



2013 Conference

Welcome to the Session on:
Africa-U.S. Higher Education Initiative: At the Crossroads of Int'l Education & Development

Nosa O. Egiebor (Tuskegee Univ., USA) – Session Chair

Amadou Hama-Maiga (2iE, Burkina Faso) – Presenter #1

Margaret Khaita (North Dakota State Univ., USA) – Presenter #2

February 19, 2013



Re-imagining Higher Education in a Global Context

Session Background.1

- **In July of 2007, a number of U.S. and African organizations, including;**
 - Association of Public and Land-grant Universities (APLU)
 - American Council on Education & Higher Education for Development (ACE/HED)
 - Partnership to Cut Hunger and Poverty in Africa
 - Forum for Agricultural Research in Africa (FARA)
 - American Distance Education Consortium (ADEC)
- **Teamed up for an initiative to strengthen African higher education capacity for development in partnership with U.S. higher educational institutions**

Session Background.2

- **The principal goal of the Initiative:**
 - To facilitate deeper and more effective partnerships between **African and U.S. institutions of higher education**
 - With a view to contributing in a more effective manner to key development priority areas in Africa, including:
 - science and technology;
 - agriculture,
 - environment and natural resources;
 - engineering;
 - business, management and economics;
 - health, and
 - education and teacher training
- **USAID later provided financial support** through Higher Education for Development (HED)

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- **33** planning grants were awarded funding to develop strategic plans
- **11 Africa-U.S. Partnerships** received 5-year initial awards in 2010/2011:
 - Int'l Institute for Water & Environ. Engineering (2iE) in **Burkina Faso** and Tuskegee University → **Session Presentation #1:**
 - Makerere University, **Uganda** & North Dakota State University → **Session Presentation #2:**
 - Catholic Univ., **South Sudan** & Virginia Tech.
 - Universite Gaston Berger, **Senegal** & Ohio State Univ.
 - University of Malawi, **Malawi** & Michigan State Univ.
 - Univ. of Nairobi, **Kenya** & Colorado State Univ.
 - Kenyatta Univ., **Kenya** & Syracuse University
 - University of Cape Town, **South Africa** & Univ. of Cincinnati
 - University of Ghana, **Ghana** & Brown University
 - University of Liberia, **Liberia** & Indiana University
 - Addis Ababa University, **Ethiopia** & Univ. of Connecticut



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Africa-US Network of Centers of Excellence in Water & Environmental Science & Technology

Amadou Hama-Maiga¹ and Nosa O. Egiebor²

- (1) International Institute for Water & Environmental Engineering (2iE),
Ouagadougou, Burkina Faso
- (2) Tuskegee University, Tuskegee, AL, USA

February 19th 2013



2iE Institut
International
d'Ingénierie



Re-imagining Higher Education in a Global Context

Acknowledgement

- *This presentation is made possible by the support of the American People through the United States Agency for International Development (USAID.) The contents of the presentation is the sole responsibility of 2iE and Tuskegee University and do not reflect the views of Higher Education for Development, USAID or the United States government.*

Participating Institutions

Lead Institutions

- (1) Tuskegee University, Tuskegee, AL, USA
- (2) International Institute for Water & Environmental Engineering (**2iE**), Ouagadougou, Burkina Faso

Other Partner Institutions

- (3) University of Benin (**UNIBEN**), Benin City, Nigeria
- (4) University of Mines & Technology (**UMaT**), Tarkwa, Ghana

Presentation Outline

2013 Conference

- Partnership project objectives
- Partnership Accomplishments
 - Relative to Initial Planning & Implementation
 - Relative to objectives/goals
- Major Lessons and Experiences → Challenges & Opportunities
- Contributions to Regional, National, USAID, and Institutional Strategies/Priorities
- Different Approaches for more Effective Partnership
- Demonstration of Development Impact
- Partnership Relation to the Larger Africa Initiative Program

Partnership Project

Objectives (Phase-1)

- ❑ **Objective #1: Development of 2iE into a Center of Excellence** in Water, Environmental, and Climate Change science and engineering.
- ❑ **Objective #2: Development of student and faculty international exchange training program & activities** between the African and United States partner institutions
- ❑ **Objective #3: Build the institutional capacity of 2iE** for enhanced capacity to conduct high quality education and research for S&T capacity development in West Africa



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Major Partnership Accomplishments

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Initial Planning and Project Launching

- ❑ A **memorandum of understanding (MOU)** signed between Tuskegee University and 2iE
- ❑ Partnership **formally launched** on 2iE campus in Ouagadougou in September 2011 (with the presence of HED, USAID and other US and African officials and partners)
- ❑ A **Baseline Survey, Monitoring & Evaluation (M&E) Plan**, and implementation strategy are completed jointly by 2iE-Tuskegee University and HED

Partnership Launching Ceremony at ZiE in Ouagadougou, Burkina Faso (September 23, 2011)



Objective 1: Development of 2iE into a Center of Excellence

- 4 PhD Students admitted into 2iE for joint training & supervision with Tuskegee University

| Name and Citizenship | Research Topic |
|--|--|
| Mr. Tadjouwa Kouawa Cameron | Use of Constructed Wetlands for Municipal Wastewater Treatment |
| Mrs. Kuela Kpoda Noellie, Burkina Faso | Impact of Municipal Wastewater & Sludge on Agricultural Crop Production |
| Mr. Ahoule Dompe Maxime Ghislain, Cote d'Ivoire | Arsenic Removal from Groundwater by Membrane Filtration |
| Mr Amadou Keita, Mali | Drainage of Tropical Savannah valley bottoms in order to alleviate iron toxicity, of irrigated soils |

Objective 1: Development of 2iE into Center of Excellence

- **Developed an MS degree program in *Sustainable Mining at 2iE***
 - **Developed Curricula**
 - **Enrolled 3 batches of students (in total 44 from 14 African countries): 2011, 2012, 2013**
 - **Lecture to MS Students**

Objective 1: Development of 2iE into Center of Excellence

- **Developed Several Joint Faculty Research Projects:**
 - **Proj#1: Climate Change Impact & Agric Decision Making by Farmers in Sahel**
 - Dr. Mudiayi Ngandu – Tuskegee Univ, USA
 - Drs. Abdoulaye Diarra – 2iE, Burkina Faso
 - Drs. G. El Afandi, J. Quansah & S. Fall – TU Participants
 - **Proj#2: Bioremediation of Cyanide Contaminated Gold Mining Wastewater.**
 - Drs. Ynoussa Maiga & A.H. Maiga – 2iE, Burkina Faso
 - Drs. Shamim Begum & N.O. Egiebor – Tuskegee, USA
 - Drs.R. Ankumah & R. Shange – TU Participants

Objective 1: Development of 2iE into Center of Excellence

- **Joint Faculty Research Projects (Contd.):**
 - **Proj#3: Low-Carbon Renewable Energy Resource & Development Research Group (Team under dev).**
 - Dr. Yao Azouma – 2iE
 - Drs. Joel Blin-2iE
 - Dr. Ben Oni – Tuskegee Univ.
 - Dr. Jonathan Mbah – Tuskegee Univ.
 - Dr. Sesa Srinivasan – Tuskegee Univ.
 - *Will include development of multiple faculty and student research projects.*

Objective 1: Development of 2iE into Center of Excellence

- **Research Projects for Training 2iE Graduate Students**
 - **Proj#4: Biochar Production & Evaluation for Agricultural Soil Amendment & Carbon Sequestration** – Drs. N. Egiebor (TU) & A.H. Maiga (2iE) with 2iE Graduate Students
 - **Proj#5: CO₂ Recycling for Chemical Feedstock Production by Electrochemical Splitting** – Dr J. Mbah (TU) with 2iE Graduate Students.
 - **Proj#6: Climate Change Modeling in West African sub-Region for Impact Assessments** - Drs. G. El-Afandi & N. Egiebor (TU) with 2iE Graduate Students.

Objective 1: Development of 2iE into Center of Excellence

- **Graduate Students Research Projects (Contd.)**
 - **Proj#7: Impact of Municipal Wastewater & Sludge on Agricultural Crop Production.**
 - Dr. Amadou Hama Maiga (2iE), Dr. Nosa O. Egiebor (Tuskegee); Gustave Kabre and Jean Noel Poda (Univ. of Ouagadougou) with 2iE PhD student
 - **Proj#8: Use of Constructed Wetlands for Municipal Wastewater Treatment.**
 - Dr. Amadou Hama Maiga (2iE), Dr. Nosa O. Egiebor (Tuskegee), Dr. Eric ROSE (Univ of Strasbourg, France.) with 2iE PhD Student

Objective 1: Development of 2iE into Center of Excellence

- Graduate Students Research Projects (Contd.)
 - **Proj #9:** Drainage of Tropical Savannah valley bottoms in order to alleviate iron toxicity, of irrigated soils
 - Dr. Hamma Yacouba (2iE), Dr. Nosa O. Egiebor (Tuskegee), Dr. Bart Schultz (UNESCO-IHE, Delft, Netherland) with 2iE PhD Student
 - **Proj #10:** Arsenic Removal from Groundwater by Membrane Filtration
 - Dr. Amadou Hama Maiga (2iE) Dr. Nosa O. Egiebor (Tuskegee); with 2iE PhD student

Objective 2: Student & Faculty Int'l. Exchange Activities

- Completed research training for **four 2iE faculty** members at **Tuskegee University** (Aug-Oct 2011 and July –Aug 2012).
 - Dr. Ynoussa Maiga in **Environmental Engineering**
 - Dr. Abdoulaye Diarra in **Adaptation to climate change**
 - Dr Yao Azoumah in **Renewable Energy & Energy Efficiency**
 - Mr Ahmed Bagre in **Renewable Energy & Energy Efficiency**
- **2 MS students** conduct their MS thesis research at **Tuskegee Univ.** (Feb-Sept 2012).
 - **Mr. Abdoul-Raimi Bouari** (Togo citizen) : “*Bioremediation of cyanide contaminated gold processing wastewater*”
 - **Miss Christelle B. Biagwoul** (Burkina citizen) : “*Design and development of high storage capacity complex hydrides for reversible hydrogen storage in vehicles*”

Objective 2: Student & Faculty Intl. Exchange Activities

- **3 2iE** staff and faculty visited Tuskegee University in 2011 for research and partnership studies
- **6 Tuskegee Univ.** faculty visited 2iE for lecture, research workshop & specific project start-up in years 2011 and 2012
- **4 Tuskegee Univ. students & 6 faculty members** attended Summer school & research studies at 2iE in June 2012
- **4 Tuskegee faculty members** participated in International conference in Solar Energy and research studies at 2iE December 2012



Objective 2: Student & Faculty Intl. Exchange Activities

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- **Successfully Organized the 1st 2iE-Tuskegee international Summer School** in Ouagadougou from June 11 – 21, 2012 on the theme of “*Energy, Environment and Food Security in a Changing Climate*”.
- 10 Tuskegee University faculty members and students attended
- 10 faculty members and students from African Universities attended (Nigeria and Ghana)
- 35 2iE Student and faculty members attended
- 1 AIST Faculty Arusha (Tanzania) attended
- 1 USAID-Burkina staff attended.

Objective 2: Student & Faculty Intl. Exchange Activities

- **Some Photographs from the 1st 2iE-Tuskegee Univ. International Summer School in Burkina Faso**



Objective 2: Student & Faculty Intl. Exchange Activities

- **Some Summer School Photos (contd.)**



Objective 2: Student & Faculty Intl. Exchange Activities

- **Established 5 Africa-US international Research Groups** - *composed of 2iE (Burkina) , Tuskegee Univ. (USA), Univ. of Benin (Nigeria), University of Mines and Technology (Ghana), and Kwame Nkrumah University of Sciences and Technology (Ghana)*
 - Chemical use by farmers,
 - Climate modeling: essential tool for Africa's development,
 - Renewable and hydrogen energy
 - Sequestration of arsenic from aqueous solution by using various adsorbents
 - Cyanide and gold mining in Sub-Saharan Africa.

Objective 3: 2iE Institutional Capacity Building

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- ❑ **Partnership workshop** on research and institutional capacity building held at Tuskegee University, USA (October 9-12, 2011).
- ❑ **2 Faculty members trained** on experimental environmental engineering and climate change modeling research methods at Tuskegee University enhance 2iE capacity in education and research.
- ❑ **3 major Collaborative research projects** already established at 2iE by the trained faculty members

Photo from Partnership workshop on research and institutional capacity building



Partnership Broader Impacts – Industry Capacity Development

□ Industrial Development Impact #1:

- Held successful meetings with **Anglo-Ashanti Gold Mining Company** - Sadiola Mining operations in Mali to develop a training program for their engineering and technical staff at 2iE
- Held successful meetings with **Essakane Mining Company** in Burkina Faso, developed research and enterprise nursery projects for 2iE graduates

Partnership Broader Impacts – Industry Capacity Development

□ Industrial Development Impact #2:

- *2iE MS Students admitted in internship site working on - design of mine blast holes & charges: **COGEB International SA, Burkina Faso***
 - *One student (Mr. Simon Tsopjio) developed a new mine blasting design now used by COGEB Int'l SA company for their quarry blasting*
- *2iE MS Students admitted in internship site working on ore treatment and waste stabilization: **Sadiola mining company in Mali***

Other Accomplishments & Assessment

- We completed the development and implementation of a project website with URL as follows: - <http://www.tuskegee-2ie.com/>

- **Overall Assessment of Accomplishments vs Objectives:**
 - Relative to project **objectives & goals** at this stage of execution: our project **accomplishments** have generally exceeded expectations

Summary of Development Outcomes & Opportunities

- **Human capacity building through advanced education** in critical areas of climate change & environmental S&T needs for **2iE, Burkina Faso,** and the **West African** sub region.
- **Capacity development in state-of-the-art** research methods, instrumentation, and graduate education at 2iE → Improve long-term S&T human capacity development in Africa.
- **Institutional capacity building in best-practices** in research & educational management.

Lessons Learned

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- International **higher education partnerships** are critically important to Sub-Saharan Africa's (SSA) economic and millennium development goals.
- Only **long-term partnerships (> 10 years)** can have the desired impacts on human & institutional capacity developments in SSA's higher education.
- International higher education partnerships in STEM fields should include significant **support for laboratory equipment and research infrastructure** procurement & development.
- Most SSA higher education institutions **do not have the capacities to administer external R&D funding** to meet stringent funding agency requirements.
- Access to **library resources and broadband Internet** to support research training is significantly limited → significant assistance is critically needed in this area across SSA.

Conclusions

- **Contribution to Regional & National Priorities:**
 - Partnership contributing directly to regional & national **industrial development priorities** as illustrated with [Anglo-Ashanti Gold](#) (Mali), [Essakane Mining](#) and [COGEB Intl. SA](#) (Burkina)
 - Helping train critically needed advanced **S&T human capacity priorities** for Burkina Faso & the West African region to support technical and economic development and wealth creation.
 - Contributing to high quality advanced education and research that are critical to development.

Conclusions (contd.)

- Partnership directly contributing to the new USAID (2012-2016) *Climate Change and Development Strategy* by:
 - Providing research & human capacity support for national & regional transition to ***climate resilient and low carbon development*** pathway, water and sanitation.
- Enhance 2iE faculty research & teaching capacity.
- Institutional capacity for education & research management & administration
- Exposure of students to international education.



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Thank You!

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The Africa-US Higher Education Initiative: At the Crossroads of International Education and International Development

“Welcome to Concurrent Session IV ”
February/19/2013



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Disclaimer

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Outline

- Partnership between North Dakota State University (NDSU) & Makerere University (Mak), (Uganda)
- Study abroad Course
- **Joint Degree between NDSU & Mak**
- Two examples of Outreach Activities by students in joint degree program
- Challenges & Accomplishments
- Lessons learned



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**Capacity Building in Integrated Management of
Transboundary Animal Diseases & Zoonoses
(CIMTRADZ) in East & Central Africa (ECA)**

**North Dakota State University &
Makerere University, Uganda**

Program Partners (US & Canada)

Columbus State University, USA

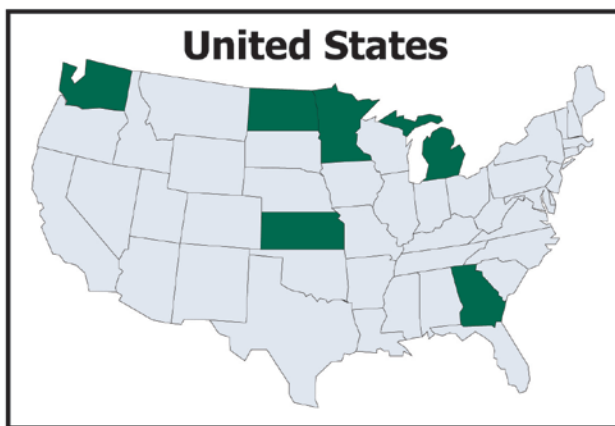
Kansas State University, USA

Michigan State University, USA

University of Minnesota, USA

Washington State University, USA

University of Saskatchewan, Canada



Program Partners (Africa)

Makerere University, **Uganda**

University of Nairobi, **Kenya**

Sokoine University of Agriculture,
Tanzania

Mekelle University, **Ethiopia**

Umutara Polytechnic University,
Rwanda

Sheik Technical Veterinary School,
Somalia





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Program Partners (Africa)

Non governmental Organizations (NGOs)

1. Africa Field Epidemiology Network (AFNET)
2. Terra Nuova
3. Conservation Through Public Health (CTPH)
4. Uganda Veterinary Association (UVA)

Project Strategic Objectives

1. Develop **an integrated and coordinated surveillance system** for zoonotic and transboundary diseases; building animal, human and environmental diagnostic capacity using “**One Health**” approach.

Use students – in teams; serving while learning

Project Strategic Objectives

2. Develop capacity for **enhanced research** addressing zoonotic and transboundary diseases in Africa.
 - Graduate student research
 - Faculty collaborative research



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Project Strategic Objectives

3. Improve educational capacity and outreach activity

Education - through development of education initiatives, including:

- joint degrees
- distance education

Outreach - integration of student outreach through research, advocacy & servant leadership.

CIMTRADZ Project – built upon on-going initiatives

- ❑ *International Animal Production, Disease Surveillance & Public Health study abroad* course offered by Mak and NDSU since 2007
- ❑ The joint NDSU/Makerere MS degree & Graduate Certificate in *International Infectious Disease Management & Biosecurity*, approved at both institutions (August & September, 2011).

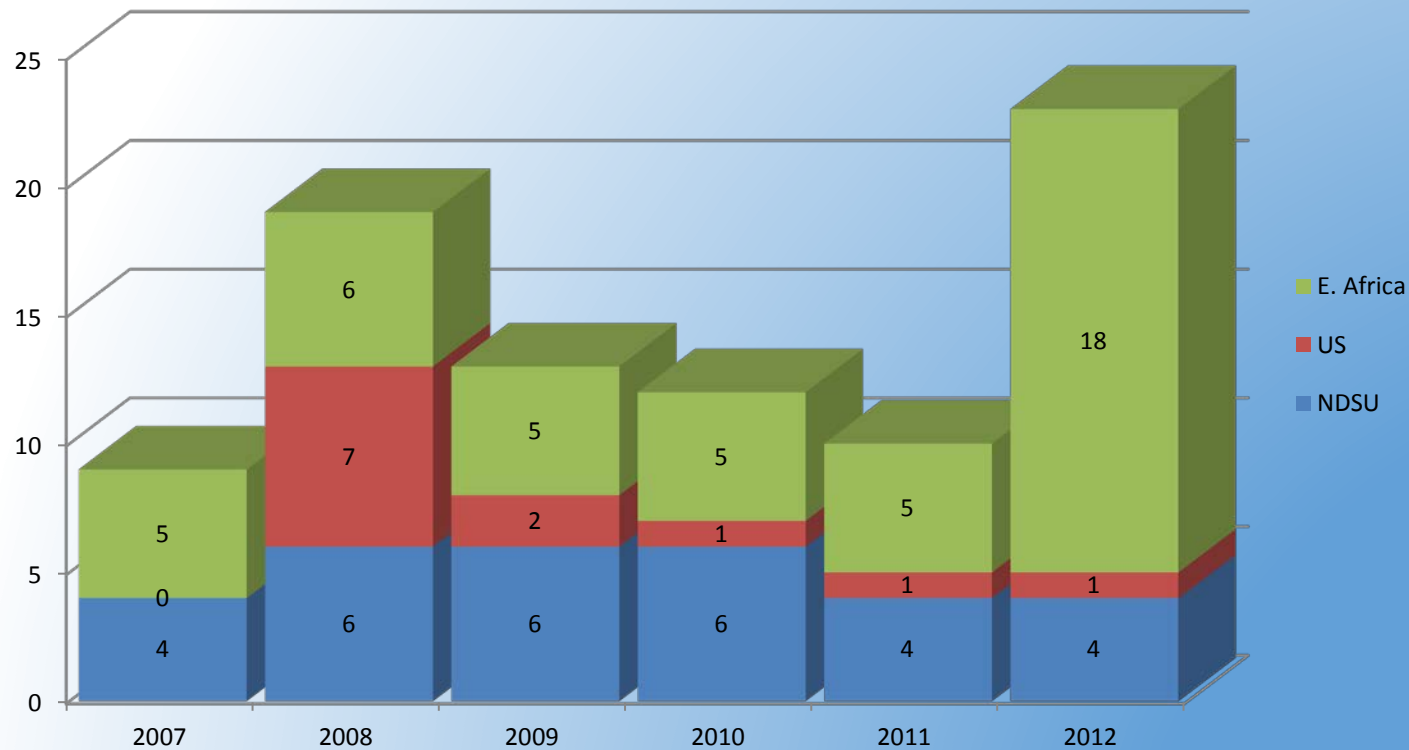
Study Abroad Course Objectives

1. Tropical Animal Production systems (Livestock & Wild Life) & Food Safety
2. Public Health & Disease Surveillance systems esp. transboundary animal diseases & zoonoses
3. Cultural exposure/interaction of students

Study abroad course (2007 -2012)

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- A total of **86** students trained so far (**US 42**; **NDSU-30**, **others-12**);
E. Africa-44



Class of 2007 (4NDSU +5 Mak)





Class of 2008

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Class of 2009-
10 students (8-US; 2 Mak)



Class of 2010



Class of 2011 9 students (4-US; 4 MAK, 1 Ethiopia)





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Class of 2012

23 students (5-US; 6 Mak; 12 E. Africa)



Photo courtesy
of Meghan Bennett

HIV/AIDS Management in Uganda (Drama) TASO-The Aids Support Organization



Members of TASO Drama Group



Cultural emersion marriage ceremony

Students Attending church





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A Joint Degree in International Infectious Disease Management & Biosecurity (IDM)

**Dept. Veterinary & Microbiological Sciences
College of Agriculture, Food Systems, and Natural Resources
North Dakota State University (NDSU)**



&

**College of Veterinary Medicine, Animal Resources &
Biosecurity (COVAB) Makerere University, KAMPALA-
UGANDA (Mak)**



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MS Program Requirements

- The program requires completion of **30 credits** with **13 credits of core courses** offered jointly by both institutions.

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- Students can enroll through NDSU or Mak; however, they have to spend at least one semester at the other institution and complete two practicum projects of 2 credits each, one at each institution.

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- Students can enroll through NDSU or Mak; however, they have to spend at least one semester at the other institution and complete two practicum projects of 2 credits each, one at each institution.
- **Experiential learning** with cross pollination of teaching methods from both institutions; it is problem-based learning with a **service-learning component**.



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Core courses – Taught jointly

| Course | Credits | Institution | Instructor |
|--|---------|-------------|----------------------|
| MICR 674:* Epidemiology | 3 | NDSU | M. Khaita |
| MICR 721: Prevention and Control of Zoonoses & Transboundary Infectious Diseases (ZTID) | 3 | MAK | F. Ejobi |
| MICR 722: International Health Systems, Policy and Biosecurity | 2 | NDSU | M. Khaita |
| MICR 723: International Animal Production, Disease Surveillance & Public Health (Cornerstone course) | 3 | NDSU & MAK | M. Khaita & F. Ejobi |
| MPH 7204:* Social & Behavioral Determinants of Health | 2 | MAK-SPH | J. Kiguli |

- Courses offered at each university
 - Core courses shared
 - Several electives at both institutions
- Long term goal - to offer most courses (including all core courses) in distance education format
- Some of the electives will be taught in the traditional face to face format.

- One joint degree to be awarded by both universities.
- Students would receive one degree certificate with seals of both universities (NDSU and MAK).
- Currently – still operating as a dual degree.



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The 1st cohort of 8 MS-IDM students



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International Health Systems, Policy & Biosecurity New Course Developed (MICR 722)

- Role of Intergovernmental organizations in Global Health, International Trade, etc
 - WHO, OIE, FAO, WTO
 - The World Bank
 - IFPRI (International Food Policy Research Institute)
- Trip to Washington –DC
- Team taught (U of M, WSU)

FAO office in DC





Networking in DC

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Six Countries represented

Canada, Ethiopia, India, Japan, US,
Uganda



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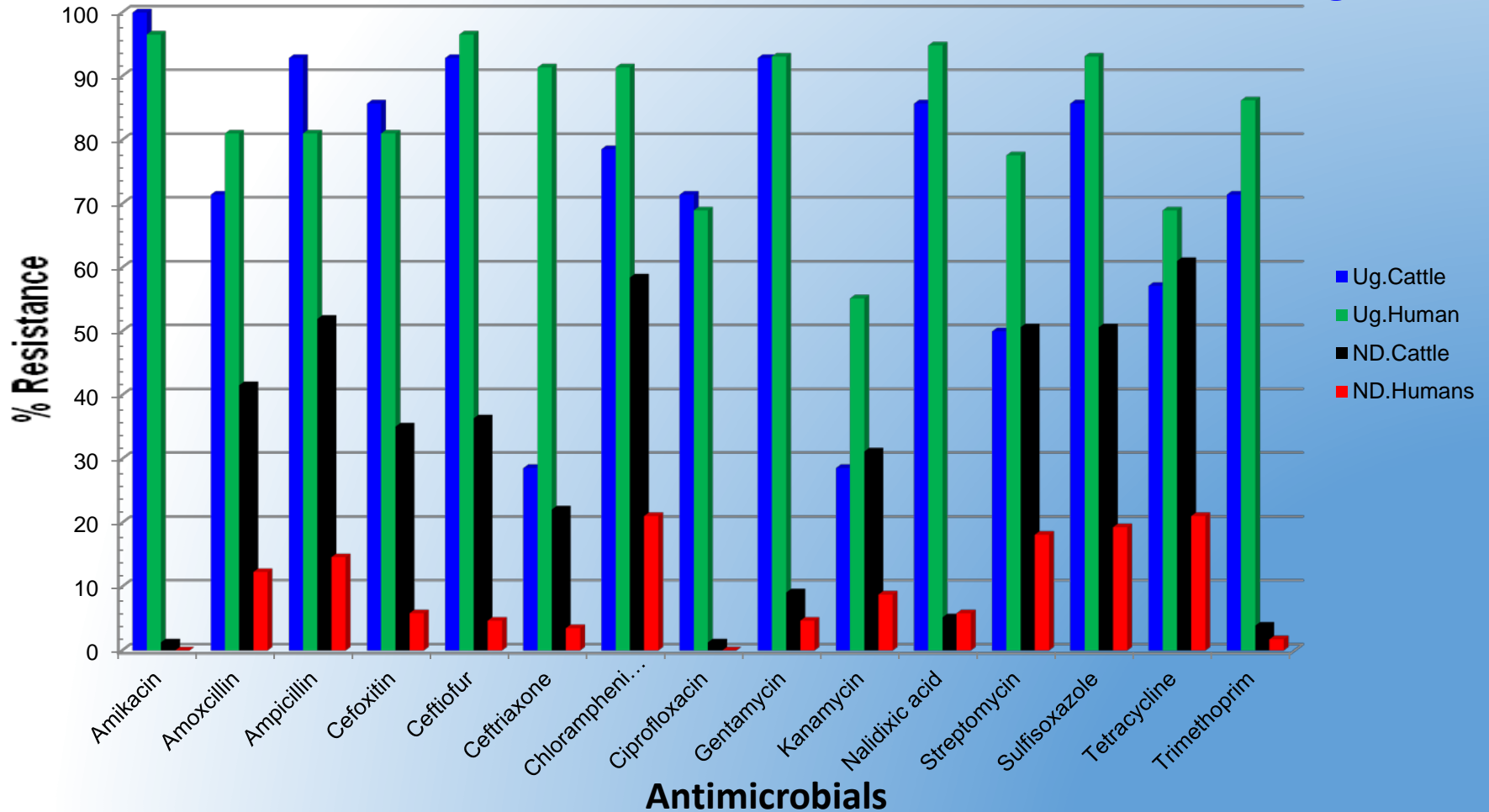


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Research

- By MS-IDM **graduate** students
- By 90 **Undergraduate** Students at Mak
- Collaborative research -Partner Institutions
 - MSU/Mak
 - WSU/Mak
 - NDSU/Mak

Resistance Profile of Cattle and Human *Salmonella* Isolates from North Dakota and Uganda



Ug.Cattle N=14 Ug.Humans N=58 ND. Cattle 77 ND.Human 171

Outreach

- **By MS-IDM students –Rocky Mountain Spotted fever (RMSF) (in AZ, US) with CDC**
- **Service Learning, Rabies vaccination (Uganda)**



— Life After High School —
WHAT'S MY NEXT STEP?

WHAT'S HOT
CLASS OF 2016
CLASS OF 2014

RMSF
RODEO

RMSF
RODEO

RMSF
RODEO

RMSF
RODEO

RMSF
RODEO

RMSF
RODEO

RMSF
RODEO

RMSF
RODEO



CDC - Environmental Health Integrated Management of RMSF

- Spraying lawn
- Tick collar – 8 months
- Education of public
- Spaying/castration of dogs



Outreach in Uganda

- Rabies Vaccination
- Servant leadership/service learning
- Education

Students serving while learning



Rabies
Vaccination
Community
engagement
Service
Learning
Project

Some Challenges

- **Insufficient infrastructure**/ resources at partner institutions (both US & Africa)
- **Institutional support** (higher administration, trained personnel in international partnerships, etc) is key to success of project.
- **Support for personnel** involved in project (resources, cost share, release time)
- Frequent **turnover** of administrative leadership

Some Challenges

- **Legal & regulatory structures governing research in different institutions:**
 - Getting institutional review approvals (IRB, IACUC, IBC) in time
 - Expedited approvals in times of disease outbreaks eg. Brucellosis outbreak in Uganda
- **Communication:**
 - Efficient communication between all parties involved in the grant – HED, US & African partners.

Achievements so far

- The partnership has led to **institutional capacity building** in both PI institutions (NDSU & Mak)
- NDSU & Mak developed **1st US-Africa joint degree** –leading to student exchange & joint research opportunities

Achievements so far

- **Human Capacity building**; MS-IDM degree (6 graduates, 8 enrolled); 4 MS fellowships
- Held **2 conferences/workshops** in Uganda with AFRUS-IDM partners (Jan & July 2012)
- **Developed Partnerships** eg Emerging Pandemic Threats (EPT) program on summer course in 2012 (funded 12 ECA participants)

Lessons Learned

- Institutional Support is important
- Regular & Effective Communication
 - Face to face meetings more effective
- A positive attitude

NDSU President's Team at Mak, 2008





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Acknowledgements



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