

# Africa-US Integrated Disease Management Consortium: A Model for International Education and International Development<sup>1</sup>

**Abel B. Ekiri<sup>2</sup> and Margaret L. Khaitso<sup>3</sup>**  
**North Dakota State University**  
**Fargo, ND**

**David Kabasa<sup>4</sup>**  
**Makerere University**  
**Kampala, Uganda**

## Abstract

In 2010, the United States Agency for International Development, The Association of Public and Land-grant Universities and Higher Education for Development awarded 11 Africa-US Higher Education partnership grants of \$1.1 million each to universities in Africa and the US to address national and regional priorities in sub-Saharan Africa. Each partnership will develop collaborative research and academic programs to build the capacity of the African and US institutions to affect change in Africa. This paper describes one of the partnerships between North Dakota State University (NDSU) and Makerere University (Mak) in Uganda that addresses capacity building in integrated management of transboundary animal diseases and zoonoses in Eastern and Central Africa. In addition, NDSU and Mak are part of a consortium of twelve North American and African institutions of higher learning working collaboratively to offer global educational experiences with an emphasis on animal production and health and food security. Several components of the aforementioned partnership will be discussed including: 1) Africa-US Partnerships, the twinning model; 2) global perspective of Higher Education training; 3) centers of excellence model and the academic-community-public-private partnerships framework under the Africa Institute for Strategic Services Development; and 4) the challenges and achievements of the NDSU-Mak partnership.

## Introduction

Protecting the world from trans-boundary health threats demands a global perspective in investment in global animal and public health infrastructure (Domenech et al., 2006). While any point on the globe could be the origin of the next global pandemic, at least 70% of the known human and animal pathogens affecting animal production, public health, global trade and security are resident in Sub-Saharan Africa (AU-IBAR, 2007) and, in particular, Eastern and Central Africa (ECA). Thus this region has become a bio-risk incubator for Africa and the global community (Wakhusama et al., 2009). Sustainable interventional strategies are therefore necessary to minimize these risks.

Higher Education Institutions are among the most stable and sustainable institutions in Africa, with tremendous untapped resources of human skills and infrastructure. The Africa-US Integrated Disease Management Network (AFRUS-IDM), the Twinning Model, is a strong collaboration of Higher Education Institutions in North America and Africa that was established to advance Higher Education-led development in Africa. The US partners are North Dakota State University (NDSU), Michigan State University, Columbus State University, University of Minnesota, Kansas State University and Washington State University located in the states indicated (Figure 1). The network also includes the University of Saskatchewan at Saskatoon (Canada).The

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<sup>2</sup>Project Manager, Department of Veterinary and Microbiological Sciences, Dept. 7690, PO Box 6050; Ph: 701-231-5947; Email: abel.ekiri@ndsu.edu

<sup>3</sup>Associate Professor and US PI, Department of Veterinary and Microbiological Sciences, Dept. 7690, PO Box 6050; Ph: 701-231-5946; Email: margaret.khaitso@ndsu.edu

<sup>4</sup>Professor and African PI, College of Veterinary Medicine, Animal Resources and Biosecurity, PO Box 7062; Ph: +256-414-554-685; Email: kabasa@vetmed.mak.ac.ug

## Africa-US Integrated

African partners include: University of Nairobi (Kenya), Sokoine University of Agriculture (Tanzania), Mekelle University (Ethiopia), Umutara Polytechnic (Rwanda), Sheik Technical Veterinary School (Somali land), Africa Epidemiology Network (Non- Governmental Organization [NGO]), Terra Nuova - Eastern Africa (NGO), The Intergovernmental Authority on Development (IGAD) and Conservation Through Public Health (NGO) located in countries shown in Figure 2.

The AFRUS-IDM network identified the program on Capacity Building in Integrated Management of Transboundary Animal Diseases and Zoonoses (CIMTRADZ) as a major pillar for transforming the East and Central Africa region. In building a system for effective disease management, the program has three principle functions: 1) providing transformative education in integrated disease management for transboundary animal diseases and zoonoses (pathogens that move from animals to people) that affect East and Central Africa (ECA) and the world; 2) promoting and supporting collaborative research and training in transboundary animal diseases and zoonoses of regional and global importance in ECA; and 3) engaging communities' positive involvement in sustainable resource management practices which promote animal health, public health and food security.

### One World, One Health Concept of Training and Collaboration

In 2004, a worldwide congress of health experts convened at Rockefeller University in New York City to discuss the current and emerging diseases among human, domestic animal and wildlife populations (One World, One Health, 2004). The assembled expert panel members delineated priorities for an international, multifaceted

approach for combating threats to global health. The One World, One Health concept is the resulting worldwide strategy for building bridges in interdisciplinary collaborations and communications among human health, veterinary health, environmental health, research science, sociology, economics and public policy. This group of experts presented 12 guiding principles with the aim of preventing zoonotic disease outbreaks and maintaining ecosystem integrity “for the benefit of humans, their domesticated animals and the foundational biodiversity that supports us all.” The CIMTRADZ project is predicated on the first guiding principle of the One World, One Health concept to “*recognize the essential link between human, domestic animal and wildlife health and the threat disease poses to people, their food supplies and economies and the biodiversity essential to maintaining the healthy environments and functioning ecosystems we all require*” (One World, One Health, 2004).

### Africa-US Partnerships, the Twinning Model

The AFRUS-IDM partnership is one of 11 Africa-US Higher Education partnerships which were each awarded \$1.1 million in 2010 to address national and regional priorities in sub-Saharan Africa. Each partnership has two lead institutions (one in Africa and one in the US) and is focused on developing collaborative research and academic programs to build the capacity of the African and US institutions to affect change in Africa. The 11 partnership grants are outlined in Table 1. Each of the 11 partnerships developed a five-year strategic plan including a long-range vision to build human and institutional capacity development. The partnerships are funded by the US Agency for International Development (USAID), Association of Public and Land-

Figure 1. US States where partner institution members of the Africa-US Integrated Disease Management (AFRUS-IDM) network and Capacity Building in Integrated Management of Transboundary Animal Diseases and Zoonoses (CIMTRADZ) project are located.

US States where partner institution members of AFRUS-IDM and CIMTRADZ project are located.

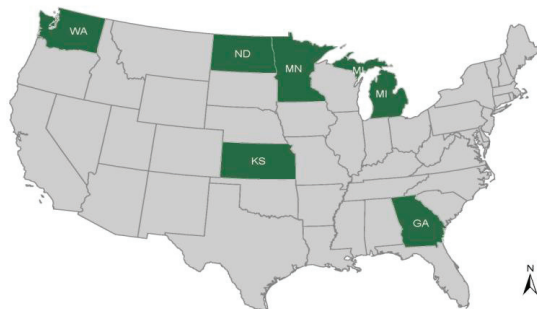
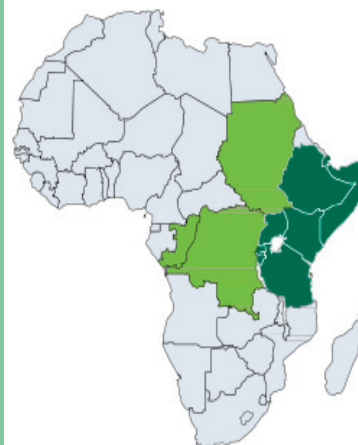


Figure 2. East and Central African countries where the Africa-US Integrated Disease Management (AFRUS-IDM) network and Capacity Building in Integrated Management of Transboundary Animal Diseases and Zoonoses (CIMTRADZ) project is located.



East and Central African countries where the AFRUS-IDM network and CIMTRADZ is located (dark green): Uganda, Kenya, Tanzania, Rwanda, Ethiopia, Somali Land

Yet to join (light green) South Sudan, Democratic Republic of Congo, Burundi

grant Universities (A-P-L-U) and Higher Education for Development (HED) for two years. The A-P-L-U continues to work to secure additional funds to expand the initiative in the years to come. Additional details on the partnerships are available at <http://www.partnership-africa.org/content/africa-us-higher-education-initiative-partnership-grant-recipients-announced>.

In the context of the 11 grants, institutional capacity building comprised curriculum development, dual or joint degrees, faculty exchanges, joint research, scholarships, community outreach, national and international conferences, sustainable partnerships with government support as defined by HED (<http://www.hedprogram.org/>).

Capacity Building in Integrated Management of Transboundary Animal Diseases and Zoonoses (CIMTRADZ):

### Project Objectives

North Dakota State University (NDSU) and Makerere University (Mak) is one of the 11 Africa-US Higher Education partnerships addressing capacity building in integrated management of transboundary animal diseases and zoonoses in Eastern and Central Africa. The three broad objectives of this project include: 1) develop an integrated and coordinated surveillance system for zoonotic and transboundary diseases; building animal, human and environmental diagnostic capacity using a “One Health” approach; 2) develop capacity for enhanced research addressing zoonotic and transboundary diseases in Africa, including collaborative research programs, scientific workshops, grant management, data-sharing initiatives, documentation of research deliverables and dissemination of new information; and 3) improve educational capacity and outreach activity through development of education initiatives, including: joint

degrees, distance education and integration of student outreach through research, advocacy and servant leadership.

### How the AFRUS-IDM Partnership and CIMTRADZ Project fit into Priorities of NDSU and Mak

The AFRUS-IDM partnership aligns well with NDSU goals of internationalization of higher education and NDSU’s mission to “address the needs and aspirations of people in a changing world,” NDSU’s core values to “reflect and serve geographically and culturally diverse populations,” “remain committed to serving people globally,” and “value collaboration with colleges and universities around the world” (NDSU, 2009). Additionally, the project aligns well with Mak College of Veterinary Medicine, Animal Resources and Biosecurity’s 5-year strategic plan and the Uganda government’s national goals of reducing poverty and the strategic goals of the Inter Africa Bureau for Animal Resources (AU-IBAR) and the World Animal Health Organization (OIE).

### Global Perspective of Higher Education Training

North Dakota State University (NDSU) is a US Land Grant institution that provides excellent educational opportunities to its students. However, in assessing the educational needs of an increasingly international student population in an ever more connected world, the institution concluded that a global view is needed to ensure that NDSU’s students are appropriately prepared to participate in the issues that will affect both local and worldwide health and policy decisions. Global perspectives in health management and related sciences are critical to the safety of our agricultural

*Table 1. The Eleven Africa-US Higher Education Partnerships Awarded Grants by USAID/APLU/HED to Address National and Regional Priorities in Sub-Saharan Africa*

US lead institution	Africa lead institution	Area of interest
Tuskegee University, Alabama	International Institute for Water and Environmental Engineering, Burkina Faso	Water and Environmental Technology
University of Connecticut, Connecticut	Addis Ababa University, Ethiopia	Sustainable Water Resources Development and Management
Brown University, Rhode Island	University of Ghana, College of Health Sciences, Ghana	Higher Education Initiative for Human Immunodeficiency Virus infection/Acquired Immunodeficiency Syndrome (HIV/AIDS)
Syracuse University, New York	Kenyatta University, Kenya	Building Capacity through Quality Teacher Preparation
Colorado State University	University of Nairobi, Kenya	Sustainability of dry lands
Indiana University, Bloomington, Indiana	University of Liberia, Liberia	Life Sciences Planning Initiative
Michigan State University, Chancellor College, Michigan	University of Malawi, Bunda College of Agriculture, Malawi	Ecosystems Services: Linking Science to Action in Malawi and the region
The Ohio State University, Ohio	Université Gaston-Berger, Senegal	Develop a West African e-Education Agro-Ecology Program for Sustainable Food Production
University of Cincinnati, Ohio	University of Cape Town, South Africa	Solar Energy Devices for Africa
Virginia Polytechnic Institute and State University, Virginia	Catholic University of Sudan, Sudan	Rebuilding Higher Education in Agriculture to Support Food Security, Economic Growth, and Peace Efforts in Post-Conflict Southern Sudan
North Dakota State University, North Dakota	Makerere University, Uganda	Capacity Building in Integrated Management of Zoonoses and Vector-borne Diseases in Eastern and Central Africa

## Africa-US Integrated

resources and public health, yet very few opportunities existed for their study at NDSU. Educators at NDSU realized that this perceived gap in knowledge could not be filled without providing the unique educational experiences that international training provided. As a result, international collaborations were developed with a number of universities and institutes around the world. Students graduating with exposure to international health management will be better prepared to address prevention and control of pandemic diseases at the source and crisis management at local, national and international levels. Through faculty exchange, curriculum building and research collaborations, NDSU has fostered a partnership with Mak that begun as a study abroad summer course for transboundary and zoonotic disease management in 2007. In 2011, NDSU/Mak approved a joint Master's degree in International Infectious Disease Management and Biosecurity. This degree provided the faculty from ECA the opportunity to earn graduate degrees in US institutions (north-south interaction) or at larger ECA institutions (south-south interaction). The summer abroad experiential learning program and the Master's degree in International Infectious Disease Management and Biosecurity were described in detail elsewhere (Ekiri et al, 2013a; Ekiri et al, 2013b).

### Formation of Consortia of Universities Model

Formation of a consortium of US universities with a commitment to international education in East and Central Africa (ECA) in the area of management of infectious diseases - in particular transboundary animal diseases and zoonoses - was a new paradigm that recognized the unique strengths of each institution in the partnership. This model enables resource sharing and increased student access to valuable educational, research and community service programs while maintaining rigorous academic standards. The consortium is largely networked electronically to minimize costs with conference calls held on a regular basis. The consortium of ECA universities with Mak as the lead institution provides students from the ECA region greater access to institutions of higher learning, not only in the African partners, but in the US institutions. This interaction is accomplished through conferences held at Mak where all ECA and US partners attend and training is offered to participants from ECA institutions through workshops held in conjunction with the conferences. In turn, regional ECA partners provide opportunities for on-the-ground research projects and service learning which are invaluable training tools for both understanding the nature of unique issues in specific communities and for engaging the community's buy-in for informed disease

management strategies that have a positive impact on the community's health and prosperity. In the context of the CIMTRADZ project, service learning is viewed as an educational experience in which students participate in an organized service activity that meets identified community needs and reflect on the service activity in such a way as to gain further understanding of course content, a broader appreciation of the discipline and an enhanced sense of civic responsibility (Bringle and Hatcher, 1996).

### Distance and Continuing Education Aspects of NDSU and Mak Partnership Programs

As an initiative to expand the delivery of instruction to a wider audience, NDSU has significantly expanded its offerings through the office of Distance and Continuing Education (DCE). The Dean of Graduate and Interdisciplinary Studies provides leadership for DCE. This structure has led to innovations and enhanced educational opportunities to students locally, nationally and internationally. As an example of one such program, the Great Plains Institute of Food Safety offers BS, MS and PhD degrees, as well as graduate and undergraduate certificates in Food Safety. These degrees and certificates are built upon core courses which are all offered through DCE. Through this delivery mechanism, the faculties of NDSU and Mak can provide an integrated curriculum with global perspective to students from both institutions. Delivery of the program through DCE also provides an opportunity for cross-pollination of teaching concepts across the faculty of Mak and NDSU and will be expanded upon in the later years as US and ECA partners are incorporated into the mix.

### Engaging With Africa

Today, 70% of the fastest growing economies are in Africa (AIEA, 2013a). About 90 million African households joined the consuming class by 2011 - an increase of 31 million households in a decade. In addition, Africa is now the world's youngest continent with 62% of the population under the age of 25 (AIEA, 2013a). Education, especially tertiary education, will play a major role in sustaining and expanding the positive trends on the continent. However, given the size of the youth explosion, many African countries currently lack the financial and human resources to provide quality education to the increasing demands for tertiary education and skills development (AIEA, 2013b). These constraints clearly present opportunities for US higher education institutions to engage with Africa.

## Centers of Excellence Model

The Center of Excellence at Mak's College of Veterinary Medicine, Animal Resources and Biosecurity (CoVAB) is a new paradigm that encourages collaboration between institutions and countries for the first time in Africa. The Center provides a framework for integrating East and Central Africa institutions of higher learning on one hand and government institutions and community on the other. The incorporation of the Center in institutions of higher education provides a framework for the integration of education, research and service objectives in an established infrastructure. The Center serves as a regional powerhouse with core laboratory research facilities that can be used for both research and training. The Center ensures a regional impact while empowering local people and institutions. Human and institutional capacity building is the primary goal of the AFRUS-IDM partnerships. To fulfill the goal of institutional capacity building at Mak, the NDSU-Mak partnership and the CIMTRADZ project with support from the Ugandan government established the Africa Institute for Strategic Services Development, AFRISA ([www.afrisa-africa.org](http://www.afrisa-africa.org)) within the Mak Center of Excellence.

Although AFRISA was established within Mak, it functions under a model similar to a non-governmental organization (NGO) in Africa or similar to a research and technology park at a US institution, providing for institutional autonomy. The institute provides academic-community-public-private partnerships that connect the university, funding agencies and communities. The institute serves as an ideal conduit for the Center to partner with policy makers to give and receive information about policy issues and change. Through AFRISA, the university, facilitated by private funders uses students to address specific targeted problems in the communities. The institute has an element of service learning incorporated into the training where students practically address a community need while learning. A successful case study of academic-community-public-private partnerships is the Stamp Out Sleeping Sickness (SOS) campaign in Northern Uganda conducted by AFRISA through Makerere University (<http://www.stampoutsleepingsickness.com/>). The Mak Center and AFRISA coordinate education, research and community engagement between NDSU and Mak in the first phase of the award period (2011-2013) for the CIMTRADZ project and will continue to do so across the regional partners in both the US and Africa as the project matures.

## Community Engagement for Sustainable Change

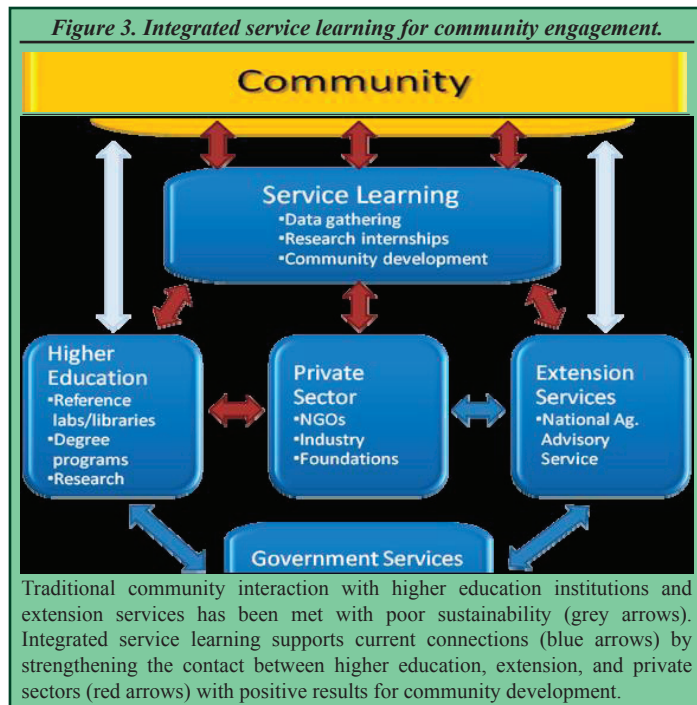
In Uganda, student involvement in prevention and control of infectious diseases in communities has helped

reduce the prevalence of certain diseases. For instance, veterinary students from Mak's College of Veterinary Medicine, Animal Resources and Biosecurity (CoVAB) in collaboration with the Uganda Veterinary Association were employed to successfully halt the impending overlap of two different pathogens (*Trypanosoma gambiense* and *T. rhodesiense*) that cause Trypanosomiasis in humans (Sleeping sickness), a zoonotic infection. Co-infection with Trypanosomes seriously compromises the treatment of the disease and adversely impacts the health of farmers of the northern and eastern regions of Uganda. This type of grass roots organizational structure is necessary for sustainable change in disease management practices as it helps identify practical and reasonable alternatives to solving specific problems faced by the community.

In the CIMTRADZ project, a One World, One Health service learning model was proposed. This model is unique in that groups of interdisciplinary students work with the community to first gather data on transboundary and zoonoses of local impact. Teams consist of animal health students (Veterinary School), public health students (School of Public Health) and environmental health students (Institute of Environment and Nature Resources) to affect a coordinated effort to address a health problem in the community. At present, these students are required to complete service learning as part of their training. The teams of students are funded to conduct epidemiological surveys of disease prevalence and local issues. The team approach ensures an integrated solution to the problem. When student teams work with local people on local problems, sustainability of the solution is maintained. Figure 3 shows the poor connection between education, government and extension services that obstructs infectious disease management practices for transboundary and zoonoses currently. Through service learning and student involvement, the cooperation and connection between universities, policy making government departments and the community (red arrows) has been strengthened.

## Challenges to NDSU and Mak Partnership

Implementation of the CIMTRADZ project presented some challenges which included: insufficient infrastructure or resources at partner institutions (both US and Africa), institutional support (higher administration, trained personnel in international partnerships) and support for project personnel (resources, cost share, release time); frequent turnover of administrative leadership; delay in institutional review approvals from legal and regulatory structures governing research in different institutions - the Institutional Review Board (IRB) and Institutional Animal Care and Use Committee



(IACUC); and inefficient communication between all parties involved in the project - HED, African and North American partners.

**Achievements of NDSU and Mak Partnership**

This partnership has led to institutional capacity building in both lead institutions (NDSU and Mak). In addition, NDSU and Mak developed a dual degree, leading to student exchange and joint research opportunities. Human capacity building included training of at least 10 MS degree graduates and 5 MS fellowships. Benefits of the MS degree were described in detail elsewhere (Ekiri et al, 2013b). Lead partners held two conferences/workshops in Uganda with AFRUS-IDM partners (in January and July 2012) and several presentations were shared. Partnerships were developed with other synergist programs such as USAID Emerging Pandemic Threats (EPT) program which later provided funding for twelve ECA participants in the summer study abroad course in 2012. Benefits of the summer abroad course were described in detail elsewhere (Ekiri et al, 2013a). The partnership also contributed to the founding of the consortium on One Health Central and Eastern Africa (OHCEA). The AFRUS-IDM network continues its drive for regional integration and synergism and recently attracted the Africa-Union Bureau for Animal Resources (AU-IBAR). The AU-IBAR has proposed a concept for a regional network for holistic curricula development and harmonization, Science, Technology and Innovations (STI) in the wider veterinary and animal value chains. Furthermore, the AU-IBAR recently sanctioned major

demographic studies on the veterinary and animal sciences training and research institutions. The AFRUS-IDM African PI was the team leader of the investigation. These studies are driving the strategic direction policy in the region and consequently repositioning the veterinary institutions to help build a resilient Africa.

**Conclusions and Recommendations**

There is an urgent need for higher education institutions to transform current teaching, learning and collaborative research methods into those of a global nature as we look to the future. International education is increasingly part of a strategic national agenda for many countries in developing global relationships, economies, higher education systems or workforces (AIEA, 2013b). As teaching and learning methods shift to a global context, assessment of the impact of a global approach to teaching and learning is important. Given the need for multi-disciplinary teams to solve complex problems, universities will need to enhance existing networks and relationships in order to achieve this goal. The consortium model is one that is cutting-edge for teaching, learning and research and has the potential to transform international higher education.

**Literature Cited**

Africa Institute for Strategic Services Development (AFRISA). The Africa institute for strategic services and development Makerere university. <http://www.afrisa-africa.org/> Accessed: April 29, 2013.

Partnership to Cut Hunger and Poverty in Africa. Africa-U.S. Higher Education Initiative Partnership Grant Recipients Announced. <http://www.partnership-africa.org/content/africa-us-higher-education-initiative-partnership-grant-recipients-announced>. Accessed: April 24, 2013

African Union Inter-African Bureau for Animal Resources (AU-IBAR). 2007. Pan African animal health year book 2007. Nairobi, Kenya. [http://www.au-ibar.org/index.php?option=com\\_googlesearch\\_cse&n=30&cx=009460898022225466435%3A8gzilgsqvlk&cof=FORID%3A11&ie=UTF-8&q=Pan+Africa+Animal+Health+Yearbook+2007&sa=Go%21&hl=en&safe=active](http://www.au-ibar.org/index.php?option=com_googlesearch_cse&n=30&cx=009460898022225466435%3A8gzilgsqvlk&cof=FORID%3A11&ie=UTF-8&q=Pan+Africa+Animal+Health+Yearbook+2007&sa=Go%21&hl=en&safe=active). Accessed: April 29, 2013

Association of International Education Administrators (AIEA). 2013a. Engaging with Africa. Association of International Education Administrators, Annual Conference, February 17– 20, 2013, New Orleans Marriott, New Orleans, LA.

Association of International Education Administrators (AIEA). 2013b. National strategies in international education. Association of International Education

- Administrators Annual Conference, February 17–20, 2013, New Orleans Marriott, New Orleans, LA.
- Bringle, R.G. and J.A. Hatcher. 1996. Implementing service learning in higher education. *Jour. of Higher Education* 67(2):221-239.
- Domenech, J., J. Lubroth, C. Eddi, V. Martin and F. Roger. 2006. Regional and international approaches on prevention and control of animal transboundary and emerging diseases. *Ann. N. Y. Acad. Sci.* 1081:90-107.
- Ekiri, A.B., L.F. Aceng, F. Ejobi, D. Kabasa and M.K. Khaita. 2013a. An international experiential learning program: A study abroad experience in Uganda. *NACTA Jour.* 57 (3a), 74-82.
- Ekiri, A.B., D. Kabasa and M.K. Khaita. 2013b. International Infectious Disease Management: A Case Study of Internationalizing Curricula. *NACTA Jour.* 57 (3a), 104-110.
- Higher Education for Development (HED). <http://www.hedprogram.org/>. Accessed: April 29, 2013
- North Dakota State University (NDSU). 2009. Mission, vision, core values. [http://www.ndsu.edu/president/mission\\_and\\_vision](http://www.ndsu.edu/president/mission_and_vision). Accessed: April 25, 2013
- One World, One Health. 2004. About “one world, one health.” <http://www.oneworldonehealth.org/>. Accessed: April 24, 2013
- Stamp Out Sleeping Sickness (SOS). <http://www.stampoutsleepingsickness.com/>. Accessed: April 14, 2013
- The Inter-African Bureau for Animal Resources (AU-IBAR). The Inter-African Bureau for Animal Resources. [www.au-ibar.org](http://www.au-ibar.org). Accessed: April 30, 2013
- Wakhusama, S., J. Wanderi and C. Brown. 2009. Trade and transboundary animal diseases in the horn of Africa. Proc. Workshop held at Kenya Commercial Bank Leadership Centre, Karen, Nairobi, Kenya. March 30 – April 3.
- World Organization for Animal Health (OIE). <http://www.oie.int/> Accessed: April 29, 2013