

Research Application Summary

**Implementing human and institutional capacity development with agricultural higher education institutions: The genesis of iAGRI**

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**Abstract**

The Innovative Agricultural Research Initiative (iAGRI) is a long-term investment in agricultural higher education and research capacity in Tanzania funded by USAID under the Feed the Future initiative. The main goal of the iAGRI project was to improve food security and agricultural productivity in Tanzania by strengthening the training and collaborative research capacities of Sokoine University of Agriculture (SUA) and the Ministry of Agriculture, Livestock and Fisheries (MALF). The need for the project was identified by the Government of Tanzania and USAID who recognized that the agricultural training, research, and outreach capacity of SUA to boost food production and reduce food insecurity was lacking. The project was designed to address these gaps by focusing on multiple dimensions of capacity building including human resource development (long term degree training), collaborative research, institutional capacity development and improved linkages with other universities in the USA and in the Global South. The experience of The Ohio State University, partner US universities, and the Regional Universities Forum for Capacity Building in Agriculture (RUFORUM) in implementing earlier institutional development projects around the world and in East Africa informed the early design and approaches used to implement and address these capacity development components. Long-term degree training of Tanzania post-graduates occurred in the United States, at RUFORUM affiliated institutions in East and Southern Africa, and in India. Following the former collaborative research support program (CRSP) model, thematic collaborative research programs were launched in Tanzania that engaged scientists from partner universities in the U.S. with research scientists from SUA and MALF. Former projects that established enhanced linkages between agricultural higher education institutions (AHEI) and the private sector were implemented through new and innovative programmatic approaches such as the Innovation Portfolio. Through the course of project implementation, it became apparent that to improve institutional capacity there was a need to focus on organizational change and improved linkages with external stakeholders including the private sector, in tandem with human resource development to improve the administrative culture and working environment and transform SUA into a

21<sup>st</sup> century university. The leadership and change management initiative represented a unique departure from past capacity programs and as a major contribution of the iAGRI project to agricultural higher education institution capacity development initiatives.

Key words: Agricultural Higher Education, Feed the Future, iAGRI, Tanzania, USAID

## Résumé

L'Initiative de Recherche Agricole Innovante (iAGRI) est un investissement à long terme dans l'éducation agricole de troisième cycle et de la recherche en Tanzanie financé par l'USAID dans le cadre de l'initiative 'Feed the Future'. L'objectif principal du projet iAGRI était d'améliorer la sécurité alimentaire et la productivité agricole en Tanzanie, en renforçant les capacités de formation et de recherche collaborative de l'Université Agricole de Sokoine (SUA) et le ministère de l'Agriculture, de l'Élevage et de la Pêche (MALF). La nécessité pour le projet a été identifiée par le gouvernement tanzanien et l'USAID qui ont reconnu que la formation, la recherche, et la capacité d'extension agricole de SUA pour stimuler la production alimentaire et réduire l'insécurité alimentaire faisait défaut. Le projet a été conçu pour remédier à ces lacunes en se concentrant sur les multiples dimensions de renforcement des capacités, y compris le développement des ressources humaines (formation du cycle supérieur à long terme), la recherche collaborative, le développement des capacités institutionnelles, et l'amélioration des liens avec d'autres universités américaines, et les pays du Sud en voie de développement. L'expérience de l'Ohio State University, les universités américaines partenaires, et le Forum des universités régionales pour le renforcement des capacités en agriculture (RUFORUM) dans la mise en œuvre des projets de développement institutionnel dans le monde et en Afrique orientale ont informé la conception initiale du projet ainsi que les approches utilisées pour sa mise en œuvre afin de répondre à ces composants de développement des capacités. La formation de troisième cycle des étudiants tanzaniens s'est déroulée aux États-Unis, aux institutions en Afrique orientale et australe membres du RUFORUM, et en Inde. Suite à l'ancien modèle du programme de soutien à la recherche collaborative (CRSP), les programmes de la recherche collaborative thématique ont été lancés en Tanzanie ; engageant des scientifiques des universités américaines partenaires avec des chercheurs de SUA et MALF. Les anciens projets qui ont établi des liens solides entre les institutions agricoles d'enseignement supérieur et le secteur privé ont été mis en œuvre par le biais de nouvelles et innovantes approches programmatiques telles que le portefeuille d'innovations. Tout au long de la mise en œuvre du projet, il est devenu évident que, pour améliorer la capacité institutionnelle, il était nécessaire de mettre l'accent sur le changement organisationnel et l'amélioration des liens avec les intervenants externes, y compris le secteur privé, en tandem avec le développement des ressources humaines pour améliorer la culture administrative et l'environnement de travail permettant de transformer SUA en une université du 21<sup>e</sup> siècle. L'initiative du leadership et la gestion du changement a été prise comme un départ unique pour améliorer des anciens programmes de capacités et comme une contribution majeure du projet iAGRI aux initiatives de développement des capacités des établissements d'enseignement agricole au cycle supérieur.

Mots clés: Education Supérieure Agricole, Feed the Future, iAGRI, Tanzanie, USAID

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## **Introduction**

Agricultural development is fundamental to economic growth and poverty alleviation in sub-Saharan Africa (SSA). Yet, in many of these largely agrarian countries, low agricultural productivity, low incomes, malnutrition, and food insecurity persist. University contributions to sustainable agricultural development in sub-Saharan Africa, have been well documented (Eicher, 2004; Bloom, 2005; World Bank, 2007; Montenegro and Patrinos, 2013). In an increasingly knowledge-based global economy, nations that fail to produce well-educated people will find it increasingly difficult to take advantage of emerging innovations such as biotechnology and genomics and to use science as a development tool. New evidence provided by the World Bank indicates that the greatest social and economic rates of return for investment in education globally are for higher education in Africa, and that they are almost twice that for basic and secondary education (Montenegro and Patrinos, 2013). Relying on technology transfer from the outside is short-term and has not proven to be sustainable. Strengthening agricultural higher education institutions (AHEIs) creates the institutional foundation necessary to sustain agricultural growth and transformation (Ojijo *et al.*, 2016).

The U.S. Agency for International Development (USAID) and U.S. land-grant universities played an important early role in building the agricultural science and technology capacity of many universities in sub-Saharan Africa (Eicher, 2003). Institution building projects, as they were then called, focused on human capacity development through post-graduate degree training programs, building nascent administrative and research capacity, and building classrooms and laboratories. The modus operandi was long term partnerships that twinned US universities with AHEIs on the continent. The first of these was between Oklahoma State University and Alemaya University of Agriculture in Ethiopia from 1952-1968, with other institutional partnerships following in Malawi, Morocco, Nigeria, Kenya and Uganda. Former Professor Emeritus from MSU Carl Eicher, termed this as the “Golden age of conviction by donors, foundations and academics that sizeable resources should be invested in human capital and institution building because these two were the prime movers of agricultural development.” (Eicher, 2004). Most of these institution building projects and degree training efforts continued through the early 1990s.

## **Decade of neglect**

However, during the 1990s, USAID and many other donors withdrew most of their support for African university capacity building and for long-term graduate student training in the U.S. The number of graduate students supported by USAID from developing countries in all disciplines dropped from 9,128 in 1990 to around 1,200 by 2000 (BIFAD, 2003). The decline in support for agricultural and rural development degree training in the U.S. over this period was even more dramatic, from 310 students in 1990 to 82 (largely supported by the Collaborative Research Support Programs - CRSPs) in 2000. This resulted in markedly reduced visibility of American institutions within African higher education and policy circles (Erbaugh *et al.*, 2009).

The decision by the international donor community and African governments to reduce investments in agricultural higher education institutions was attributable to many factors, including donor perceptions that investments in primary and secondary education contributed more than tertiary education to economic growth and poverty reduction, political strife, shifting donor priorities (emphasis on health improvement and poverty alleviation, and structural adjustments), and donor perceptions that long-term degree training and institution building programs were non-sustainable and had had limited impacts on development (Bloom *et al.*, 2005). Faced with stagnant or declining national investments for higher education and rapidly increasing undergraduate enrollments, African AHEIs were left with overcrowded and deteriorating facilities, depleted faculty numbers, and diminished instructional and research capabilities. Public concerns mounted about the ability of universities in general and AHEIs in particular to meet the emerging needs of society and contribute to economic growth (World Bank, 2007).

### **Renewal of commitment**

In 2003, the Board for International Food and Agricultural Development (BIFAD) proposed that USAID should renew its investment in global long-term training and capacity building in agriculture and rural development. USAID recognized the need to reinvest in institutional capacity development and long-term graduate degree training. Unfortunately, its institutional memory and organizational capacity to implement these projects had been dissipated, as had its partnerships with US Land-grant universities. In 2004, USAID provided limited funding to Higher Education for Development (HED) to develop three pilot long-term degree training and capacity-building partnerships between U.S. and African universities. Since then there has been a resurgence of interest among donors to revitalize AHEIs. With the advent of the USAID Feed the Future initiative, strengthening AHEIs through human and institutional capacity development (HICD) initiatives have again emerged as an important strategy for addressing food security constraints and sustaining agricultural development (Erbaugh *et al.*, 2009).

Like many other U.S. land-grant colleges of agriculture, The Ohio State University's College of Food, Agricultural and Environmental Sciences (OSU/CFAES), has a long history of implementing international development and institution building projects around the world. OSU's experience began in 1955, when it was invited by the nation of India to work with 3 states in India to develop land-grant colleges of agriculture, complete with the three traditional land-grant missions of teaching, research and outreach or extension, all under a university umbrella. Since then OSU has been engaged in similar institution building efforts in Brazil, the Dominican Republic, Swaziland, Uganda, Kenya, Senegal and now Tanzania. OSU drew upon these previous human and institutional capacity development (HICD) experiences, to inform implementation of the Innovative Agricultural Research Initiative (iAGRI) project in Tanzania.

The purpose of this paper is to describe the rationales and key approaches that define the iAGRI model of human and institutional capacity development (HICD). It will draw upon

lessons learned from earlier HICD initiatives implemented by OSU that informed the design and implementation of iAGRI.

### **Genesis of iAGRI**

In Tanzania, increasing agricultural productivity remains central to improving food security and economic growth, particularly since it has a largely agrarian-based economy with 73% of its nearly 48 million people living in rural areas and 77% of its population reliant on agriculture as their main form of livelihood. The agriculture sector also accounts for 27% of GDP and 85% of export earnings (USAID, 2014). Demographic trends indicate that most Tanzanians will be engaged in agriculture for the next 15-20 years, including a 2.8% population growth rate that will see Tanzania's population double and urban population surpass rural population by 2050; 65% of the population being less than 25 years of age; and growth in wage jobs remaining less than the number of people entering the labor force. Yet agricultural productivity remains low and the agricultural sector's annual growth rate of 5% per year over the last decade, remains below national and regional targets, and is insufficient to significantly reduce rural poverty and improve national food availability per capita.

Given the burgeoning population of Tanzania and the major demographic shifts it was experiencing, the Government of Tanzania and USAID recognized that the agricultural training, research and outreach capacities of the major agricultural support institutions to improve agricultural productivity, boost food production and reduce food insecurity was lacking. The Innovative Agricultural Research Initiative (iAGRI) was designed to address these gaps by focusing on multiple dimensions of capacity development to strengthen the training and collaborative research capacities of Sokoine University of Agriculture (SUA) and the Ministry of Agriculture, Livestock and Fisheries (MALF) to address these food security challenges in Tanzania

The iAGRI was conceived as a long-term investment in agricultural higher education and research capacity in Tanzania funded by USAID under the Feed the Future initiative. It was led by The Ohio State University in conjunction with five other U.S. land grant universities and the Regional Universities Forum for Capacity Building in Agriculture (RUFORUM). The main goal of the iAGRI project was to improve food security and agricultural productivity in Tanzania by strengthening the training and collaborative research capacities of Sokoine University of Agriculture (SUA) and the Ministry of Agriculture, Livestock and Fisheries (MALF). The project's 4 major objectives were to: 1) implement a program of collaborative agriculture research with SUA and MALF; 2) provide advanced degree training programs in agriculture for 135 Tanzanian graduate students; 3) strengthen the capacity of SUA to develop and implement instructional, research and outreach programs in agriculture; and 4) promote cooperation between SUA, U.S. universities, and global south universities.

### **Building on previous HICD experiences**

In many ways iAGRI represents an extension of previous human and institution building efforts undertaken by OSU in East Africa and elsewhere. These efforts also involved long-

term degree training and institutional capacity building as well as strengthening linkages with counterpart institutions in the region. They also had a heavy emphasis on strengthening agricultural research capacity and funding research that addressed important agricultural production constraints. These past experiences of OSU, its partner U.S. universities, and RUFORUM, in implementing institutional capacity development projects informed the design of iAGRI. They suggested approaches that could be used to address various dimensions of capacity building.

The OSU's past engagements in institutional capacity development in India, Brazil, Uganda and Kenya suggested some general partnership success preconditions, namely: (1) These programs require significant amounts of time and resources, to be successful; (2) partnerships take time to evolve because they are based on trust which takes time to develop; 3) long term partnerships require adequate resources and require national and institutional commitment on both sides; and (4) in order to be successful, they need to be partner led, which requires working closely with administrative counterparts. These and later HICD efforts emphasized the importance of conducting needs assessments and strategic planning to ensure that project planning is informed by actual situational analyses and allow partners to participate in the design of their own projects and related work plans (Kahi *et al.*, 2014).

Trust had been built between OSU and SUA over a period of ten years prior to the initiation of iAGRI. During this time, OSU and SUA undertook a succession of 6 smaller projects. These projects enabled OSU to familiarize itself with the national Tanzanian agricultural context and its evolution, as well as to get to know many SUA staff on a personal basis. The need for strategic planning was built into the original design of iAGRI during the first year of the project as a needs assessment of the Tanzanian Food System, to determine priority training and research needs for graduate students and collaborative research projects.

The need for degree training to restock human capital at SUA and MALF was specifically mentioned in the iAGRI request for proposal (RFP). It was noted in this document that many senior scientists were on contract or nearing retirement and that post graduate degree training programs were necessary to rebuild scientific and research capacity at these two institutions. Several prior OSU projects contributed to the design of the iAGRI post-graduate degree program. From 1983-1993, OSU managed and led the Uganda Manpower for Agricultural Development Project (MFAD) and then a follow-on project titled Agricultural Research and Training Project (ARTP) with Cornell funded by the World Bank. Through these two projects, 50 post-graduate degree programs were administered and completed through partner universities in the US.

From 2005 – 2009, OSU led the Higher Education Partnership Program (HEPAD), which was a pilot effort with SUA, Makerere and Egerton universities, to implement long term degree training programs with US universities. It was considered to be a pilot project because USAID was interested in renewing its investments in long-term training and capacity building, which had been neglected during the previous decade. It needed to relearn and rebuild its knowledge base for implementing these programs. This project, was managed regionally by RUFORUM, and included the provision of short-term faculty development

activities, programs to strengthen linkages between these universities and agribusinesses and provision of degree training programs in the US. Innovative degree training design features included a merit based process for selecting candidates, sandwich degree programs, involvement of regional and US faculty mentors for each student, and the provision of seed-grants to support in-country research.

These experiences suggested that post graduate degree training programs improved the scientific and research capacity at these institutions by filling critical gaps at them with high quality, motivated individuals. Post project evaluations indicated that Deans at each of the respective institutions valued degree training in the U.S. because students were exposed to (a) the land grant model where research and outreach are integrated with the instructional mission; (b) modern and rigorous curricula; and (c) demand-driven, applied problem solving research. At the end of the MFAD project the Dean at Makerere University and the Director General of NARO mentioned that the most valuable part of the project was the degree training because technical assistance was short-term and degrees contributed to long-term capacity development. The HEPAD project also demonstrated the value of working with higher level administrators in the design and implementation of the program and the value of working through a regional organization that was familiar with regional universities. RUFORUM knew the region and our three partner universities well; and provided the U.S. universities with a single point of contact for in-region project administration that facilitated fiscal and program implementation.

The Trilateral Program for Food Security was a partnership between Egerton University and Ohio State University in collaboration with the Punjab Agricultural University (PAU), a long-term South Asian partner of OSU. It was implemented between 2011- 2014. In addition to building the capacity of Egerton University to conduct applied problem solving research and provide outreach services related to mushroom production and beekeeping, this project also focused on building capacity in agribusiness management and outreach. By the end of the project, Egerton had established laboratories for both on its campus, developed classroom and extension teaching materials, and provided short-term training to beekeepers and mushroom producers. The project strengthened its agribusiness curriculum and outreach programs by developing a course on value chain management that was taught to all undergraduates on the Egerton campus; enhancing the university internship program through the preparation of an internship guidance manual; and developing an agribusiness outreach program that included workshops to local agribusinesses on developing business plans, business record keeping, marketing of agribusiness products, and loan applications. Egerton's capacity to teach these skills was strengthened as a result of these inputs. The contribution of this project to the design of iAGRI included recognition of the importance of building university linkages to the private sector agribusiness and the need to broaden SUA's South-South linkages. It led to the inclusion of PAU as a location for placing Tanzanian graduate students.

The design of the iAGRI collaborative research program was informed by OSU and US partner institutions past engagements with Collaborative Research Support Programs (CRSP), including the IPM and INTSORMIL CRSPs in Tanzania. The CRSP model was designed to strengthen the HICD of participating institutions. Various elements of this model

were incorporated into the design of iAGRI including the conduct of research on prioritized themes or specific development challenges, building multi-disciplinary and multi-institutional teams to address these challenges, and integrating human capacity development (degree training) with the conduct of research.

The importance of building linkages with the private sector stakeholders is now recognized as critical to developing the capacity of AHEIs (World Bank, 2007; USAID, 2014). These linkages are increasingly important as private sector agribusinesses emerge as major contributors to agricultural growth and important employers of agricultural graduates. Using funding from USAID through a higher education partnership program, OSU partnered with SUA in 2002-2004, to build its capacity in agribusiness management. The project's purpose was to improve business-oriented training and outreach activities at SUA through building enhanced linkages with the private sector agribusiness. In effect, it showed how to improve these linkages, and through them, to enhance the relevance of graduate student education. This and other project experiences resulted in a model consisting of a series of eight activities that strengthen the linkages between AHEIs and the private sector (Erbaugh and Hansen, 2015).

From the beginning of the iAGRI project, it has facilitated and catalyzed the creation and nurturing of SUA's linkages with the private sector and has put in place several programs for promoting public-private partnerships. One example is The Innovation Portfolio developed by iAGRI at SUA, to train researchers and graduate students how to attract sponsored-research monies from private firms to facilitate the commercialization of agricultural innovations. The Innovation Portfolio initiative is also building the university's capacity to attract private firms to set up corporate research, demonstration, and training centers on university land.

## **Conclusion**

The OSU's prior engagement in human and institutional capacity building efforts contributed to the design and implementation of iAGRI and to each of its 4 major objectives. These past experiences provided a broad tool-kit that allowed strategies to be selected, applied, and adapted to the unique HICD context provided, in this case, by SUA in Tanzania. Perhaps most importantly, these past experiences reinforced the need to engage stakeholders in ongoing research, teaching and outreach activities. This is especially true for private sector stakeholders. It was serendipitous that many previous activities also involved interactions with leaders and academic and research staff at SUA. They helped build the necessary conditions for successful partnerships and program implementation.

The iAGRI degree training activities were informed by previous project experience administering these programs in the U.S. and in the region with RUFORUM. Various degree training models and features such as sandwich degrees, U.S. versus local degree training, co-supervision using mentors from Tanzania and from the university granting the degree, and efficient fiscal management of tuition and research funding, were derived from these previous programs, and incorporated in to the iAGRI training model. These past

best-practices were critical to iAGRI's ability to move quickly in implementing the selection, placement and administering of over 135 Tanzanian student degree programs.

The Tanzanian Food System needs assessment conducted at the onset of iAGRI informed the development of collaborative research projects involving partners from OSU Consortium member institutions, SUA and MALF research stations. This study also informed students about priority topics for research and guided the placements of students into high priority graduate degree programs.

Previous project efforts to link AHEIs directly with agribusiness and other stakeholders, including NGOs and civil society representatives, also informed iAGRI about how to facilitate these linkages with SUA. These linkages have been promoted by iAGRI through the Innovation Portfolio and capacity building efforts designed to enable SUA to be more responsive to the needs and interests of external stakeholders.

Building on previous collaborations related to HICD in East Africa, we have come to realize that capacity development activities need to take a broader multi-dimensional approach that implies the need to effect institutional transformation along with training, research and outreach activities. We recognize that human capacity development efforts must be done in parallel with the institutional capacity development efforts. iAGRI activities addressed the institutional change component focused on enhancing capacity for using ICTs, building public public-private-partnerships (PPPs), and a new component that addressed organizational leadership and change management. The leadership and change management inputs represented a unique departure from many past capacity programs. Informal working sessions among members of administration and academic staff have been initiated by iAGRI and have led to organizational experiments. They are designed to change the culture and administrative processes at SUA, with a view to making them more agile in addressing the changing environment and challenges confronting SUA.

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