention to establish an Environmental Health Tracking Network for California, which is conducting a biomonitoring study of chlorpyrifos. The Environmental Health Tracking Grant is part

of a nationwide effort by the CDC which involves collaboration with 20 other funded states and three academic Centers of Excellence. Dr. English focuses on the public health impacts of climate change, spatial epidemiology, environmental health issues at the U.S.-Mexico border, environmental links to asthma and adverse reproductive outcomes. English was a World Health Organization advisor contributing to a systematic review of health indicators of climate change and has assisted local government and health agencies in India on heat preparedness. Over the last seven years, Dr. English has served as principal investigator of the California Environmental Health Tracking Program, which takes a community-based approach to develop surveillance and biomonitoring systems for environmental hazards, exposures and environmentally related chronic disease. He has been dedicated to responding to community needs and concerns regarding environmentally related disease by integrating environmental epidemiology, health education, community participation, geographic information systems and spatial methodologies, and health policy. Dr. English has a PhD in epidemiology and an MPH in epidemiology/biostatistics both from the University of California, Berkeley, and has published his research in numerous peer-reviewed journals.

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Madeleine Scammell is Assistant Professor in the Department of Environmental Health at Boston University's School of Public Health. Dr. Scammell's research includes the use of qualitative methods in the area of community-driven environmental health and epidemiologic studies, mapping and monitoring community-identified environmental health hazards, and analyzing cumulative exposures to chemical and non-chemical stressors. She is the Principal Investigator of an EPA grant to study cumulative risk to social and environmental stressors in urban populations. This grant is a community-based participatory research project conducted in partnership with the Chelsea Collaborative. Dr. Scammell also directs Community Engagement and Research Translation Cores of the Boston University Superfund Research Program, and the Partnerships and Collaborations Core for the Partners in Health and Housing Prevention Research Center (PHH-PRC) at Boston University. In these capacities her work includes developing long-term mechanisms to support research relationships between community groups and scientists, and responding to community requests for assistance. Dr. Scammell serves on the Board of Health in the City of Chelsea and is also a member of the board of directors of the Science & Environmental Health Network. Research interests include: chronic kidney disease in agricultural workers in Central America, environmental justice, health inequality, community mapping, community health indicators, community-based participatory research, human biomonitoring and ethics.

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Risk Assessment

Lauren Zeise is Deputy Director for Scientific Affairs for California EPA's Office of Environmental Health Hazard Assessment and as such oversees the scientific activities of the department. Her department evaluates hazards and risks for chemicals in drinking water, air, consumer products, air and other environmental media. It houses the Cal/EPA Children's Environmental Health Center. The department is also developing Cal/EPA's approach for assessing the cumulative impacts of multiple sources of pollution and non-chemical stressors on communities, and with other California departments operates California's biomonitoring program. In her 25 years of service in state government she has coauthored hundreds of chemical assessments and regulations, and the California's Green Chemistry Hazard Trait regulation. She has been involved in a wide range of risk assessment activities, including cancer and reproductive toxicant assessments; development of frameworks and methodologies for assessing cumulative impacts, nanotechnology, green

chemistry/safer alternatives, human interindividual variability and risk, and susceptible populations.

Dr. Zeise is a National Associate of the National Academy of Science's National Research Council and received the Society of Risk Analysis' Outstanding Risk Practitioner Award in 2008.. She has served on various advisory boards and committees of the US EPA, Office of Technology Assessment, World Health Organization, National Institute of Environmental Health Sciences, National Research Council and Institute of Medicine. She has coauthored numerous National Academy of Sciences reports, including "Science and Decisions: Advancing Risk Assessment" (2009), "Toxicity Testing in the 21st Century" (2007), "Sustainability and the US EPA" (2011), "Breast Cancer in the Environment" (2012), and "Understanding Risk: Informing Decisions in a Democratic Society" (1996). Her doctorate is from Harvard University.

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INTERNATIONAL EXPERTS

Olivier de Schutter served as the UN Special Rapporteur on the Right to Food from 2008- 2013. Trained as a human rights lawyer, Dr. de Schutter is a Professor at the Catholic University of Louvain and at the College of Europe in Poland. He is also a Member of the Global Law School Faculty at New York University and is Visiting Professor at Columbia University. In 2002-2006, he chaired the EU Network of Independent Experts on Fundamental Rights, a high-level group of experts which advised the European Union institutions. Since 2004, and until his appointment as the UN Special Rapporteur on the Right to Food, he has been the General Secretary of the International Federation of Human Rights (FIDH) on the issue of globalization and human rights. He has also been active in the United Nations/FAO Committee on Food Security, established in 1974 to be the most inclusive international and intergovernmental platform for all stakeholders to work together in a coordinated way to ensure food security and nutrition for all. In 2014, New York Times columnist Mark Bittman described de Schutter as "Food's Big Picture Guy," a scholar who "with increasing depth...has analyzed a food crisis that is international and systemic, with common threads in countries rich and poor." De Shutter received his LLM from Harvard University and his PhD from the University of Louvain.

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Edith T. Lammerts van Bueren is a Professor Organic Plant Breeding at the Louis Bolk Institute and at Wageningen University in the Netherlands. Dr. Lammerts van Bueren has more than 25 years of experience in organic research and management. She is a pioneer in plant breeding and genetic resources for organic and low-input agriculture and has put this subject on the European agenda. Since 2005, she has held a chair at Wageningen University in the Netherlands as professor Organic Plant Breeding. She is also senior researcher Organic Plant Breeding at the Louis Bolk Institute, a research institute specialized in organic agriculture, healthcare and nutrition. Edith was co-founder and has been chair of the European Consortium for Organic Plant Breeding (ECO-PB) for 10 years, and is now chair of the Section Organic and Low-input Agriculture of EUCARPIA (European Association for Research for Plant Breeding). Among several PhD research projects of which many on developing selection tools for breeding for nutrient efficiency and improved root systems, she also coordinates a participatory organic potato breeding program with main focus on late blight resistance. Through supervising master students she became involved in setting up participatory cotton breeding in Uganda, and became involved in the Organic Cotton Seed Taskforce

of Textile Exchange. She aims at building bridges between existing expertise among both farmer breeders and professional breeders, and incorporating efforts of other stakeholders towards chain-based or community-based breeding models

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Humberto Ríos Labrada is currently the Latin America Representative for the International Centre for Development Oriented Research in Agriculture (ICRA) where he focuses on interdisciplinary and participatory approaches to capacity building and agroecological innovation for smallholder farmers. He is currently based in Bolivia where he advises the Swiss Agency for Development and Cooperation financed project “El Programa de Innovación Continua.” Dr. Ríos Labrada holds a PhD in Agricultural Sciences and was a lecturer of plant breeding and experimental design for 12 years in Cuba. Prior to joining ICRA, Dr. Ríos Labrada coordinated the Agricultural Local Innovation Program (PIAL) at the National Institute of Agricultural Science in Cuba from 2001 to 2011. During this time he initiated and expanded farmer participatory systems for the promotion and enhancement of crop agrobiodiversity. This program has resulted in significant increases in food production and now includes the participation of more than 50,000 farmers. In 2010, Dr. Ríos Labrada was awarded the Goldman Environmental Prize in 2010 and was cited for excellence in biodiversity research, working with farmers to increase crop diversity, and “encouraging Cuba’s shift from agricultural chemical dependence toward sustainability.”

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