2010

Opening- Proceedings of the 2010 Water for Food Conference

Prem S. Paul
University of Nebraska at Lincoln, ppaul2@unl.edu

Monica Norby
University of Nebraska-Lincoln, mnorby1@unl.edu

Gillian Klucas
University of Nebraska-Lincoln

Ashley Washburn
University of Nebraska-Lincoln, awashburn2@unl.edu

Elizabeth Banset
University of Nebraska-Lincoln

See next page for additional authors

Follow this and additional works at: https://digitalcommons.unl.edu/researchecondev

Paul, Prem S.; Norby, Monica; Klucas, Gillian; Washburn, Ashley; Banset, Elizabeth; and Miller, Vicki, "Opening- Proceedings of the 2010 Water for Food Conference" (2010). Office of Research and Economic Development--Publications. 53.
https://digitalcommons.unl.edu/researchecondev/53
Authors
Prem S. Paul, Monica Norby, Gillian Klucas, Ashley Washburn, Elizabeth Banset, and Vicki Miller
Proceedings of the 2010 Water for Food Conference
Lincoln, Nebraska – May 2-5
Conference Sponsors

Major conference support underwritten by
Robert B. Daugherty Charitable Foundation

Generous conference support provided by
Bill & Melinda Gates Foundation
Monsanto Company

Water for Food Conference Committees

Senior Advisory Council
Michael K. Doane, Monsanto Company
Simi Sadaf Kamal, Hisaar Foundation
Katherine Lombardo, Bill & Melinda Gates Foundation
Robert Meaney, Valmont Industries Inc.
David Molden, International Water Management Institute
Keith Olsen, Nebraska Farm Bureau
Prem S. Paul, University of Nebraska–Lincoln
Peter Rogers, Harvard University

University of Nebraska
Faculty Planning Committee
Ann Bleed
Ken Cassman
Bruce Dvorak
Kimberly Andrews Espy
Thomas Farrell
Sheri Fritz
Steve Goddard
Mark Gustafson
Kyle Hoagland
Richard Hoffmann
Monica Norby
Shashi Verma
Ron Yoder
Don Wilhite
Mike Zeleny
Sandi Zellmer

Conference Staff
University of Nebraska–Lincoln
Office of Research and Economic Development

Tausha Ward Armbruster
Elizabeth Banset
Joel Brehm
Seth Burkey
Peg Filliez
Mari Greer
Kristen Kinnan
Vicki Miller
Tim Savage
Peter Stewart
Corrie Svehla
Karen Underwood
Ashley Washburn
Becky Zavala
Lorrie Benson
Contents

11 Foreword

12 Executive Summary

24 Chapter 1: Introduction

28 Chapter 2: Global Perspectives on Water for Food

30 Keynote Address – The Water Crisis and the Future of Global Poverty
Jeff Raikes, CEO, Bill & Melinda Gates Foundation

34 President’s Welcome – A Visionary Gift for the 21st Century
James B. Milliken, President, University of Nebraska

36 Chancellor’s Welcome – Water for Food: Imagining the Future
Harvey Perlman, Chancellor, University of Nebraska–Lincoln

38 Increasing the Drought Tolerance of Crops: Urgency, Myths, Achievements and Realities
Gary Atlin, Associate Director, Global Maize Program, International Maize and Wheat Improvement Center (CIMMYT)

42 Charting Our Water Future: Economic Frameworks to Inform Decision-Making
Giulio Boccaletti, Expert Associate Principal, McKinsey & Company

45 Water Security: What is the Challenge and What Needs to be Done?
John Briscoe, Gordon McKay Professor of the Practice of Environmental Engineering, Harvard University

49 Comparing Green Revolutions in Asia and Nebraska: Lessons for Sub-Saharan Africa
Ken Cassman, Heuermann Professor of Agronomy and Director, Nebraska Center for Energy Sciences Research, University of Nebraska–Lincoln

53 Science Challenges at the Water/Food Nexus: An NSF Perspective
Richard Cuenca, Program Director for Hydrologic Sciences, National Science Foundation

56 A System Approach to Water Productivity
Robert T. Fraley, Executive Vice President and Chief Technology Officer, Monsanto Company

60 ICIWaRM – America’s First UNESCO Category 2 Water Center
William S. (Will) Logan, Deputy Director, International Center for Integrated Water Resources Management (ICIWaRM)
Growing Enough Food Without Enough Water
David Molden, Deputy Director General for Research, International Water Management Institute

Water Sector Improvement through Participatory Irrigation Management in India
U.N. Panjiar, Secretary, Ministry of Water Resources, India

The Water-Saving Irrigation Strategy and Effect in China
Shiqi Peng, Chief Scientist, National Agro-Technical Extension and Service Centre, Ministry of Agriculture, China

Population, Food and Water: Role of Water Management in Global Food Production
Krishna C. Prasad, Senior Lecturer in Land and Water Development, UNESCO-IHE, Netherlands

Going from 1 to 3 Tons Per Hectare in Africa with More Variable Rainfall
Pedro Sanchez, Columbia University Earth Institute, 2002 World Food Prize Laureate

Chapter 3: Genetics and Physiology of Crop Water Use

A Global Assessment of Corn Water Use As Affected by Climate, Genetics and Scarcity
Marty Matlock, Professor of Ecological Engineering, University of Arkansas

Plant Research Innovations in the University: When Will They Apply to the Real World?
Sally Mackenzie, Ralph and Alice Raikes Chair, Plant Sciences, and Director, Center for Plant Science Innovation, University of Nebraska–Lincoln

Mapping and Cloning QTLs for Drought Tolerance in Durum Wheat and Maize
Roberto Tuberosa, Professor of Biotechnology Applied to Plant Breeding, University of Bologna, Italy

Breeding for Water Productivity in Temperate Cereals
Richard Richards, Chief Research Scientist, Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia

Panel Discussion

Chapter 4: Human Dimensions of Water for Food Production

Feeding 9 Billion and Maintaining the Planet: Meeting the Challenge of 2050
Jason Clay, Senior Vice President of Market Transformation, World Wildlife Fund
### Contents

<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>94</td>
<td><strong>Agricultural Water: Challenges and Opportunities for Africa</strong></td>
<td>Elijah Phiri, Leader of the Comprehensive Africa Agriculture Development Programme (CAADP) Pillar 1, University of Zambia</td>
</tr>
<tr>
<td>96</td>
<td><strong>Agricultural Productivity in Developing Countries: The World Food Equation and Food Security</strong></td>
<td>Lilyan Fulginiti, Professor of Agricultural Economics, University of Nebraska–Lincoln; Richard Perrin, Jim Roberts Professor of Agricultural Economics, University of Nebraska–Lincoln</td>
</tr>
<tr>
<td>97</td>
<td><strong>Managing in a World of Ever Increasing Water Scarcity: Lessons from Australia</strong></td>
<td>Mike Young, Executive Director, The Environment Institute, University of Adelaide, Australia</td>
</tr>
<tr>
<td>99</td>
<td><strong>Panel Discussion</strong></td>
<td></td>
</tr>
</tbody>
</table>

#### Chapter 5: Technologies and Advances in Water Management

- **Highlights of Research and Educational Programs Related to Agricultural Water Management in Nebraska**
  Suat Irmak, Associate Professor of Biological Systems Engineering, University of Nebraska–Lincoln

- **Wireless Underground Sensor Networks: A New Perspective for Automated Water Management**
  M. Can Vuran, Assistant Professor of Computer Science and Engineering, University of Nebraska–Lincoln

- **Trends in Crop Water Productivity Enhancement: Why the New Green Revolution Must Be Blue-Green**
  Steven R. Evett, Research Soil Scientist, USDA-Agricultural Research Service Conservation and Production Research Laboratory

- **Panel Discussion**

#### Chapter 6: A View from Agricultural Producers

- **Rainfed and Irrigated Production in Argentina**
  Martin Pasman, Producer, Argentina

- **No-till Rainfed Farming in Nebraska**
  Keith Olsen, Producer; Nebraska Farm Bureau

- **Consumptive Water Use on a Nebraska Irrigated Farm**
  Roric R. Paulman, Paulman Farms, Nebraska
121 Farming in an Oregon Critical Groundwater Area
Aaron Madison, Madison Farms, Oregon

123 Panel Discussion

126 Chapter 7: Climate Challenges to Water for Agriculture

128 Impacts of Weather Variability on Rice and Aquaculture Production in the Mekong Delta
Nguyen Hieu Trung, Dean of the College of Environment and Natural Resources,
Can Tho University, Vietnam

130 Change in the Western Himalaya and Hindu Kush
John (Jack) F. Shroder, Professor of Geography and Geology, University of Nebraska at Omaha

132 Chapter 8: Key Issues for the Future

135 Important to Nebraska and Important Globally
Ken Cassman, Heuermann Professor of Agronomy and Director, Nebraska Center
for Energy Sciences Research, University of Nebraska–Lincoln

136 An Unbiased Source of Information
Eugene Glock, Producer, Cedar Bell Farms, Nebraska

136 Filling the People and Research Gaps
David Molden, Deputy Director General for Research, International Water Management Institute

137 Putting the Knowledge into Action
Peter Rogers, Gordon McKay Professor of Environmental Engineering, Harvard University

138 Panel Discussion

142 Appendix

144 Poster Competition

148 Conference Participants

154 Photos
In Memoriam

Robert B. Daugherty
Jan. 8, 1922 – Nov. 24, 2010

“Improving agricultural productivity has been my life’s work.”
$50 Million Gift from Robert B. Daugherty Foundation Funds Water for Food Institute

On April 20, 2010, the University of Nebraska announced a $50 million founding gift commitment from the Robert B. Daugherty Charitable Foundation to support the global Water for Food Institute, a research, education and policy analysis institute focused on the efficient use of water in agriculture.

NU President James B. Milliken said the gift will enable the university to become a global resource for developing solutions to the challenges of hunger, poverty, agricultural productivity and water management. “By 2050, the world’s population will increase by 40 percent and demand for food – produced with finite amounts of land and water – will double,” Milliken said. “We have the experience and opportunity to build a global center in Nebraska, leveraging the knowledge and resources of the University of Nebraska and other leading institutions to help alleviate human suffering and food insecurity.”

Milliken praised the vision and commitment of Robert B. Daugherty, founder of Valmont Industries, who created the most successful irrigation company in the world and remained committed to the efficient and sustainable use of water to feed a growing world population. “Bob Daugherty was a true pioneer and visionary,” Milliken said. “He helped transform production agriculture and was a leader in addressing one of the most critical challenges facing the world.”

When the gift was announced in April, Daugherty said, “I have great faith in the University of Nebraska and its ability to make this institute a place where the best minds come together to find solutions that will improve the quality of life for people around the world through the strategic and responsible use of water.”

The Water for Food Institute is committed to helping the world efficiently use its limited fresh water resources to ensure the food supply for current and future generations. The institute will offer research, education and policy analysis on the efficiency and sustainability of water use in agriculture, the quantity and quality of water resources, and human issues that affect the water decision-making process.

Issues surrounding water for food have long been, and continue to be, a focus of University of Nebraska research. The knowledge and capabilities developed in Nebraska can be shared and applied globally, and Nebraska can, in turn, learn from its regional, national and international partners, Milliken said.

The water for food institute is governed by a board of directors: James B. Milliken, president, University of Nebraska, chairman; Mogens Bay, chairman of the board, Robert B. Daugherty Charitable Foundation, and chief executive officer, Valmont Industries; and Jeff Raikes, CEO, Bill & Melinda Gates Foundation.
Foreword

Today 75 to 80 percent of human water consumption is used to grow food. The projected doubling in food demand, coupled with the impact of climate change on the geographic availability of water, will significantly increase the demand for water and the potential for a water crisis.

As native Nebraskans, we know very well the linkage between water and food. We grew up in an agricultural state, in an environment with an abundance of good soil, enough rainfall and water for irrigation, and the constant expansion of agriculture through innovation. As the threat of global poverty and food insecurity grows, we know that water security and food security are inextricably linked. Without adequate water resources, we cannot meet the needed increase in food production. We must grow more “crop per drop.”

This was the key issue at the 2010 Water for Food Conference: Growing More with Less, hosted by the University of Nebraska with the support of the Robert B. Daugherty Charitable Foundation, the Bill & Melinda Gates Foundation and Monsanto Company. This report documents the ideas and discussions that emerged from that conference.

Two weeks before the conference convened, fellow Nebraskan Robert B. Daugherty showed his commitment to the efficient and sustainable use of water to feed a growing world population with a founding gift of $50 million from his foundation to the University of Nebraska to establish the global Water for Food Institute. As founder of Valmont Industries, the most successful irrigation company in the world, Daugherty played a role in transforming production agriculture and was a leader in addressing one of the most critical challenges facing our world. His gift creates an opportunity for the University of Nebraska to make a lasting impact on global poverty and hunger.

The conference provided a forum to bring together more than 300 people from 13 countries who share our urgent interest in finding innovative solutions to the challenge of growing more food with less water. We hope this report inspires you to consider your contribution to growing more with less.

Jeff Raikes, CEO
Bill & Melinda Gates Foundation

James B. Milliken, President
University of Nebraska