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Research Application Summary

Facilitating placements of graduate students to build capacity for National Agriculture Research and Extension System: The case of iAGRI in Tanzania

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Abstract

The attainment of sustainable food security in Africa, as elsewhere, requires the efforts of a cadre of innovative well-trained agriculture specialists who are familiar with the constraints and perspectives of national priority needs. In light of this, a USAID-sponsored partnership among six American Land Grant universities, Tanzanian Government, the Regional Universities Forum for Capacity Building in Agriculture (RUFORUM) and the Global South universities was established in 2011 to implement Innovative Agricultural Research Initiative (iAGRI). The focus was to help strengthen human and institutional capacity for agricultural research for development in Tanzania. As part of the implementation of the programme, RUFORUM was sub-contracted by the Ohio State University to coordinate the training of Tanzanians in selected universities in Africa for Master of Science and PhD Degrees in disciplines identified as priority areas for Tanzania. The iAGRI project training model involved course work at the host university and research in Tanzania under the supervision of the academic supervisors from the host university and a local supervisor from Tanzania, majority being from Sokoine University of Agriculture (SUA). The model also included a compulsory student participation in scientific conferences, skills enhancement short trainings, and travel to Tanzania by university supervisors to check on students and interact with the Tanzanian supervisors. A total of 31 students (30 MSc and 1 PhD) under RUFORUM coordination were successfully placed in nine Universities in Eastern and Southern Africa to undertake postgraduate training in 16 selected programmes of strategic interest to the Tanzania National Agricultural Research and Extension System (NARES). Of the 31 students placed, 65% have completed their degree programmes and reported back to their respective institutions in Tanzania and the rest are due to graduate by end of February 2017. The placements provided a platform for exposure and cross learning among the participating institutions and graduates have gained relevant skills to effectively contribute to the development of the agriculture sector in Tanzania. They have also been linked to close to 2,000 students and graduates across Africa. The implementation process has demonstrated the need for flexible approaches that not only take into account the needs of the sending institutions but also those of the host institutions. The additional skill enhancement trainings, field/industry attachment, regional and international exposure, and link to the wider community of graduate students and research community enhance the quality and relevance of training and wider interconnection across Africa. The iAGRI model presents learning opportunities for similar projects that are linked with academic mobility.

Key words Academic mobility, higher agricultural education, iAGRI, RUFORUM, Tanzania

Résumé

La réalisation de la sécurité alimentaire durable en Afrique, comme ailleurs, nécessite les efforts d'une équipe de spécialistes en agriculture bien formés qui sont familiers avec les contraintes et les besoins prioritaires nationaux et capables d'y apporter des solutions innovatrices. C'est dans cette perspective qu'un partenariat dirigé par l'Ohio State University et financé par l'USAID a été créé en 2011 entre six universités américaines à vocation agricole, le gouvernement tanzanien, le Forum des Universités Régionales pour le Renforcement des Capacités en Agriculture (RUFORUM), et les universités des pays du Sud en développement, pour mettre en œuvre l'Initiative de Recherche Agricole Innovante (iAGRI). L'objectif était d'aider à renforcer les capacités humaines et institutionnelles pour la recherche agricole pour le développement en Tanzanie. Dans le cadre de la mise en œuvre du programme, RUFORUM a été sous-traité par l'Ohio State University pour coordonner la formation des Tanzaniens dans des universités africaines sélectionnées pour le troisième cycle dans des disciplines agricoles identifiées comme étant prioritaires pour la Tanzanie. Le modèle de formation du projet iAGRI implique les cours académiques à l'Université d'accueil et la recherche en Tanzanie sous la supervision des superviseurs académiques de l'université d'accueil et un superviseur local de la Tanzanie; la majorité venant de l'Université d'Agriculture de Sokoine (SUA). Le modèle comprend également une participation obligatoire des étudiants à des conférences scientifiques, des formations courtes pour l'amélioration des compétences, et les voyages en Tanzanie par les superviseurs universitaires pour superviser leurs étudiants et s'entretenir avec les superviseurs tanzaniens. Au total 31 étudiants (30 MSc et 1 doctorat) sous la coordination de RUFORUM ont été placés avec succès dans neuf universités en Afrique orientale et australe pour entreprendre une formation de troisième cycle dans 16 programmes considérés comme étant stratégiques pour le Système National de Recherche et de Vulgarisation Agricoles (NARES) en Tanzanie. Sur les 31 étudiants placés, 65% ont terminé leurs programmes d'études et sont retournés à leurs institutions respectives en Tanzanie. Il est prévu que le reste finira leurs études supérieures à la fin de Février 2017. Les placements ont fourni une plate-forme pour l'exposition et l'apprentissage mutuel entre les institutions participantes et les étudiants ont acquis les compétences nécessaires pour contribuer efficacement au développement du secteur agricole en Tanzanie. Ils ont également été en contact avec près de 2000 étudiants et diplômés à travers l'Afrique. Le processus de mise en œuvre du programme a démontré la nécessité d'adopter des approches flexibles qui non seulement prennent en compte les besoins des établissements d'origine, mais aussi ceux des institutions d'accueil. Les formations de perfectionnement des compétences supplémentaires, les stages, l'exposition régionale et internationale, et la connexion avec une grande communauté estudiantine et des chercheurs améliorent la qualité et la pertinence de la formation et les échanges intellectuels à travers l'Afrique. Le modèle iAGRI dégage des leçons pour des projets similaires qui sont liés à la mobilité académique.

Mot Clés La mobilité académique, l'enseignement supérieur agricole, iAGRI, RUFORUM, Tanzanie

Background

The African continent desperately needs innovative support to develop skill sets that will substantially increase agriculture productivity in an environmentally sound manner, at the same time improving the availability of nutritional foods (FARA, 2014). The case of Tanzania indicates that agricultural productivity has not made steady progress to usurp vulnerability to food insecurity. Rates of malnutrition are high even among food-producing households. With a high population growth rate, Tanzania will continue to face severe food shortages unless widespread agricultural productivity advances occur (iAGRI, 2012). A key strategy to deal with this challenge is building capacity to generate a critical human-resource to drive reforms and initiatives especially for agriculture-led development. Tanzania will need to continue advancing skill sets for agriculture research, science, technology, extension, innovations, policy and social learning to attain the agricultural and overall development goals such as improved nutrition and food security.

The National Agriculture and Research and Extension Systems (NARES) in Tanzania play key central role in conducting research and promoting innovations. However, the key NARES institutions including Ministry of Agriculture Food security and Cooperation, Ministry of Livestock Development and Fisheries, Agricultural Colleges and Research Institutions are constrained by a lack of diverse capacity to strengthen and coordinate training, research and outreach activities at national level (Beintema and Janstads, 2014). Over the years there has been reduction in staffing partly as a result of decentralization of extension activities in the country.

The USAID funded innovative Agriculture Research Initiative (IAGRI), a partnership of actors', was established in 2011 to strengthen training and collaborative research capacities of the NARES in Tanzania with a particular focus on Sokoine University of Agriculture and the Ministry of Agriculture, Livestock and Fisheries with the overall goal of improving food security and agricultural productivity in Tanzania. The project purpose is aligned with the Government of Tanzania Agricultural Sector Development Programme as well as themes and road map of the USAID Feed the Future initiative (Kraybill *et al.,* 2016). The project funded by the USAID Feed the Future Programme is led by Ohio State University in partnership with five U.S land grant universities (Michigan State University, Virginia Tech, University of Florida, Tuskegee University and Iowa State University) and the Regional Universities Forum for Capacity Building in Agriculture (RUFORUM).

RUFORUM, a consortium of 66 Universities in 26 African countries provides a platform to support and facilitate staff and student's placements and mobility within Africa. As such RUFORUM was engaged in the project to support Tanzanian students' training in other African countries. The paper analyze the students' placements system developed and tested under this project in regard to its ability to enhance the quality and relevance

of post graduate education for the Tanzanian agriculture sector, in comparison with other similar student placement systems. It also assess the effect of student's placement on universities outside Tanzania and on SUA's and NARS regional and international research collaboration.

Approaches used in placement of the students. The main scope of RUFORUM in the project implementation was specifically to facilitate students' placements, admissions, and co-supervision of students. In line with the Paris declaration for aid effectiveness (2005), placement for the country specific capacity building projects connotes matching degree programmes offered by universities with the identified national training priority needs. This is a key consideration in design of long term training needs in Eastern, Central and Southern Africa region (Beintema, 2014; ASARECA, 2015). RUFORUM worked with the coordinating units in both iAGRI project office at Sokoine University of Agriculture and Ohio State University in USA. They defined priority areas for students training (Table 1) and submitted to RUFORUM the list of students to be trained.

Table 1. Training piorities identified through stakeholder consultation process in Tanzania

• Agriculture Extension and Innovations
• Agribusiness
• Plant Breeding and Seed Systems
• Food Sciences
• Crop and Plant Protection
• Rural Development
• Aquaculture and Fisheries Sciences
• Agriculture Engineering
• Agronomy
• Food Sciences – Post harvest Technologies
• Agricultural Economics
• Food Sciences and Technologies
• Soil Sciences
• Dairy Sciences and Technology
• Land and Water Management

Source: iAGRI Project Needs Assessment Report (2011)

RUFORUM obtained academic documents from the selected students and identified the appropriate universities for admission. One of RUFORUM's comparative advantages in executing such a student placement initiative was that the RUFORUM Secretariat already had extensive connections established with all the potential host universities. The recruitment was done yearly basing on annual allocation by iAGRI and was aligned to the calendar year of the host university.

At each university they formed an academic advisory committee for the student, which included also a local supervisor from Tanzania, mostly at SUA. At the host university the students did one year course work, before returning to Tanzania for research. Both the academic supervisor from the host University and staff of the RUFORUM Secretariat visited the student in Tanzania to check on research progress and link with the home institution to enhance student's settlement at the home institutions. During the visit by the host university academic, they made presentations during seminars in Tanzania. During the training at the host university and subsequent research in the home country (Tanzania), the Secretariat maintained close contact with the students and the supervisors at the host university and in Tanzania. This was to help address emerging issues and ensure timely completion. The approach also included additional skill enhancement trainings and mentoring based on RUFORUM well tested model (Fig 1).

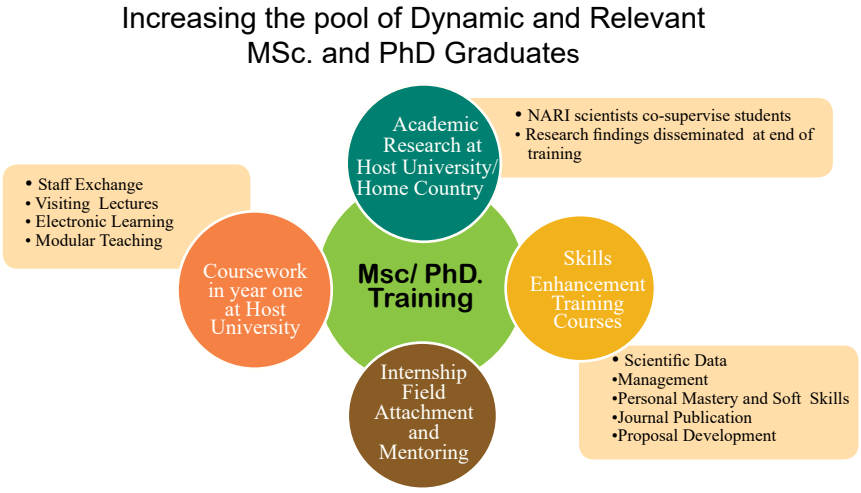

Fig 1: RUFORUM Postgraduate Training Model for Africa

All students received skill enhancement training at the host university and in Tanzania where students from the various universities were brought together for targeted training especially in research skills and publications and more recently (October 2016) on sharing of information through social media. A total of 12 such trainings were conducted and 122 students benefitted. In some cases the trainings involved also students that were being trained in the USA and at SUA.

A particular aspect of the training involved students' attachments to industry and to communities/institutions where they conducted their research. This involved students who had submitted their theses and were waiting for results. This was an important activity to help improve practical skills of the students and to enable the students gain experience in how to communicate their research results to end users, provide accountability for the investments made in their training and enhance linkage to industry. Five students benefitted from the attachments; others were not able to participate due to time constraint.

All students were given opportunity to participate in a local and an international conference to give them exposure to a broader scientific community and to network. Seven students attended the RUFORUM Biennial Conference in Maputo in 2014 and 23 students attended the Fifth African Higher Education Week Conference held 17-21 October 2016 in Cape Town, which had >800 participants. They were also able to participate in special skill enhancement training on communicating using social media and on data management. Further special attention was made to build the publication skills of the students including publishing in international peer reviewed journals. In total 31 conference papers and 15 journal publications have been generated by the students. As part of strengthening publication skills of the students, the students worked with a team of experts from the African Journal of Rural Development to guide them in their write-ups for publications as conference papers and or journal articles.

Effective student placements at member universities. The main aim of the RUFORUM's degree training approach is the production of proactive graduates through high quality and innovative training, and high quality research that is linked to outreach. As such, a principle of comparative advantage in locating appropriate host universities is at the heart of RUFORUM graduate placement model for the Member Universities. Specifically, this takes into consideration that placements are only made at host universities with adequate facilities including quality teaching staff, and learning facilities to handle postgraduate training responding to international, regional and national priority areas (Blackie, 2005). In the process each University used existing procedures to review the students' applications, offered admission with an understanding that the students would complete course work within the first year of study at the host university and carry out research in Tanzania, their home country, during part of the second year of studies.

Table 2 presents the results of the students' placement. RUFORUM had no difficulty in securing students placement, mostly because of the link with its member universities, and knowledge of the academic set up in the different universities. However, there were often delays in securing students releases from their home institutions. Also virtually all students initially wanted to do their training in South Africa or USA, but subsequent dialogue got them more interested to study within Africa. Some wanted to train in Tanzania yet the focus was to train outside Tanzania.

Enhanced skills for graduate students to improve quality of research publication. The iAGRI project provided opportunities for students to attend three skills extra-curricular courses: Proposal Writing, Scientific Data Management, and Scholarly publication. Skill enhancement training courses offers high potential for knowledge building, competency development in communication skills, scientific writing, ability to operate independently and practical implementation of research (Wanjiku, 2011). The courses were recommended by RUFORUM Alumni who also found these complementary to their technical and specific skills to make them fit in the job market (RUFORUM, 2014). Similarly, iAGRI students have appreciated the skills enhancement courses which, according to students, has attributed to accelerating production of publications in peer review international journals.

Figure 2 shows the number of students who benefitted from the training in three cohorts of students.

Table 2. Distribution of students placements across host universities

Participating University	Number of students placed
Egerton University, Kenya	4
Jomo Kenyatta University of Agriculture and Technology, Kenya	3
Kenyatta University, Kenya	1
Lilongwe University of Agriculture and Natural Resources, Malawi	4
Makerere University, Uganda	13
Stellenbosch University, South Africa	2
University of Nairobi, Kenya	3
University of Zambia, Zambia	1
University of Zimbabwe, Zimbabwe	1
Total	32

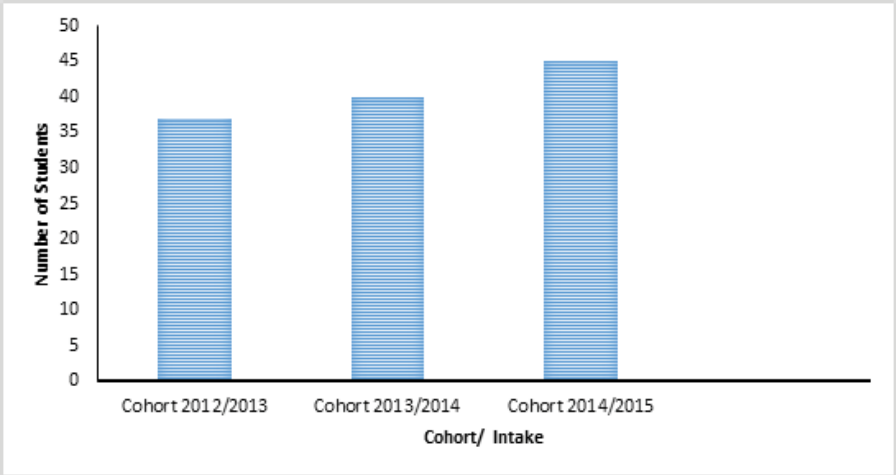

Figure 2: Students trained in skills enhancement courses by intake

Enhanced scientific communication through conference participation. Under the iAGRI training, each graduate student had opportunity to attend a scientific conference during the project period. This was done considering the fact that a major challenge that most young graduate students face is how to make effective public scientific communication and presentations (Toloudis, 2010). Corpas *et al.* (2008) argues that scientific conference exposes young researchers to a professional gathering and provides avenues for strengthening communication and publications while keeping them aware of current trends on the African continent. Figure 3 presents benefits realized as a result of conference participation as indicated by the iAGRI- supported students (RUFORUM, 2015b). According to Mpinganjira (2011), in many instances academics have realized spin-offs from contacts made during conferences leading to partnerships for collaborative research.

Enhanced partnerships and collaboration in research. A central component of the iAGRI project was the requirement for physical travel to Tanzania by the academic supervisors. The purpose of the field visits was not only to monitor their students' progress and meet local supervisors, but also to conduct seminar presentation to the Tanzania scientific community in a bid to forge potential partnerships and cross learning. The approach provided a good basis for future co-operation and networking of universities in Eastern, Central and Southern Africa (ECSA) region with Tanzania NARES in efforts to transforming the agriculture sector. If the outcomes of the seminar process are closely monitored beyond the presentations, the project will have multiplier effects from the interactions and collaborations. For instance through this, a network of academic supervisors at host universities and home country supervisors has been developed beyond the iAGRI student's supervisor. There are spin- offs realized including opportunities of external examiners partnerships and visiting guest lecturers between institutions in Tanzania and the participating host Institutions of the project outside Tanzania.

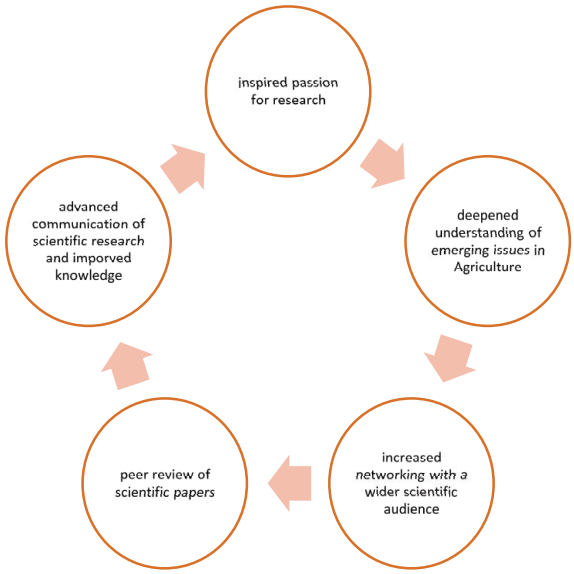

Figure 3: Benefits realized by students as a result of conference participation
Source: RUFORUM 2015b

According to Mpinganjira (2011) International collaborative research gives researchers access to international perspective on issues under investigation and provides empirical evidence from a number of sources to support research and outreach activities.

Building community of practice. The iAGRi project beneficiaries across the participating universities organized themselves into a community of practice. Not only did this play a vital role in social learning among the peers during the professional degree training period, it also continued to provide benefits beyond the study period through mutual engagements after the graduates' reintegration to the respective institutions in Tanzania.

Discussion

The iAGRI provided opportunity for RUFORUM to support training of 30 MSc and one PhD students in different universities in eastern and southern Africa. This provide opportunity for building a cadre of young scientists to support development of the agricultural sector in Tanzania. Importantly, the process helped to create a community of scholars and researchers in Tanzania and linked to other scholars and researchers across the African continent, since universities hosted the students from other parts of Africa and globally. Below are key observations and recommendations:

Capacity Building project planning and arrangements need to take into account existing structures: We noted institutional variations among the participating institutions in terms of graduate training structure and calendar (admissions, and graduation frequency across African Universities). Thus, we had to adjust training plans to suit individual university set-up.

Capacity building projects require innovative implementation approaches to enable implementers benefit from opportunities arising during the project implementation which may not have been earlier planned for: The programme was designed to undertake course work in host university and research in home country. In the course of implementation it was apparent that a 2 year programme with course work and research in some cases would be best done at host institution. For example, courses like Plant Breeding and Seed systems required students to commence research and setting up of experiments alongside the course work in order for them to complete their studies on time. We had to accommodate a few such cases.

Regular field monitoring and visits for capacity building activities are critical for timely completion. The process of tracking students at host universities and home country enhanced the understanding of the context in which the students were working. This enabled the implementer to set up proper measures for settling back of students in their home institutions and addressing concerns.

The project presented opportunity for participating institutions and their respective faculty to internationalize their programmes. This was evidenced by the measures some host universities put in place to facilitate timely completion of the students' study programs.

Quality assurance mechanisms are vital in students' recruitment processes. The scholarship award and recruitment process undertaken before students applied for university admission was very rigorous and effective with inbuilt quality assurance. During the implementation, none of the students selected for the scholarship failed admission or entry requirements to targeted universities. They also did not fail course work at the host univerrsity.

The success of the programme is attributed to identification of the students who were keen to pursue degree studies and contribute to the transformation of Agricultural sector in

Tanzania. For instance, one student through the Field Attachment Program Award (FAPA) has already mapped out action plans on how he will engage upon return to Tanzania especially concerning reducing postharvest losses which seems to be a major problem among the smallholder farmers.

Working with a network like RUFORUM has multiplier effects. As an example, in the case of RUFORUM there was an already existing structure for students' placements, and good mastery of procedures and facilities available in each university. RUFORUM also had experience in working in different countries and programmes, and had prior knowledge of the likely additional skill enhancement training for the students. In addition, the degree training at the host institutions provided opportunities for students to strengthen Africa – Africa linkages. Based on previous experience, these linkages and collaborative engagements will be sustained and serve as stepping stones for shaping rewarding career paths and for achieving greater regional integration.

Conclusion

The iAGRI training programme has helped to increase human resource capacity in diverse fields of specialization to support growth of Tanzanian agricultural sector. It is a good model for concentrating resources to build capacity at national level. The training program approach was also unique as it aimed at quality outputs; it went beyond the normal curriculum as prescribed by the universities in order to provide complementary skill sets. Moreover the students were given opportunity for career growth and have successfully reintegrated into their institutions not only with degree certificates but also with adequate hands on skills to proactively engage in transformation of the agricultural sector. Additionally, the project has fostered interaction among researchers in Tanzania and RUFORUM member universities and the graduates are already developing collaborative activities amongst the different institutions in Tanzania and other colleagues in different parts of Africa.

Acknowledgement

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References

Association for Strengthening Agricultural Research in Eastern, Central and Southern Africa (ASARECA). 2015. Capacity needs assessment in the ASARECA Region. ASARECA, Entebbe, Uganda

Beintema, N. and Janstads, G. 2014. Taking Stock of National Agricultural R and D Capacity in Africa South of the Sahara. Agriculture Science and Technology Indicators (ASTI). IFPRI. New York, USA.

Corpas, M., Gehlenborg, N., Janga, S.C. and Bourne, P.E. 2008. Ten simple rules for organizing a scientific meeting. *PLoS Comput. Biology* 4 (6): 1 – 3. doi: 10.1371/journal.pcbi.1000080.

Forum for Agricultural Research in Africa (FARA). 2014. Science Agenda for Agriculture in Africa (S3A): Connecting Science to transform agriculture in Africa. FARA, Accra, Ghana.

Global Forum for Agricultural Research (GFAR). 2011. Annual Report. FAO. Rome, Italy

Innovative Agricultural Research Initiative (iAGRI). 2012. Collaborative Research and Capacity Building of Sokoine University of Agriculture and the National Agricultural Research System. USAID – 11-003-RFA, Ohio State University, USA.

Kapucu, N. 2012. Classrooms as Communities of Practice: Designing and facilitating learning in a Networked environment. *Journal of Public Affairs Education* 18 (3):585-610.

Kraybill, D.S., Erbaugh, J.M., Minde, I.J. and Hansen, D.O. 2016. Improving the capacity of agricultural higher education institutions to contribute to food security: the iAGRI experience and lessons learned. *African Journal of Rural Development* 2 (1): 1-10.

Mpinganjira, M. 2011. The state of academic mobility in the SADC region. pp 23-38. In: Building Regional Higher Education Capacity through Academic Mobility. SARUA Leadership Dialogue Series Volume 3 Number 1. ISBN: 978-0-9869903-2-8

RUFORUM. 2014. Tracer study of RUFORUM Alumni. RUFORUM. Kampala, Uganda

Toloudis, N. 2010. Pedagogical conferences and stillborn professionalism among nineteenth Century instituteurs. *Journal of Paedagogical Historica* 46: 585-599. http://dx.doi.org/10.1080/00309230.2010.499725 accessed on 5 September 2016.

United States Government. 2011. Global Food Security Research Strategy, Feed the Future. US Government Initiative on Global Hunger and Food Security. https://www.feedthefuture.gov/sites/default/files/resource/files/FTF_research_strategy.pdf accessed on September 2016.

Wanjiku, J., Mairura, F. and Place, F. 2010. Assessment of professional training programmes in international agricultural research institutions: The case of ICRAF. *Journal of Agricultural Education and Extension* 16 (4): 413-431. http://dx.doi.org/10.1080/1389224X.2010.515064 accessed on 5 September 2016