



IHE Delft Institute for Water Education (IHE)

and

Robert B. Daugherty Water for Food Global Institute  
at the University of Nebraska (DWFI)

## *Accomplishments and Impacts 2011-2016*

March 29, 2017

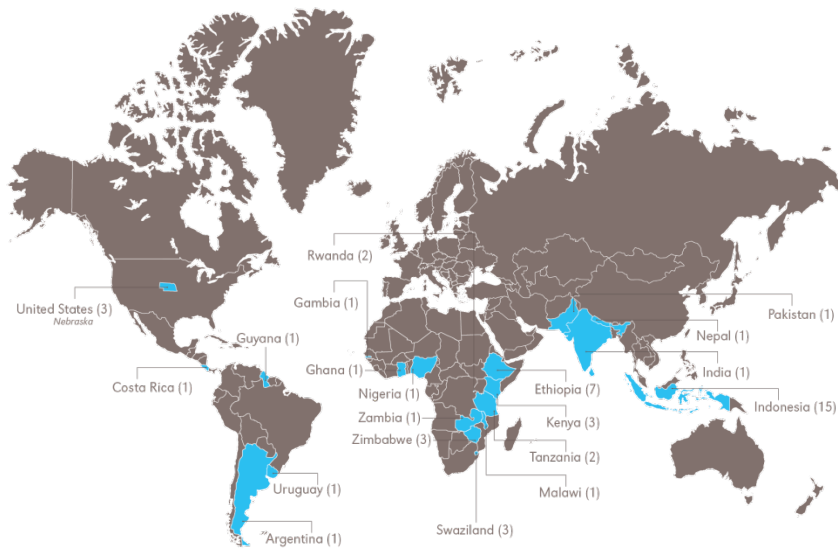
The partnership between IHE and DWFI formally began with the signing of the initial five-year Memorandum of Understanding on May 2, 2011, at the third Water for Food Global Conference in Lincoln, Nebraska. Following is a summary of accomplishments and impacts of the program.

### **Nebraska Irrigation Field Course**

DWFI and IHE have completed three intensive two-week field courses in Nebraska in 2012, 2014 and 2016. This course is for students in the *Land and Water Development for Food Security* M.Sc. program at IHE, graduate students at the University of Nebraska-Lincoln (UNL) and for students in the Double Master of Science degree program offered by UNL and IHE (described below). The course emphasizes field and laboratory measurement and/or evaluation techniques and proper analysis of the following components of irrigation, hydraulic, and hydrologic systems: flow in streams, canals, and irrigation pipelines; irrigation pumping systems; surface, sprinkler, and drip irrigation systems; irrigation well hydraulics; pipeline hydraulics; and soil water properties. The laboratories are combined with a field trip where students visit agricultural irrigation water supply projects, hydraulic structures, dams, hydroelectric plants, irrigated cropping systems field research at industry and university sites, and industries that manufacture and install center pivot systems, subsurface drip irrigation systems, and irrigation pumps. Students prepared a written report at the end of the course. A total of 50 students have completed the course. The participants represent the following 20 countries (number from each country in parentheses): Argentina(1), Costa Rica(1), Ethiopia(7), Gambia(1), Ghana(1), Guyana(1), India(1), Indonesia(15), Kenya(3), Malawi(1), Nepal(1), Nigeria(1), Pakistan(1), Rwanda(2), Swaziland(3), Tanzania(2), Uruguay (1), Zambia(1), Zimbabwe(3) and the U.S. (3). By April of this year all of these students from outside of the U.S. will have earned their M.Sc. degrees at IHE.

## IMPACT

*Surveys show that more than 90% of the students that earn M.Sc. degrees at IHE return to their home countries upon graduation to work in water-related industries. The impact of this two-week course on water management in the developing world is indeed very significant.*



*Country of origin of students that have participated in the Nebraska Irrigation Field Course*

## Double Master of Science Degree Program

The faculty at IHE and in Biological Systems Engineering at the University of Nebraska-Lincoln (UNL) brought their individual and collective expertise in the broad areas of agriculture, engineering, and water resource management together to create a new Double-degree Masters of Science (M.S. & M.Sc.) program focused on *Advanced Water Management for Food Production*. A Memorandum of Agreement was signed on May 7, 2013, between UNL and IHE that spells out the details of the program including the curriculum and the admission procedures to be followed by both institutions. This program is uniquely global and targeted at professionals from developing countries who are interested in learning more about water resource identification and development, water allocation and distribution and about food production, plant-water interactions, and maximizing crop yield while minimizing water usage. The program consists of a total of eight UNESCO-IHE modules, each three weeks in duration, and ten UNL semester courses. The program offers students significant classroom and hands-on learning experiences. As part of their program, students are required to complete a research project in their home country and present and defend their thesis to faculty members from both institutions. Upon completion of the 20-month program, students earn a M.Sc. in Water Science and Engineering with a specialization in Land and Water Development for Food Security at IHE and an M.S. in Agricultural and Biological Systems Engineering at UNL. Two students completed the program in May 2015 and returned to their previous water-related employment in their home countries; Evodius Rulazi to the Tanzanian Department of Agriculture; Gregory Williams to a water resources consultancy in Guyana. Mumba Mwape will graduate in May 2017 and will return to the Zambian Department of Agriculture.

## IMPACT

*These graduates' newly earned expertise in agricultural water management will be of tremendous benefit in their home countries, where their knowledge can help inform policy making and best practices. In all three cases the graduates work for action agencies or consultancies – all of which have great influence on water use in their region of the world.*



*Hands-on learning is an important part of DWF/IHE Partnership Programs<sup>1</sup>*

## European Field Trip for UNL Graduate Students

In late May and early June 2015 two UNL graduate students, Katherine Smith and Isaiah Krutak, participated in a two-week field trip hosted by IHE. Twenty-six IHE students from nine different developing countries also participated in the course. The field trip entailed travel to six countries of Western Europe. The students visited water projects that ranged from irrigation works, hydro-electric power facilities, navigation facilities and unique wetland systems used for wildlife habitat, aquaculture, and crop production. Visits to irrigation and hydraulic research laboratories were also part of the trip.

## IMPACT

*The trip was an outstanding learning experience for the UNL students and an excellent cultural exchange for all of the participants. The two UNL students now work in water related fields in Nebraska, one for the U.S. Corps of Engineers and the other with an irrigation dealership. Participation in this course will help them bring new insights to their chosen professions, advancing effective water management for food security.*

## Cooperative Research

A cooperative research program in the use of hydroinformatics for improved management of water resources for food production was identified early-on in the DWF/IHE partnership. In August 2015, the first student in this program, Alessandro Amaranto from Italy, began his Ph.D. studies at UNL. In fall 2016 Alessandro moved to Delft to continue his courses and conduct research with the faculty at IHE. In summer 2017, Alessandro will return to UNL to complete his final year of his Ph.D. program. Alessandro's research will be the first collaborative Ph.D. program offered between the two institutions.

In another DWF/I and IHE collaborative research project researchers are studying the use of remote sensing to enhance water resources management for crop production and for global water accounting.

## **IMPACT**

*Knowledge gained through this research will greatly enhance the hydroinformatics capability at UNL and spur the development of new joint research projects in hydroinformatics and advanced remote sensing technologies for water management and water accounting.*

## **Faculty Exchanges**

Former UNL School of Natural Resources groundwater faculty member Dr. Ed Harvey participated in a six-month faculty exchange at IHE from October 11, 2011, through March 2012. During that time period, Dr. Harvey helped develop the double Master of Science degree program and has since has continued teaching basic groundwater geology to students in the IHE Land and Water Development for Food Security program.

During the past two years Dr. Dean Eisenhauer has provided guest lectures in Irrigation Agronomy at IHE, focusing on crop water management and the application of the AquaCrop model in irrigated and dryland agriculture.

## **IMPACT**

*Sharing expertise between IHE and the University of Nebraska through DWFII was one of the objectives of the original MOU between IHE and DWFII. The organizations accomplished this goal through the field courses, double Master of Science degree program, the cooperative research programs that have been initiated and the faculty exchanges. This has enriched the educational opportunities for all of the students involved and has set the framework for future collaborative education and research between the faculty at IHE and the University of Nebraska. Research findings and gained knowledge will contribute to a number of global efforts to increase water and food security for our world.*



*Students experience both indoor and outdoor laboratories<sup>2</sup>*



*Students learn from irrigation district and industry cooperators<sup>2</sup>*

## **Institutional Leadership**

### **University of Nebraska/Robert B. Daugherty Water for Food Global Institute**

**James B. Milliken**

Chancellor of The City University of  
New York

**Hank Bounds**

President, University of Nebraska

**Ronnie Green**

Chancellor, University of Nebraska-Lincoln

**Prem Paul** (deceased)

Vice-Chancellor for Research, University of  
Nebraska-Lincoln

**Mike Boehm**

Vice-Chancellor, Institute of Agriculture and Natural  
Resources, University of Nebraska-Lincoln

**Ron Yoder**

Associate Vice-Chancellor, Institute of Agriculture  
and Natural Resources, University of Nebraska-  
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**Christopher Neale**

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**Tom Farrell**

Sr. Advisor to the Chancellor, International Affairs,  
University of Nebraska-Lincoln

## **IHE Delft Institute for Water Education**

### **András Szöllösi-Nagy**

Former Rector (retired)

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Rector Ad Interim

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### **Arthur Mynett**

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### **Dimitri Solomatine**

Head, Integrated Water Systems and Governance

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## **Partnership Development and Coordination**

### **Dean Eisenhauer**

Partnership Coordinator DWFI

Emeritus Professor, Biological Systems Engineering, UNL

### **László Hayde**

Partnership Coordinator IHE

Senior Lecturer in Irrigation Engineering, IHE

### **Ed Harvey**

Former Professor of Natural Resources

School of Natural Resources, UNL

Division Chief & Supervisory Hydrologist

National Park Service

### **Krishna Prashad**

Former Senior Lecturer, IHE

### **Gary Hergert**

Emeritus Professor, Agronomy and Horticulture,

UNL

### **Ron Yoder**

Associate Vice-Chancellor, Institute of Agriculture and Natural Resources, UNL

## **Double Master of Science Degree Program**

**Evordus Rulazi:** UNL Co-advisors, Derrel Martin and Dean Eisenhauer; Committee Members, Derek Heeren, UNL and László Hayde, IHE

**Gregory Williams:** UNL Co-advisors, Francisco Munoz-Arriola and Dean Eisenhauer; Committee Members, Christopher Neale, UNL, and Sur Suryadi, IHE

**Mumba Muwape:** UNL Advisor, Derek Heeren; Committee Members, Dean Eisenhauer (UNL), Aaron Mittlestet (UNL), and Laszlo Hayde (IHE)

## **Ph.D. in Hydroinformatics**

**Allessando Amaranto:** UNL Advisor, Francisco Munoz-Arriola; Committee Members, Dimitri Solomatine, IHE, Gerald Corso, IHE) and Dean Eisenhauer (UNL)

## **Applications of Remote Sensing Technologies**

**Wim Bastiaanssen**  
Professor of Global Water Accounting, IHE

**Christopher Neale**  
Director of Research, DWFI

## **Field Trip/Field Measurements Course Coordination**

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## **Staff**

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**Teresa Ryans**  
Graduate Program Specialist, UNL

## **Field Trip Hosts and Primary Contacts**

**Central Nebraska Public Power and Irrigation District**  
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**Valmont Industries**  
Richard Berkland  
Vice-President International Sales

**T & L Irrigation**  
Jim Kostal  
Marketing Manager

**Lindsay Corporation**  
Brad Dunbar  
Regional Manager

**Eco-Drip Subsurface Drip Irrigation**  
Colby Gardine  
System Design/Sales

**Flow Serve**  
John Brooke  
Customer Service

**Mid-America Pump & Supply Inc.**  
Tom Bramble  
President

**Hastings Irrigation Pipe**

Gale Jones  
Sales Account Executive

**Diamond Plastics Corporation**

Larry Schmidt  
Technical Services Engineer

**McCrometer | Great Plains**

Ken Quandt  
Sr. Member Technical Staff

**Central Valley Irrigation, Inc.**

Monty Vonasek  
President

**Lower Platte South NRD**

Glen Johnson (retired)  
Former General Manager

Paul Zillig  
General Manager

**Lower Platte North NRD**

John Miyoshi  
General Manager

Larry Angle  
Water Resources Manager

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Eberhard Professor Biological Systems Engineering

**Gothenburg Water Utilization Learning Center**

**Monsanto**  
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**Eastern Nebraska Research and Extension Center**

UNL  
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UNL**

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Haishun Yang  
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<sup>1</sup>Photographs by **Annelieke Duker, IHE**

<sup>2</sup>Photographs by **László Hayde, IHE**