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Five-Year Growth Report: From Inception to Global Influence 2010 - 2015

Robert B. Daugherty Water for Food Institute

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Five-Year Growth Report

From Inception to Global Influence

2010 - 2015



Water for Food
ROBERT B. DAUGHERTY INSTITUTE
at the University of Nebraska

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Nebraska



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Water for Food
ROBERT B. DAUGHERTY INSTITUTE
at the University of Nebraska

FOREWORD FROM THE BOARD CHAIR

With special thanks to the Robert B. Daugherty Foundation



Jeff Raikes speaking at the 2014 Global Water for Food Conference

The Robert B. Daugherty Water for Food Institute at the University of Nebraska was once a seed of an idea. The idea was to create an organization that would harness the University of Nebraska's expertise in water and agriculture to help address one of the most complex challenges of our time: how to meet the world's rising food demands in the context of scarce water resources.

Following the first Water for Food Global Conference in 2009, it became clear that the University of Nebraska was not only well positioned to be a global player in the quest for water and food security, but was also motivated to turn its research into action.

The university's commitment to bring global attention to the need for better water use and management in agriculture provided fertile ground for that "big idea" to grow. The institute became a reality in 2010 thanks to the visionary leadership of James B. Milliken, then NU president, and a transformative \$50 million gift from the Robert B. Daugherty Charitable Foundation. We are excited to share this report with you, which reflects on the institute's evolution in the five years that followed.

Today, the institute has a strong capacity to take its vision to the next phase. It has established an effective leadership



Jeff Raikes
Co-Founder, Raikes
Foundation
Chair, Robert B. Daugherty
Water for Food Institute
Board of Directors



Brazilian cattle ranch

team and invested in a talented group of Faculty Fellows who are committed to ensuring a more food and water secure world. Together, we are helping farmers use water more effectively for agricultural production, contributing scientific and policy research that informs decision-making, and educating future leaders in the management and use of water by and for agriculture.

As we look to the past, we are inspired by how far the institute has come. However, our eyes are fixed on the future. There is much more work to be done to find solutions to the complex and interconnected issues surrounding water and food security. All of us on the institute's Board of Directors look forward to the next five years of continued growth and progress.

Jeff Raikes
Co-Founder, Raikes Foundation
Chair, Robert B. Daugherty
Water for Food Institute
Board of Directors





Roberto Lenton speaking at the 2013 Global Water for Food Conference

PREFACE FROM THE FOUNDING DIRECTOR

It has been a pleasure and a privilege to guide the Water for Food Institute during this initial period of rapid program development and institutional growth. We didn't have a grand strategy from the start, but took an exploratory approach. This course of action allowed us to experiment, make discoveries and learn lessons that would help in developing a focused direction that made the most of our comparable advantages. As you'll see in this five-year report, we are proud of the great strides we have made in building the institute and working toward our goal to help ensure global water and food security for the generations to come.

Building the institute has been a central preoccupation since the institute's beginning in 2010. But the hard work has paid off. We are now fully staffed with an outstanding leadership team and program staff who are driving our strategic plan forward. We have rapidly grown into a known and respected leader among our peer organizations. Our 73 Faculty Fellows, numerous post docs and graduate and undergraduate students are expanding the effectiveness of our impact through projects around the world. Our online and media communications have greatly broadened our reach and connected us to stakeholders at the local, national and international levels.



Roberto Lenton
*Founding Executive
Director*
Robert B. Daugherty
*Water for Food
Institute*



Rice harvesting in Indonesia

While we are proud of our accomplishments in building an institutional framework, we are even more proud of our institute's initial work to build an impact-driven program. This work is indeed the central focus of this report.

Through the leadership of our new directors for research and policy, we have begun to build a vigorous research and policy development program that includes engagement with both local and global stakeholders. We have also developed a strong set of collaborations with national and international partners, striving to achieve a balance between

work in Nebraska and globally, including in India, Brazil, China and selected countries in East Africa and the Middle East and North Africa region. Our annual Water for Food Global Conference has become a sought-after event for thought partners, researchers, students, policymakers, producers, business leaders and others in our sector. We have also convened or co-convened many policy dialogues, workshops and seminars in the last five years, including at the annual Stockholm World Water Weeks and the 2012 and 2015 World Water Forums. We are pleased by the progress we have made in our work to educate the next generation and engage

young talent, through such activities as the double Master of Science program in Agricultural Water Management with UNESCO-IHE in Delft and a fellowship program for undergraduate and graduate students and post-docs.

Now, with a full complement of directors and staff, the past year has witnessed a transformation at WFI. Relationships and partnerships have matured, programs launched and directions clarified. After reflecting on lessons learned in our initial years and many discussions with university leadership, global experts and faculty, we've identified where WFI's greatest capacities lie to effect change. As we've developed new strategies for the next five years, we've targeted key subject areas and geographic locations in which we will focus our resources. The 2015-2020 Strategic Plan details specific research, policy and educational projects we are undertaking and how we will measure progress in outputs and outcomes.

A year ago, when we moved into our new location on the Nebraska Innovation Campus, we had many empty desks. Today, those desks are filled and our offices bustling with core staff as well as students, faculty and visiting researchers. As WFI heads into its next five years, we're excited to embrace promising new projects, from closing water and agricultural productivity gaps in Africa to educating the next generation of researchers and practitioners.

I would like to express my deep appreciation to the Board of Directors, the leadership at the University of Nebraska, our International Advisory Panel and Faculty Advisory Panel, and the dedicated staff and faculty who have worked tirelessly to support the institute. We have the organizational strength, research expertise and collaborative partnerships needed to advance the institute's mission well into the future, helping to ensure sustainable water and food security for our grandchildren and their grandchildren.

Roberto Lenton
Founding Executive Director
Robert B. Daugherty
Water for Food Institute



Sebastian Elbaum, explaining his research at the 2013 Global Water for Food Conference



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Ending Water and Food Insecurity

“*Technological and agronomic advances generate opportunities.*”

We can radically improve water and food security in the world by 2050.

That may seem a bold statement, but the potential exists. In many regions of the world, farmers achieve only a small fraction of the crop yields their land is capable of producing. In other, high-yield areas, farmers continue to innovate, using technology and other practices to use water more effectively. These realities provide tremendous opportunities to both improve yields and lower agriculture’s global water footprint.

Technological and agronomic advances generate opportunities. Remote sensing and other data tools, increasingly resilient plant varieties and precision agriculture enable producers to make big strides.

Most importantly, the world is paying more attention to the water-food nexus. Public awareness is growing, private companies are engaging, and governments are increasingly acknowledging and committing resources to solving the problem of growing more food with less impact on the quantity and quality of our water resources.

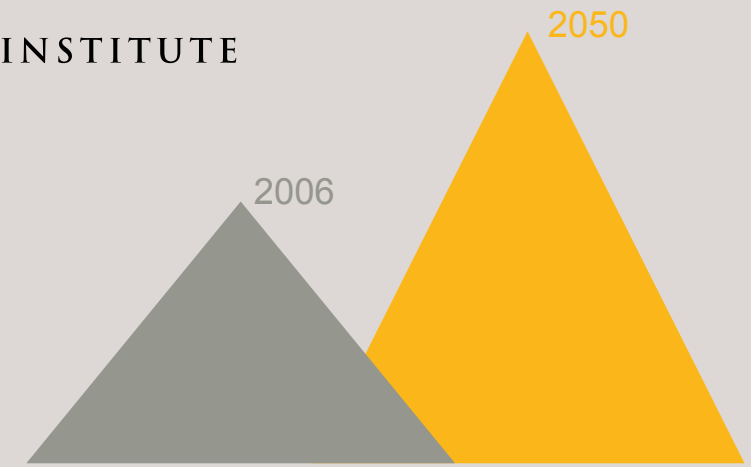
Admittedly, the challenges are enormous. By 2050, food demand is expected to double as the global population reaches

nearly 10 billion and economic prosperity improves diets. Long-entrenched social roadblocks seem impervious: inequality, poverty, corruption, marginalization of women, conflict over resources. And, not least, climate change is already beginning to undo progress with more severe consequences coming. Increasingly, severe droughts threaten major agricultural regions worldwide, leading to even greater unsustainable use of available water.

These challenges are not insurmountable. We believe the skills, technology and knowledge exist to greatly reduce the pervasiveness of water and food insecurity by 2050.

The Robert B. Daugherty Water for Food Institute at the University of Nebraska (WFI) is one of the few university-based institutes in the world focused squarely on the water-food nexus. We are committed to bringing together the resources, talent and knowledge available at the University of Nebraska (NU) and throughout the world to find unique solutions to the challenge of achieving greater food security with less pressure on water resources.

Our new 2015-2020 Strategic Plan articulates our vision to have a food- and water-secure world, where global food security is ensured while maintaining

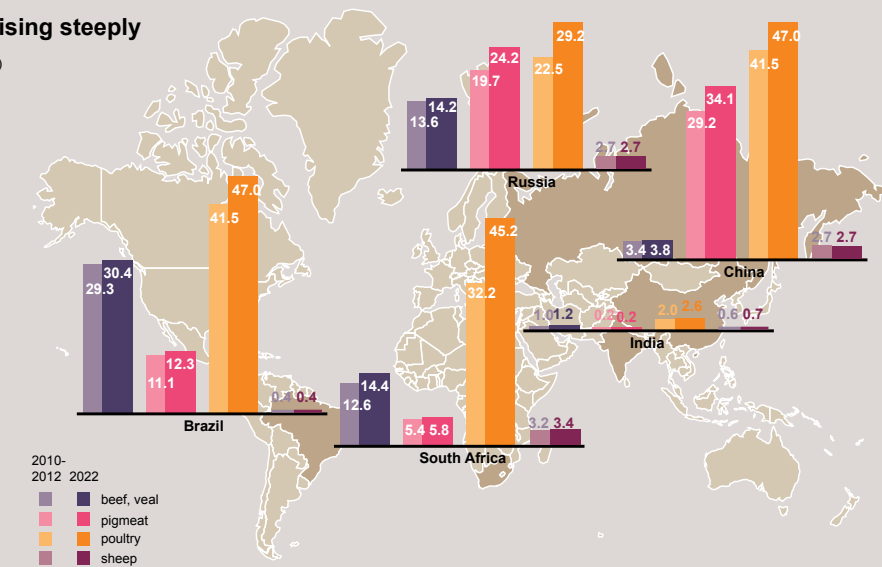


69%

Required increase in food calories to feed 9.6 billion people by 2050

Demand in the developing world is rising steeply

Meat consumption per capita, kilograms, average 2010-12 (estimate) and 2022 (forecast), in the BRICS countries (Brazil, Russia, India, China and South Africa)



the use of water to meet other pressing human and environmental needs. We work to achieve that vision by supporting research and policy

development, engaging stakeholders and educating the next generation, while adhering to our core values of integrity, service and collaboration.

A Comprehensive Plan for Today ...

Water and agriculture are inseparable. Of the world's freshwater withdrawals, food production takes a substantial 70 percent.

WFI's Strategic Plan commits to reducing agriculture's water needs by focusing on four key areas.

First, we contribute to local and global efforts to close productivity gaps in crop and livestock systems, both rainfed and irrigated. By building upon the pioneering work of the Global Yield Gap and Water Productivity Atlas and other advances and expertise at NU, we are investing in the promise of significantly boosting productivity in low-yield regions of the developing world.

Second, we help to improve groundwater management in agricultural production by contributing to relevant scientific and policy research. WFI's location in the U.S. High Plains, a region with substantial groundwater irrigation and innovative management, allows us to draw upon significant state

and university expertise to support improving groundwater management practices in key areas worldwide.

Third, we are increasing water productivity in irrigated agricultural settings to optimize food production and resource management under various irrigation scenarios. Through partnerships and NU expertise, we are building a world-class program for solving problems in irrigated agriculture for important food producing regions.

And, finally, we help ensure that efforts to improve water and food security also maintain ecosystem integrity and advance the public's health. This focus strives to channel NU's expertise in natural resources management, water quality and public health to address public and agro-ecosystem health aspects of the use of water for food production.

Together, actions in these four, interconnected research areas maximize the opportunities available worldwide to

increase water and food security, while addressing the growing challenges in irrigation and rainfed agriculture.

We are not content simply to limit our outputs to publications, websites and trained personnel. Rather, we seek to achieve strong positive outcomes in terms of changes in knowledge, changes in action and, ultimately, changes in water and food security. We strive to connect our immediate outputs to desired impacts through an explicit "output to impact" approach. For example, the research and policy work shared at conferences and workshops leads to knowledge of students, producers and decision-makers. Our work on engagement and communication fosters knowledge that alters behaviors of key stakeholders, leading to changes in practices and

policies at different scales. And our work on the ground, as in the CIRCLES project in Tanzania, aims to make tangible improvements in water and food security for the communities involved.

Geographically, we pay particular attention to those regions of the world where we can have the most impact, either through established connections or where water or food insecurity is most severe. To date, our geographic focus includes: Nebraska and the major food-producing regions surrounding it; the large agricultural countries of India, China and Brazil, which are experiencing significant water stress; several countries within sub-Saharan Africa with tremendous food insecurity and water management challenges; and the Middle Eastern and North African regions where water is scarcest.

“Water and agriculture are inseparable. Of the world's freshwater withdrawals, food production takes a substantial 70 percent.”

Wheat farm in northwest Morrill County, Nebraska.





Peruvian woman harvesting rye, Colca Canyon, Peru

As an institute of the University of Nebraska, WFI leverages the university's long and distinguished history of agricultural, water and social science research and education.

We have created a structure in which faculty aligned with WFI's mission from all four NU campuses are able to participate in and receive support from institute programs. Our Faculty Fellows' range of expertise is broad, and that diversity greatly expands our research and policy development, education and communication activities. In turn, WFI serves as an "intellectual umbrella" to help advance faculty work and to forge

collaborations among those addressing water and food issues locally and globally.

The University of Nebraska provides the foundation, but our vision and scope are global. WFI continues to expand its reach by actively seeking out partnerships and developing cooperative research programs with organizations working nationally and internationally. These partnerships expand the unique role each entity has to offer, a key to developing innovative solutions.

... and Tomorrow

In its first five years, WFI has established itself as a persuasive voice on the global stage. We've created a strong foundation of leadership and staff, and have developed an expansive set of partnerships and programs that further goals in research and policy, education and communication within the university, throughout Nebraska and around the world.

Now, as we enter the next five years, we're poised to take the next steps toward impacting global water and food security. Our founders recognized

that finding unique solutions required building bridges: across specialized disciplines, across scales of focus and across the worlds of large-scale and smallholder agriculture. Researchers, farmers, nongovernmental organizations, and the public and private sectors must work together.

In taking on this task we recognize that our work is challenging, but by pulling together we can help achieve a significant jump forward in water and food security by 2050.

“Researchers, farmers, nongovernmental organizations, and the public and private sectors must work together.”

Innovation through Research and Policy

Research and policy development are at the heart of WFI's mission to create a food and water secure world. Our scientific research is leading to insights and techniques to sustainably increase water and food productivity. Policy activities are helping to inform decision-making and to develop good governance systems.

Our goals encompass both the research that advances innovations in technology and management and the practical applications that directly benefit farmers,

water managers, policymakers, and others in Nebraska and throughout the world.

Research and policy programs range from maximizing the value of every drop of water in the soil and harnessing data-gathering satellites to engaging decision-makers by helping to resolve community water disputes and sharing information at global forums.

WFI projects have the potential to show results quickly, and in the



Center pivot irrigation in the Midwest

long-term; lead to new tools, technologies, applications, educational programs and policy impacts relevant to our mission; and secure additional external funding. Many also involve national and international collaborations with other research institutions, including public-private research and policy partnerships.

In addition to projects led by WFI leadership, we draw on the research, extension and educational work conducted by NU faculty across four campuses. WFI leverages 100 years of agricultural and water research and the outstanding extension experience of

the NU system and the Nebraska Water Center. We're able to draw upon a range of disciplines related to water and food, from agricultural and water sciences to social sciences, law, public health and administration. Our resources include relevant specialized centers of national prominence, such as the National Drought Mitigation Center, UNL's Plant Transformation Core Research Facility and a network of partners and affiliated faculty at other institutions.

To support faculty, we created a structure for faculty affiliation. Our Faculty Fellows program enrolled NU faculty members who identify

with the institute's mission and are actively involved in WFI programs. We supported Faculty Fellows through seed grants, student support grants and other means. Seed grants funded both preliminary work in promising research areas and mature projects that, with further development, could result in new technologies, tools or processes.

WFI projects focused on the four subject areas noted earlier. To identify and close productivity gaps, we supported University of Nebraska-Lincoln (UNL) agronomist Ken Cassman and his colleagues in developing the Global Yield Gap and Water Productivity

Atlas, an analytical tool that estimates exploitable gaps in yield and water productivity for major food crops worldwide. With WFI support, the project was expanded to Argentina and Brazil and, with additional major support from the Bill & Melinda Gates Foundation and U.S. Agency for International Development, developed into a mature initiative with yield gap maps for the main cereal and grain crops available for countries in South Asia, sub-Saharan Africa and the Middle East and North Africa.

Building on that success, WFI has initiated a new, ambitious program that focuses

on closing yield gaps using satellite-based remote sensing technology and extension efforts on the ground. The program, a partnership with the UN's Food and Agriculture Organization and the U.S. Department of Agriculture, has started in the Middle East and North Africa but aims to expand globally. (See pg. 21.)

In addition, we provided a seed grant to UNL agronomists Stephen Baenziger and Harkamal Walia to expand wheat varieties better adapted to tolerate drought. They investigated how wheat's genetic make-up influences its ability to withstand water stress and also develop a deeper rooting system.

In our second focus area to improve groundwater management in agricultural production, WFI published a comprehensive report on Nebraska's Natural Resources Districts, the state's successful and unique groundwater governance system. It's the first in-depth, peer-reviewed report in a series of Water for Food publications that will discuss key issues related to global water and food security. (See pg. 23.)

We also provided seed grants to two faculty working on groundwater management issues. UNL agricultural economist Lilyan Fulginiti studied how producers should pump U.S. High Plains Aquifer water to maintain or increase farm profits over the next 40 years. And UNL hydrogeologist John Gates investigated aquifers in sub-

Saharan Africa to assess the long-term viability of irrigated agriculture.

In our third focus area to increase water productivity in irrigated agricultural settings, we worked with our partners World Vision International and Valmont Industries to develop a new pilot project bringing center-pivot irrigation to Tanzanian smallholder farming communities. We hope to demonstrate how community-based, high-productivity irrigation combined with improved access to inputs and markets can lead to significantly increased yields and incomes and economic development. (See pg. 25.)

We also developed a strong collaboration with Jain Irrigation Ltd. of India, one of the world's largest irrigation and food processing companies, to bring the latest irrigation technology to smallholder farmers.

Measuring evapotranspiration helps to understand crop vitality and improve water management. We provided a seed grant to UNL engineering professor Suat Irmak to help grow the Nebraska Water and Energy Flux Measurement, Modeling and Research Network, the largest and most comprehensive flux network operated by a single research laboratory to measure evapotranspiration in the U.S.

In our fourth focus area to ensure efforts to improve water and food security, maintain ecosystem integrity and advance

Key Research & Policy Accomplishments

Identify and close productivity gaps

- Supported the Global Yield Gap and Water Productivity Atlas
- Initiated a satellite-based remote sensing program in the MENA region with FAO and USDA to close yield gaps using technology and extension efforts on the ground
- Supported research to develop drought resistant wheat varieties

Improve groundwater management

- Supported UNL hydrogeologist John Gates to research aquifers in sub-Saharan Africa to assess viability of irrigated agriculture
- Published a comprehensive report on Nebraska's Natural Resources Districts and helped create an NRD oral history project with the Nebraska State Historical Society and the NARD
- Supported studies by UNL agricultural economist Lilyan Fulginiti on how producers should pump U.S. High Plains Aquifer water to maintain or increase farm profits over the next 40 years

Increase water productivity in irrigated agriculture

- Initiated CIRCLES with WorldVision and Valmont Industries, a pilot project bringing center-pivot irrigation to Tanzanian smallholder farming communities
- Developed a joint venture with Jain Irrigation Systems Ltd of India to improve salt and drought tolerance of soybeans and bananas; educate and train scientists in biotechnology; and advance geospatial technology
- Collaborated with the Institute of Water Resources and Hydropower Research in China to develop water saving technologies and fertigation adoption for center pivot irrigation

Improve ecosystem integrity and public health

- Supported UNL soil scientist Martha Mamo to develop groundwater mapping resources in Ethiopia and conduct surveys on crop, water and nutrition among farm households
- Supported the Platte Basin Timelapse Project and funded the Raikes School of Computer Science and Management to develop photo organization software
- Advanced a study of collaborative governance reforms within the Platte River Recovery Implementation Program to help improve the health of the ecosystem

“... improved access to inputs and markets can lead to significantly increased yields and incomes and economic development.”



Plant science innovation

1 Improving Yields and Water Productivity in Arid Agricultural Areas

the public's health, we supported the Platte Basin Timelapse Project developed by WFI fellows at UNL. The team placed cameras along the Platte River in the U.S. heartland to leverage the power of time-lapse photography to better understand the river, its ecosystem and hydrology and build a community around the watershed. (See pg. 27.)

We funded a project by Ian Cottingham and his team at the Raikes School of Computer Science and Management to develop software that allows the general public to view the imagery and produce their own time-lapse videos. We provided a seed grant to

UNL soil scientist Martha Mamo, who mapped groundwater resources for agricultural use in Ethiopia and conducted surveys on crop, water and nutrition from farm households in the region to better understand crop water use and water resource management. We also supported Christine Reed, professor of public administration at the University of Nebraska at Omaha, who studied successful implementations of collaborative governance reforms within watersheds, including the Platte River Recovery Implementation Program in the U.S. heartland that aims to improve the health of the ecosystem of the Platte River and the people who depend on it.

The extremely arid landscapes of the Middle East and North Africa make these regions especially vulnerable to food shortages. The potential exists, however, to significantly improve food production in both good times and bad, and WFI has devoted considerable resources to the region.

We supported the Global Yield Gap and Water Productivity Atlas, an analytic tool that estimates crop yield and water productivity gaps. The atlas, developed by an international team led by UNL and Wageningen University in the Netherlands, scales site-specific data to regional, national and global levels.

UNL agronomist Haishun Yang and his colleagues employed the atlas protocol in Morocco, Tunisia and Jordan to assess potato, wheat and barley crops. The USAID provided funding for this project under a partnership agreement with WFI.

“In many regions of these countries, we found the potential yield could be doubled,” Yang said. With improved crop and irrigation management, for example, wheat yields could increase from one or two tons per hectare to four tons.

“The atlas is an important step because it establishes the locations that have a yield gap,” said WFI Research Director



Justin Van Wart, Patricio Grassini & Ken Cassman

2 Telling Nebraska's Groundwater Governance Story

Christopher Neale. “Now, we’ve developed a project in collaboration with others to close the gaps.”

That project employs satellite-based remote sensing techniques to estimate water productivity and yields down to individual field levels on a seasonal basis. The precision allows the team to identify farms, both rainfed and irrigated, that achieve better water productivity and yields. Then, they will work with local water and agricultural agencies to reach out to high-producing farmers to better understand crop and water use management techniques that could benefit other farmers in the area.

The project is a collaboration with FAO, UNESCO-IHE, USDA, the University of Maryland and NOAA.

In addition, WFI, in collaboration with USAID, the International Center for Biosaline Agriculture in Dubai, and faculty fellows at the National Drought Mitigation Center, will use satellite-based evapotranspiration estimates to develop a system to monitor agricultural drought and create drought early warning systems.

The teams plan to expand beyond the initial Middle Eastern and North African region to sub-Saharan Africa, and eventually globally.

When WFI Policy Director Nick Brozović talks about Nebraska’s unique and highly successful groundwater governance system, he’s often met with skepticism.

“A lot of people refuse to believe that farmers would regulate themselves,” he said. Brozović dispels many of the myths surrounding Nebraska’s groundwater governance, explaining at national and international conferences the soundness of the state’s Natural Resources Districts.

Nebraska’s NRDs, established in 1972, are locally elected governing boards organized around river basin boundaries. The boards have broad powers, including

taxation and regulatory authority, and are responsible for governing Nebraska’s vast groundwater resources.

And, yes, Nebraska’s farmers can regulate themselves. The institutional framework contributed significantly to the state’s ability to maintain groundwater levels during a time of rapid irrigation expansion. Nebraska overlies a significant portion of the High Plains Aquifer, which has been severely stressed in states farther south. The NRDs have been a key contributor to Nebraska’s ability to maintain its groundwater levels despite drought and increased irrigation.



Farmer inspects a center pivot irrigator near Elsie, Nebraska.

3 Making Crop CIRCLES in Tanzania

Download a copy of the report at waterforfood.nebraska.edu/publications/. It continues to be updated as policies and discussions evolve.

To help tell Nebraska's groundwater story, in March of 2015 the institute published a report on the history and institutional framework behind Nebraska's NRDs.

"Nebraska's Natural Resources Districts: An Assessment of a Large-Scale Locally Controlled Water Governance Framework," is the first in-depth, peer-reviewed report in a series of Water for Food publications that will discuss key issues related to global water and food security.

The report, an outgrowth of a 2013 presentation faculty fellow and UNL adjunct professor Ann Bleed gave on

behalf of WFI at an FAO "expert consultation" on water governance held in Rome, describes Nebraska's groundwater resources and details the development and characteristics of the NRDs.

"One of our goals is to take our research and analysis to international audiences," said Brozović. "This report is a mechanism through which others might learn from the various water management examples within Nebraska."

He adds that it also encourages conversations about groundwater policy with Nebraska's farmers, policymakers, academics and local managers.

Few farmers in rural Africa are able to produce enough food to feed their families for the entire year. Most are women, farming less than three acres and earning less than \$2 a day.

In wealthy agricultural areas, center pivot irrigation has transformed large-holder food production and incomes and has been employed successfully in several parts of sub-Saharan Africa. Could it have the same revolutionary effect for smallholder farmers in Tanzania and other low-income countries in the region?

In a unique collaboration established in 2013, we teamed with Valmont

Industries, the world's leading center-pivot irrigation company, and the aid organization World Vision International on an ambitious project to find out.

CIRCLES, a five-year pilot program, is assisting a northern Tanzanian farming community to develop a center pivot irrigation system and to access the training, equipment, inputs and markets needed to maximize crop production and farm income.

Together, we seek to demonstrate how smallholder and subsistence farmers can improve productivity and commercialize their farm production, significantly increasing incomes.



Building a well in Ethiopia

4 Setting a River in Motion

The additional household profit should ripple out into the community to create opportunities for further economic development and growth.

“Only four percent of African agriculture is irrigated, compared to 20 percent of world agriculture,” said WFI Research Director Christopher Neale. “And with even drier conditions predicted, the need is only going to become greater.”

To foster local involvement and cooperation, CIRCLES uses World Vision’s established economic development efforts in the area to bring additional resources and market

infrastructure, including microfinancing and marketing for higher-value crops.

We anticipate that crop revenues will allow farmers, as a group, to own the center pivot technology within five years. The loaned money will then go to serve other farming communities.

WFI will provide comprehensive monitoring and evaluation as well as technical expertise to improve data collection and program design. If the CIRCLES data proves the project successful, we will expand center pivot irrigation to additional smallholder settings.

If a picture is worth a thousand words, what are a million images taken along the entire length of a river worth? The Platte Basin Timelapse Project chronicles a story that neither words, nor traditional photography, can tell.

In 2011, professional photographer Michael Forsberg and filmmaker Mike Farrell, of Nebraska Educational Telecommunication, “set a river in motion” by placing more than 40 cameras along the U.S.’s Platte River, from the headwaters in the Colorado Rockies to its confluence with the Missouri River. Each day the cameras take a picture every daylight hour,

documenting one of the world’s most allocated rivers.

“These cameras are providing us a view that we’ve really never seen before,” Forsberg said at the 2013 Water for Food Conference. “You actually can watch the corn grow.” Forsberg and Farrell are WFI Faculty Fellows and UNL Professors of Practice.

With more than one million images, the visual data provide scientists, resource managers and the public with a greater understanding of the influences agriculture, municipal water supplies, geological processes, restoration projects



Platte River, Nebraska



Rolando Flores leading a conference discussion

and other activities have on the watershed. The project captured the major flood of 2011 and the record drought in 2012. Tying the images to other data, such as water quality and crane bird populations, helps researchers investigate extreme events and their consequences. WFI is supporting efforts to develop science applications for the photography project. We also funded software development to wrangle the tremendous amount of digital data generated by the project. WFI faculty fellows at UNL's Jeffrey S. Raikes School of Computer Science and Management created user-friendly software (Phocalstream: *images.plattebasintimelapse.com/Home/SiteList*)

that enables researchers and the public to easily add datasets, manipulate images and create their own time-lapse movies and narratives about the river.

With the infrastructure in place, the team's focus shifted to telling stories through multimedia that help build a community around the watershed. They have developed learning programs for schools and a compelling website, available at *plattebasintimelapse.com*.

The Platte Basin Timelapse Project could be a template to better understand and engage support for other stressed watersheds around the world.

Educating, Engaging and Communicating

WFI research and policy efforts go hand in hand with university-level education, engagement and communication activities. Uniting research with the equally important jobs of educating the next generation of leaders and engaging stakeholders better equips students and current practitioners to face the water for food challenge today and tomorrow. The union also enhances research — within WFI and elsewhere — by nurturing greater understanding across sectors and stakeholders.

Through education, we build knowledge.

Our educational strategy encompasses formal and informal settings, including academic teaching, extension, Web-based education, seminars and workshops, special events, and community outreach. We feel strongly that participants in our educational activities, whether students or professionals, are sources of knowledge as well as learners. Learning becomes a two-way process

as we also gain greater understanding, which further enhances our education and communication activities as well as research and policy projects.

In our first five years, we developed a number of educational projects to benefit NU students, creating courses and curricula related to water in society and providing internships to undergraduate students. Our internship program was designed to give highly qualified students pursuing fields relevant to our work practical experience in the WFI offices. Intern projects ranged from Nebraska irrigation data analysis to Web design.

Uniquely, interns also participated in an oral history project we created with the

Nebraska State Historical Society and the Nebraska Association of Resources Districts. Together, we documented the formation and early years of Nebraska's Natural Resources Districts, the state's novel locally governed resources management system based around watersheds. The project is online at nrdstories.org.

We also supported nine students and their faculty advisors by providing stipends to graduate students and postdoctoral fellows. The program targeted interdisciplinary research projects that also advanced educating promising students. For example, master's student Kate Boone worked with UNL agronomist and WFI Faculty Fellow Patricio Grassini to

investigate the relationships among groundwater, irrigation and agronomy to better understand how climate and local features, such as soils, influence irrigation and groundwater. Master's student William Avery helped UNL hydrogeophysicist and WFI Faculty Fellow Trenton Franz improve soil moisture measurements using cosmic-ray neutron probes. The probes measure subatomic neutron particles in the air, a reliable estimate of water in soil. Doctoral student Yulie Meneses worked with WFI Faculty Fellow Rolando Flores, head of UNL's Food Science and Technology Department, to find new ways to make food processing more water efficient through water conservation and re-use during whey processing.

In 2011, we formally partnered with UNESCO-IHE, an international institute for water education based in Delft, the Netherlands, to help build agricultural water management capacity both in Nebraska and globally. Together, we're educating scientists, students and water sector practitioners.

In 2013, we successfully launched a new program to offer dual graduate degrees in advanced water management for food production, in which students receive master's degrees from both IHE and UNL. The program, designed to train professionals from developing countries, graduated its first two students in May 2015. (See pg. 35.)

In addition, WFI and IHE began offering summer field courses, alternating yearly between Nebraska and Europe. In 2012 and 2014, we welcomed a total of 36 IHE students specializing in land and water development. The 14-day field course, taught by UNL faculty, gave students the opportunity to observe and learn about irrigation systems, groundwater hydrology and soil water measurements. In summer 2015, two UNL graduate students attended the two-week international IHE field course, joining 26 others from around the world to tour six European water programs and projects. In addition to learning about ecological, social and engineering water challenges, the students made valuable social and cultural connections that will enhance their career opportunities in the future.

“Together, we're educating scientists, students and water sector practitioners.”

Through communication and engagement, we build relationships.

WFI communication activities facilitate research, policy development and education by sharing the institute's products and advances in the water and food arena nationally and around the world.

Our signature event, the Water for Food Global Conference, showcases our work and that of our partners to the world, linking Nebraska with the global water for food community. We held conferences in each of the first five years. These conferences nurtured relationships and facilitated networking

Vivek Sharma shares his research at the 2012 Water for Food Global Conference.



across the global community by bringing together researchers, practitioners, producers, private industry leaders and policymakers. The conferences are particularly well suited to building bridges across the worlds of large-scale and smallholder agriculture and across expertise. (See pg. 36)

“The Nebraska Water Center also expanded its social media presence to Facebook, Twitter and YouTube.”

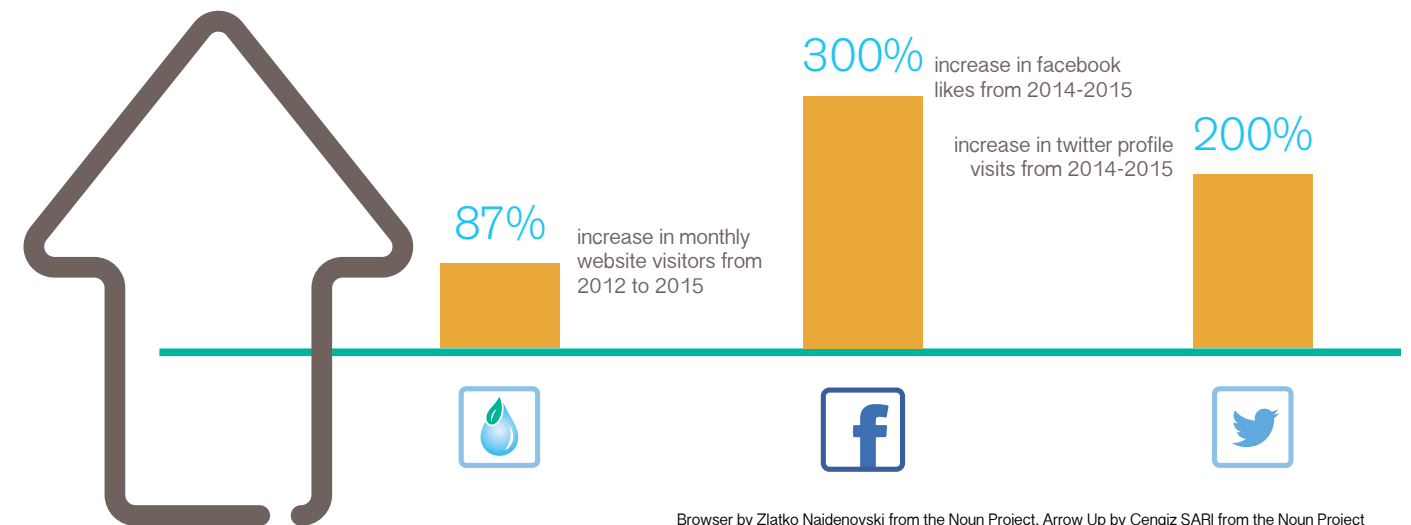
We built on those relationships through extensive communication and engagement activities. WFI hosted numerous policy dialogues, workshops and seminars nationally and internationally. For example, in 2012 and 2015, we hosted sessions on water for food at the Sixth and Seventh World Water Forums in France and South Korea. In 2010, we co-hosted a workshop with the M.S. Swaminathan Research Foundation in Chennai, India, on managing water resources for food security and sustainability. In the U.S., we hosted a policy dialogue on water and food with the Institute on Science for Global Policy in 2013, and a symposium on water and conflict in the Middle East with UNL's Department of Political Science in 2014.

Our leadership team raised the institute's profile through numerous speaking engagements and networking trips worldwide. WFI also brought renowned experts to Nebraska to give seminars and share their expertise, such as Israeli soil scientist and 2012 World Food Prize

winner Daniel Hillel, and Andrew Noble, director of the CGIAR Research Program on Water, Land and Ecosystems.

Digital communication was also an important component to engaging constituents. In our first five years, we developed a robust social media presence on Twitter, Facebook and YouTube, as well as an engaging Web presence where visitors can access up-to-date organizational news, blog posts and publications. In 2013, we began publishing the “Water for Food Digest,” a bimonthly e-newsletter that reaches more than 2,000 stakeholders at the local, national and international levels. The Nebraska Water Center also expanded its social media presence to Facebook, Twitter and YouTube.

Print media remains an invaluable form of communication, particularly for our diverse global audience, and we have published or co-published several reports and articles. Following each Water for Food Global Conference, we published proceedings summarizing the conferences' discussions and insights. With FAO, we co-published a report on Yield and Water Productivity Gaps resulting from a workshop on closing productivity gaps in late 2013 that was co-sponsored by FAO, the Stockholm Environment Institute and WFI. We contributed an invited article for the official publication of the 7th World



Browser by Zlatko Najdenovski from the Noun Project, Arrow Up by Cengiz SARI from the Noun Project

Water Forum in Korea. The Nebraska Water Center also published numerous fact sheets and its quarterly “Water Current” newsletter that reaches more than 2,500 people in Nebraska and all other states.

We produced the first report in a series of Water for Food publications that discusses key issues related to global water and food security. “Nebraska’s Natural Resources Districts: An Assessment of a Large-Scale Locally Controlled Water Governance Framework” was released March 2015. The printed report is available on request or online at waterforfood.nebraska.edu/publications.

For a complete list of the Water for Food Institute’s projects from 2010 to 2015 please see waterforfood.nebraska.edu/projects-and-publications-inventory.



Building Capacity in Developing Countries

The first two students to enter the double-degree Master of Science program on Advanced Water Management for Food Production graduated in May 2015.

The program is a partnership between WFI, UNL and UNESCO-IHE in Delft, the Netherlands, launched in 2013.

Evordius Rulazi of Tanzania and Gregory Williams of Guyana each earned two master’s degrees, one from UNESCO-IHE in water science and engineering and another in agricultural and biological systems engineering from UNL.

Rulazi and Williams exemplify the type of students the degree program seeks, said Dean Eisenhower, WFI’s UNESCO-IHE partnership coordinator and a Faculty Fellow. It targets professionals from developing countries working in government, water users associations, research institutes and companies in areas related to water management.

“Our goal is to improve the professional skills of people in developing countries in water management for food production,” he said. “We can improve water management by further training professionals already working on the ground.”

Students begin the program at UNESCO-IHE for one academic year, then come to UNL for a year to finish their coursework and complete a field project.

It’s important that their project relate to water management in their home country to ensure relevance to their work when they return, Eisenhower said.

Rulazi, an irrigation engineer with the Tanzanian government, worked on WFI’s CIRCLES project in a northern Tanzanian community. He assessed the feasibility of center pivot irrigation and the sustainable level of groundwater development based on planned cropping practices in the project.

Williams, a hydraulic engineer with consulting company SRKN’Gineering, analyzed the impact of extreme drought conditions on a water district near Georgetown, Guyana. He’ll use his investigation to recommend ways to reduce the risk of water shortages during dry seasons.

With degrees in hand, both students returned to their former jobs.

Now that the program has successfully graduated its first students, WFI and IHE seek sponsors to secure fellowships for future students.

“During our first offering of fellowships, it was astonishing to me that within a matter of a few weeks, we had 20 or 30 applications for these fellowships,” Eisenhower said. “The students are really hungry for advanced education and their employers definitely see the value in this opportunity.”



Rulazi



Williams



Frank Rijsberman, CEO of CGIAR Consortium at the 2014 Water for Food Global Conference

Success Story

A Global Forum for Water for Food

“We have to realize that these discussions we’re having ... grab people, they stir emotions and they are indeed right at the heart of the social debate.”

That sentiment conveyed by Frank Rijsberman, CEO of the CGIAR Consortium at the 2014 Water for Food Global Conference, captured the magnitude and immediacy of the issue that brought the world’s water and food production leaders and experts to WFI’s many conferences.

The only annual forum dedicated to the challenge of water for food, WFI’s Water for Food Global Conferences not only imparted the field’s latest research and technology, but also raised awareness of the complex and often controversial social conditions that frequently prove to be the biggest obstacles.

To that end, conferences covered a wide range of topics: genomics research to improve crop varieties, the distinct challenges women farmers face, the

impact of climate change, the debates surrounding “big data,” and others.

More than 2,000 people from 25 countries have participated in the Water for Food Global Conferences since 2010. Participants came from fields as diverse as agriculture, law and public health. They included researchers, representatives from nonprofit organizations, private industries and governments, and large-scale and smallholder farmers from around the world.

Such diversity broadened participants’ perspectives and facilitated unique collaborations. For example, discussion at the 2013 conference led to a collaboration between WFI Faculty Fellows and members of the Resilience Alliance, an international

multidisciplinary network of researchers, to apply environmental resilience research to improve the resilience of agroecosystems. The collaboration resulted in a concept paper submitted for publication and a proposal for further research on this important topic.

The annual conferences helped raise the prominence of water for food as a global issue. In 2012, for the first time, water for food was the focus of World Water Week in Stockholm. We believe that kind of attention and focus is necessary to solve one of the most urgent challenges facing humanity. Our conferences remain critical forums to share ideas and encourage partnerships. Conference proceedings are available on the WFI website.

“More than 2,000 people from 25 countries have participated in the Water for Food Global Conferences since 2010.”

50 Years of Nebraska Water Experience

For more than 50 years, the Nebraska Water Center at the University of Nebraska-Lincoln has been a leader in the Nebraska water community, helping to address water issues within the state, from urban water contamination to rural agricultural water use.

Shortly after WFI was established, the Nebraska Water Center became an integral part of the institute, bringing its

long and distinguished history in research and education to support WFI’s mission.

In turn, the center has benefited from WFI’s expanded role and in the global community.

New ideas and partnerships inject fresh perspective and energy, without diminishing the center’s contribution to Nebraska’s varied water challenges.

“The center has a track record of providing state-of-the-art analytical technology...”

The Nebraska Water Center, one of 54 congressionally mandated water centers at U.S. land-grant universities, facilitates NU's research, extension and teaching in water science, law and policy to address water quantity and quality issues of priority to the state of Nebraska. It works to expand the financial resource base for UNL water programs through private and governmental sources and to establish collaborations with state and federal agencies, industry, producers and other water resource managers.

The center has a track record of providing state-of-the-art analytical technology to conduct research in water resources and hands-on training of scientists and engineers to help make informed decisions and shape policies affecting water resource quantity and quality. The center's Water Sciences Laboratory, established in 1990, is one of the largest in the country based at a U.S. water center. It supports environmental and water related research by providing technical services and expertise in analytical and isotopic methods.

Under the WFI umbrella, the center continues to focus on water issues of priority to Nebraska. Many of these issues involve water for agriculture, including groundwater-surface water interactions, ecosystem management, and climatic and weather impacts to water resources.

Others go beyond the water-food nexus, such as urban water quality.

As part of WFI, the center benefits from increased expertise, staffing and financial support, which expands potential funding and outreach opportunities, said the center's director, Chittaranjan Ray.

The water center also contributes to WFI's mission, acting as an important liaison between the state's stakeholders and WFI leadership. "The water center is a bridge," Ray said. "We're a key player in connecting the institute to the local community."

WFI's global presence and partnerships bring broader water for food perspectives to Nebraska agriculture. In turn, the state's farmers, water managers and researchers gain opportunities to both learn from and share knowledge and experience with the world.



Emily Hoehn, working at the NU Water Sciences Laboratory



Elkhorn River, Nebraska.

Success Story

Connecting Nebraska to the World

Our location is an important asset to help address the global water for food challenge.

Nebraska, in the heart of the U.S., encompasses an impressive tapestry of geological and climatic variety. The western edge is part of what was once known as the Great American Desert, while the Corn Belt, one of the world's most productive agroecological zones, begins in the east. In addition, a large portion of Nebraska sits atop the High Plains Aquifer, one of the world's largest.

Mountains to the west and monsoonal moisture from the Gulf of Mexico create a remarkable moisture gradient across Nebraska. More variation in precipitation takes place within the state than from its eastern border to the Atlantic Ocean. That tremendous diversity provides a natural laboratory for experimentation.

Farming in the state evolved according to local conditions and today is rainfed and irrigated in almost equal parts.

This unique balance has led to innovation in water productivity and land management along with some of the world's most sophisticated irrigation systems. The state's government also contributed to the creation of natural resources districts, a novel system of water governance.

WFI, based at Nebraska's land grant university, founded to support agriculture, benefits from more than 100 years of practical, real-world experience in research, extension and education. We unite on-the-ground research and policy development with training the next generation of leaders.

We're convinced novel solutions to the water and food security challenge can be found at the crossroads of large-scale agriculture in the major food-exporting countries and smallholder-producer systems in the world's poorest countries, and in the continuum between the two. WFI bridges both worlds through its research and educational programs, as well as its annual global conferences.

Nebraska's innovation and expertise benefit the world. We're extending that wealth of knowledge to help local farmers and governments in a variety of global settings to improve water and food security for everyone.

Success Story

Bringing People Together



Thomas Farrell, Bhau Jain and Christopher Neale, participating leaders in the Jain Irrigation Systems and Water for Food Institute partnership

Partnerships drive everything we do. From its inception, WFI was envisioned as a collaborative institute, working nationally and internationally to bring together WFI research and extension experience with complementary expertise elsewhere. We work with governments, businesses, industries, international organizations and other research institutes to build the bridges that will bring about a new era of innovation.

In addition to the partnerships described throughout this report, we developed a joint research and education venture with Jain Irrigation Systems Ltd. of India to bring the latest technology to smallholder farmers. The partnership focuses on improving salt and drought tolerance of soybeans and bananas, educating and training Jain scientists in biotechnology, and using geospatial technologies to improve crop and irrigation water management and to monitor crop water productivity.

“We are eager to work with UNL so as to bring the latest cutting-edge technology, including remote sensing and climate modeling, to the doorstep of small farmers in India and other countries around the world,” said Alit Jain, joint managing director at Jain Irrigation.

Additional collaborations include:

- Northwest Agriculture and Forestry University in China to develop a research project regarding center pivot irrigation management in Inner Mongolia and to host a doctoral student conducting research at WFI and UNL.
- Institute of Water Resources and Hydropower Research in China to develop research and extension collaborations in water-saving technologies for center pivot irrigation, fertigation adoption and management of surface irrigation for water savings.
- International Water Management Institute to encourage and facilitate cooperation, building of global capacity and collaboration in water and food security.
- Michigan State University to develop and promote water, nutrient and climate smart technologies. The USDA National Institute of Food and Agriculture funds this project.



Women harvesting tea leaves in southern India

- University of California, Santa Barbara to investigate the potential of water lease markets to benefit the environment during droughts by creating an incentive to distribute scarce water resources toward stream flows.
- Global Harvest Initiative, a corporate consortium, to provide input into their annual Global Agricultural Productivity Reports.



BUILDING THE INSTITUTE

Growing Organization, Growing Impact

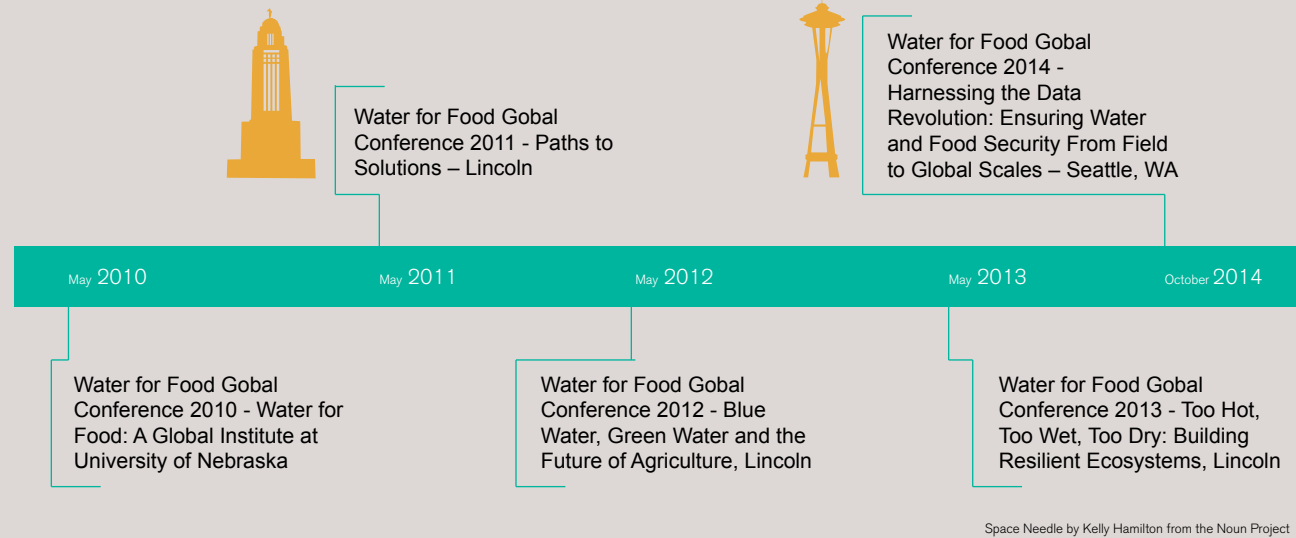
As droplets add up to a river, the steps taken during the past five years have built a vibrant institute, implementing the work needed to achieve its global mission. During its start-up period, the institute's first goal was to begin developing a strong, impact-driven program. The second goal was institutional, building WFI's own capacity and institutional framework that would provide the basis for its long-term work. This goal has now largely been accomplished. Highlights include:

- **Recruiting core leadership staff.** During the first few years, work focused on ensuring the institute had excellent core leaders, appropriate program staff in place and the facilities needed to operate effectively. After Roberto Lenton joined as the founding executive director in 2012, the institute added a director of policy, director of research and director of the Nebraska Water Center.
- **Recruiting and developing faculty and research fellows.** As a distributed institute, the affiliated faculty play a crucial role in achieving the institute's program objectives. Working closely with the leadership of UNL's Institute of Agriculture and

Natural Resources, the institute recruited seven outstanding faculty members with experience in different aspects of water and agricultural science to help jump-start the institute's activities and contribute to the institute's agenda. WFI also appointed 73 Faculty Fellows from across the university who are actively engaged with WFI and significantly participate in the institute's work.

- **Preparing a clear strategy to guide the institute's work.** In 2013, the board approved the WFI's initial strategic plan, as well as its operational plan for FYs 2014 and 2015. In 2015, the institute updated its strategy and prepared a new operational plan to govern the period from 2015 to 2020.
- **Ensuring effective governance and financial management.** The institute's Board of Directors has met twice a year since 2010, providing effective oversight and governance. In 2014 and early 2015, an international advisory panel and a faculty advisory panel were established to advise the institute on programmatic matters. The business office of UNL's Institute of Agriculture and Natural Resources has provided excellent financial management and administrative support services to the institute.





Water for Food Institute, Nebraska Water Center and Water Sciences Lab Staff. Front: Autumn Longo, Chittaranjan Ray, Nicholas Brozović, Roberto Lenton, Christopher Neale, Molly Nance, Rachael Herpel, Lindsay Knight. Center: Sathaporn (Tong) Onanong, Aaron Shultis, Wen Qi Ou, Nathan Roddy, Steve Ress, Karen Hansen, Janet Means. Back: Jesse Starita, Richael Young, Tim Foster, Andrew Barry, Dana Ludvik, Pongpum Jantakut, Craig Eiting, David Cassada.



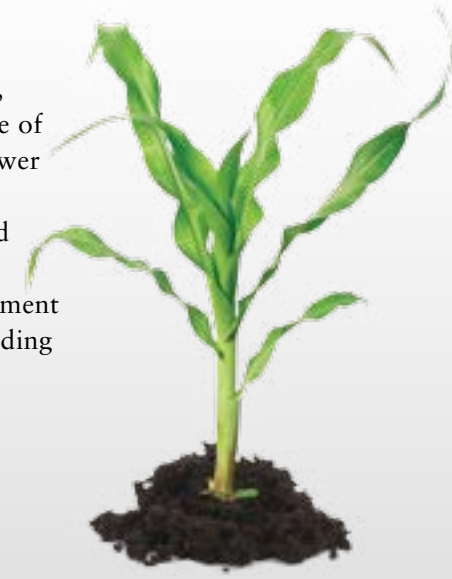
- **Integrating the Nebraska Water Center and Water Sciences Laboratory.** The Nebraska Water Center, formerly the UNL Water Center, transitioned to become part of WFI in January 2012, having been part of UNL's School of Natural Resources. The Nebraska Water Center's Water Sciences Laboratory, which was established in 1990 and is a world-class, state-of-the-art water research facility specializing in the measurement of chemicals and trace organics in water, also became a part of WFI at that time.

- **Developing a strong communications capacity.** Beginning in 2013, the institute began developing a fully functioning communications and outreach effort to build and increase awareness of the institute's mission and accomplishments among its many audiences. The communications strategy included development of an interactive website (originally created in 2010 by UNL's Office of Research and Economic Development) social media platforms, a twice monthly e-newsletter, news releases,

video production, coordination and production of the Water for Food Conferences, and the organization of other symposia, workshops, lectures and seminars. The institute hired a new director of communications and public relations in 2014.

- **Establishing partnerships and leveraging funding.** Starting in 2012, the institute developed strategic partnerships to enable it to access complementary expertise, extend its global reach and amplify its impact. WFI signed memorandums of agreement

with FAO, USAID, the Indian Agricultural Research Institute, Jain Irrigation, and the Institute of Water Resources and Hydropower of China. In 2014, the institute created an appropriately staffed and effective system to support and coordinate project development and leverage the additional funding needed to advance its mission.





Institute early leaders: JB Milliken, Mogens Bay, Ronnie Green, Harvey Perlman, Prem Paul, Monica Norby, Roberto Lenton

The Water for Food Institute: A Founding Story

It began with a question.

“What is the university doing about water issues?” Mogens Bay asked J.B. Milliken, president of the University of Nebraska, in late 2007.

Bay, CEO of Nebraska-based Valmont Industries, chaired the Robert B. Daugherty Charitable Foundation board. Valmont’s founder, the late Bob Daugherty, had spent his life developing center pivot irrigation and other ways to

use water more effectively in agricultural production. He continued to worry about future generations’ ability to cope with the growing water crisis.

The university was doing a great deal, Milliken responded. Nebraska was one of the biggest irrigation users in the world, so the state and its land-grant university had long focused on water issues.

As Bay got to know NU’s water research over the following year, he encouraged NU

administrators to think even bigger. “The university has at least a hundred years of experience in the relationship between water and production agriculture,” he said. “What better institution to address the food and water challenges facing the world than the University of Nebraska?”

What were the global water challenges? Was a need going unanswered? What role could the university play? To help answer those questions, NU hosted a conference, “The Future of Water for Food,” bringing the world’s leading water experts to Nebraska.

Jeff Raikes gave the keynote address. The CEO of the Bill & Melinda Gates Foundation had grown up on a Nebraska farm and understood that the effective use of water for food was an important component for fighting poverty. His endorsement lent credibility and enticed an impressive array of experts to attend.

The conference established that an institute dedicated to water for food was needed and, moreover, that NU, in the heart of U.S. agriculture, was the place for it. Excitement was building.

The global endorsement helped convince Bob Daugherty that NU could become a real force in water issues. In early 2010, he donated \$50 million to help establish the Daugherty Water for Food Institute at the University of Nebraska. It was one of the largest gifts the university had ever received.

“The institute would not have happened without the gift,” Milliken said. “It allowed us to take the whole vision for this to the next level and create something for which Nebraska, I think, will always be known.”

What had been a grand idea now shifted into the difficult work of developing a successful institute. While the gift made the global water community take notice, giving NU instant recognition, it also raised enormous expectations. The institute had promised to be relevant to the entire University of Nebraska system, the state of Nebraska and the world.

“It was clear to everyone that we are going to be part of resolving a global challenge, but also a challenge that was equally present in Nebraska,” Milliken said. “We had to demonstrate both these things: that we were relevant and contributing at a global level, but that we were also providing some fundamental value to the state of Nebraska and the citizens who support the public university.”

With staff assistance, NU administrators and the WFI board got to work, developing global partnerships and providing grants to faculty and students. Importantly, UNL continued to host WFI’s global conferences, attended by nearly 500 people from more than 20 countries. “The conferences were really key to the early support we were able to get,” said Monica Norby, assistant vice chancellor of research.

Conference participants especially enjoyed the “View from the Field,” a panel of large-scale and smallholder farmers from around the world. “We really pushed bridging these different communities because water and agriculture were so separated,” Norby said. “We were going to bring these diverse groups together.”

Perhaps the most urgent and pivotal task in those early days was finding the right founding executive director — someone with international credibility in the water sector who would complement NU’s U.S. agricultural expertise.

Roberto Lenton, from the World Bank and former director of the International Water Management Institute, arrived in early 2012. His leadership in these first years have put WFI on a sound institutional footing, developing a framework that integrates both smallholder and large-scale agriculture and setting WFI on the global stage.

The institute would not have happened without the passion and vision of its early champions. Participants speak of Mogens Bay’s igniting spark and guidance in setting the university on the path of understanding that it could — and should — be a global leader in water for food, J.B. Milliken’s visionary leadership in raising the profile and relevance of the university, and Jeff Raikes’ contribution as a master strategist and in convincingly

articulating the need for “more crop per drop” to the global water community at the Water for Food conferences. Monica Norby, Prem Paul, UNL vice chancellor of research and economic development, and Ronnie Green, Vice President and Harlan Vice Chancellor of Agriculture and Natural Resources, also contributed substantial support.

Despite their powerful positions, each personally invested tremendous time and commitment. They cited their deep conviction that the issue was vitally important and their passion to see Nebraska and the university succeed on a global scale.

As the initial excitement and suspense of founding a major institute that positions NU at the center of one of the most pressing challenges in the new century has eased, it is succeeded by the energy of a dedicated team working to make a real and measurable difference in people’s lives.

“We’ll know this has been a success,” said Bay, “if five years from now, or 10 years from now, you go somewhere in the world ...and they say, ‘We had a problem with water, we contacted the Daugherty Water for Food Institute, they helped us out, and we solved our problem’.”



Yunnan Province, China

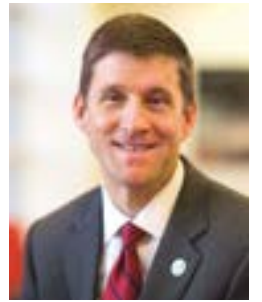
CONCLUSION

The Robert B. Daugherty Water for Food Institute is a major asset of the University of Nebraska. As a university-wide initiative, the Water for Food Institute draws on the expertise and resources of all four of NU's campuses and fosters research, collaboration and knowledge sharing among students and faculty as well as partners around the state and beyond. The institute's work around the globe helps extend the university's reach and builds beneficial relationships focused on water and food security. That work also benefits those of us in Nebraska and across the nation – as with groundwater management practices and educational workshops that can benefit areas such as California that are seeking solutions to prolonged drought.

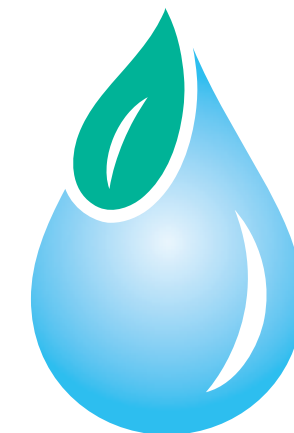
I am impressed with the accomplishments and institutional development the Water for Food Institute has achieved in its first five years under Roberto Lenton's leadership and thanks to the hard work and commitment of many. I look forward to the global impact the institute will have as it continues its next phase of development. The challenge before us could not be more urgent: a growing global population that will require twice as much food produced with the same amount of water and land resources. Our ability to meet this challenge will directly affect the type of world we leave to our children. The University

of Nebraska is well-positioned to lead the global conversation on feeding the world. I am optimistic about what we can achieve in the future, together.

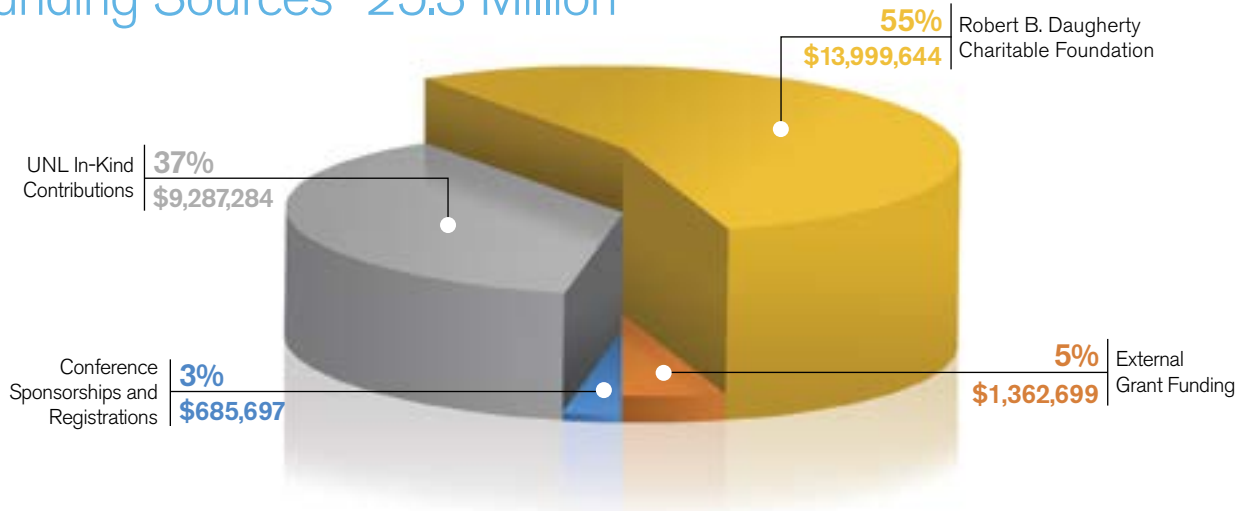
Hank M. Bounds
President, University of Nebraska



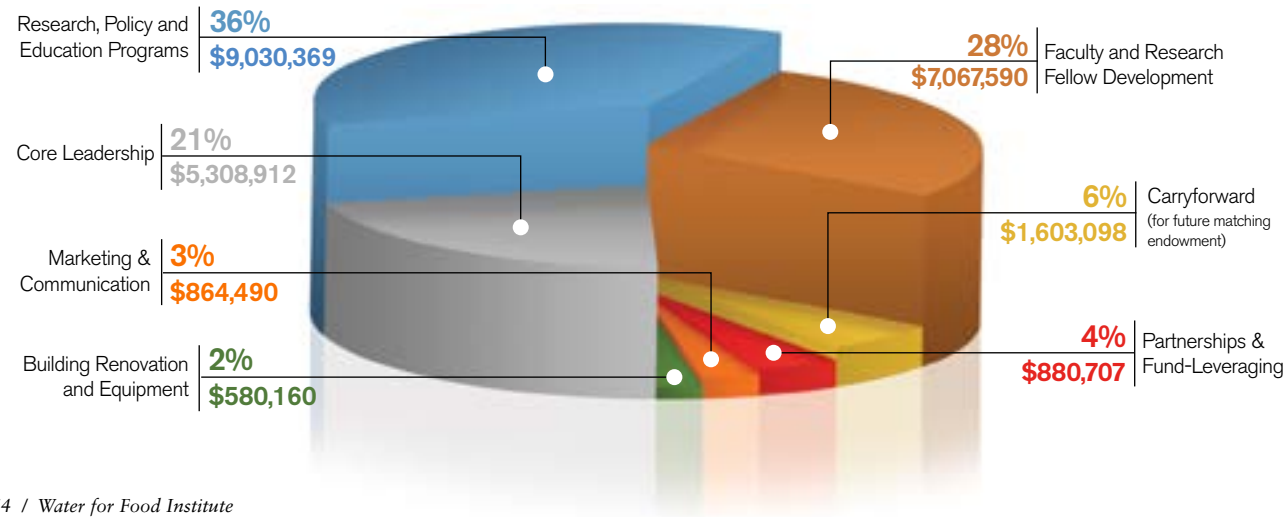
Hank M. Bounds
President, University of Nebraska



Funding Sources \$25.3 Million



Total Expenditures = \$25.3 Million



Financials: FY 2011-2015

For the past five years, the Water for Food Institute has received funding from several sources and allocated these carefully to advance its global mission through research, policy, education and communication work. In addition to the generous gift from the Robert B. Daugherty Charitable Foundation, the institute benefited from in-kind support from the University of Nebraska-Lincoln, as well as grant funding, corporate sponsorship and foundation gifts.

Foundations

- Robert B. Daugherty Charitable Foundation
- Bill & Melinda Gates Foundation

Grant Funding

- Michigan State University
- National Science Foundation (NSF)
- Nebraska Department of Natural Resources (NDNR)
- Nebraska Environmental Trust (NET)
- U.S. Agency for International Development (USAID)/Development Alternatives Inc.
- U.S. Department of Agriculture – National Institute of Food and Agriculture (NIFA)
- U.S. Department of the Interior – Geological Survey (USGS)

Corporate Sponsors

- BASF
- Dow International
- Global Harvest
- Li-Cor
- Monsanto Company
- Nebraska Corn Development Board
- Pioneer Hi-Bred International
- Syngenta

In addition to the funding sources listed, the institute received considerable in-kind support from partners for collaborative projects.

See the Water for Food Institute website (waterforfood.nebraska.edu) for more complete financial information.

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Raikes Foundation

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Founding Executive Director and
Robert B. Daugherty Chair

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Rachael Herpel

Assistant Director

Christopher Neale

Director of Research

Molly Nance

Director of Communications
and Public Relations

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Water Center

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