

**ASSOCIATION OF AFRICAN UNIVERSITIES (AAU)**  
12th General Conference  
Abuja, Nigeria  
May 4 – 9, 2009  
Sustainable Development in Africa: The Role of Higher Education

**Strengthening Capacity for innovation in Africa's Agricultural Industry: A case for learning platforms**

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**Abstract**

The development of Africa's most diverse industry, agriculture, has relied on official programmes and projects which are based on the heroic assumption that the human and institutional capacity will be there when needed, without committing to the investment required to build that capacity. Traditional capacity strengthening approaches involving strengthening of disciplines and skills have had disappointing impact on the livelihoods of smallholders because the trainees have been constrained from achieving what they have been trained to do by institutional capacity weaknesses.

This paper discusses how agricultural research systems and African tertiary agricultural education networks could work to integrate development agenda and programmes into their actions and create learning platforms that will strengthen Africa's endogenous capacity for agricultural innovation. The paper uses the Forum for Agricultural Research in Africa's (FARA) SCARDA initiative to provide an example of how the required capacity to enable Africa to sustainably feed its present underfed, malnourished and increasing population could be achieved by better integration of research organizations, universities and African tertiary education networks plans and actions with major development initiatives such as the Comprehensive Africa Agriculture Development Programme (CAADP).

Key words: innovation, development, education, research, integration, learning platform

**1. Introduction**

Nearly 65% of Africans, over 400 million people, depend on agriculture as their primary source of livelihood. Of these, smallholder farmers account for more than 90% of total agricultural production. Together with the relatively small commercial farming sector they account for 27% of GDP in Africa (FAO, 2006). This could be greatly increased if Africa could improve productivity and capture more of the potential value additions from processing and marketing. The scope for increased earning is illustrated by cocoa farmers, mainly Africans, who earn about

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US\$4 billion for their products while global chocolate sales are worth about US\$ 75 billion (Independent News, 4<sup>th</sup> March, 2009).

With rising demand from expanding, and over time richer populations, there is growing interest amongst foreign investors in opportunities for agricultural production and processing in Africa. But without the critical mass, in terms of quantity and quality, of human and institutional capacity Africa will remain a major source of raw commodities with others capturing most of the value adding and employment opportunities. The persistent capacity shortage has raised offshore investors' interest in buying or leasing land in Africa to produce food and other commodities rather than depending on being able to buy them from African producers.

Well performing education systems and effective research institutions are important contributors to economic development. This was stressed at the World Summit on Sustainable Development held in Johannesburg in 2002. In African agricultural research and tertiary education institutions this is constrained by the urgent need for higher caliber professionals and technicians to replace the many impending retirees as well as for addressing the many emerging issues such as globalization, the food and financial crises and climate change. However, the agricultural courses offered by tertiary educational institutions are too often delivered from outdated, narrowly defined and specialized perspectives insufficiently influenced by the needs of the agricultural industry (IBRD, 2008). This has, ironically in the face of the demand for agricultural professionals, resulted in a high level of unemployment and underemployment of agricultural graduates and it is compromising the universities' ability to provide the next generation of scientists. Despite the urgent need for more research the universities are also under-utilised for publicly-supported science which is a serious loss for agriculture-based economies.

## **2. The challenge**

*“Until it learns to grow its agriculture, Africa is unlikely to register significant developmental advances” Johanson and Saint (2007)*

Current global challenges, such as high population growth, climate change, natural resources degradation, low agricultural land productivity, food and water insecurity, energy deficiency, increased health problems and decreasing economic power, are all interlinked. Bringing together science, technology, industry and other development stakeholders is therefore of paramount importance to attaining the required rapid and sustainable agricultural development in Africa.

The Commission for Africa (2005) concluded that “Skilled professionals are key to building improvements in the administration and technical ability which Africa so gravely lacks. The international community should commit in 2005 to provide US\$500 million a year, over 10 years, to revitalise Africa's institutions of higher education and up to US\$3 billion over 10 years to develop centres of excellence in science and technology, including African institutes of technology.”

Many studies have shown that agricultural education and training is a vital but neglected component of agricultural development in Africa. It is under-valued, under-resourced and under-

provided. Despite being aware that global trends in market-driven agriculture and agriculture innovation systems place new demands on the knowledge and skills of those working in the agricultural sector, human capital in agriculture has been depleted by long term neglect. Continuing that neglect will constrain agricultural recovery, economic growth and poverty reduction in Africa. (Johanson and Saint 2007).

Addressing the shortcomings of current approaches to human capital formation in agriculture and producing a new generation of agricultural professionals in Sub-Saharan Africa will not be a quick fix. Long-term, patient support will be needed from government, agricultural education and training institutions and development partners over twenty years or more. Johanson and Saint (2007) proposed a strategic framework with short and long-term elements (box 1)

### **Box 1 Strategic Framework**

#### **In the short term the proposed:**

- Modernizing teaching methods and curricula at the tertiary level, along with the necessary teaching inputs;
- Improving institutional linkages (e.g., strategic partnerships, professional networks, collaboration incentives) and knowledge access (e.g. TEEAL, AGORA, computers);
- Persuade development partners to fund essential operational and equipment maintenance costs;
- Conducting labor market studies and establish a labor market monitoring capacity;
- Working to make the agricultural professions attractive employment and career options, while recruiting many more women into this field; and
- Creating networks and associations that can champion the cause of agriculture, and learn lobbying techniques to generate supportive political will.

#### **For the longer term they proposed:**

- Re-balancing agricultural education and training enrollments in favor of diploma, degree and especially postgraduate programs.
- Strengthening and expand strategic MSc. programs, including associated staff development, so that all standard MSc programs for agriculture are available in Sub-Saharan Africa within ten years.
- Broadening the foundation for regional PhD programs by launching a major program of postgraduate fellowships to train 1000 PhDs, initially abroad and eventually at home, over 15 years.
- Taking a more proactive approach to agricultural education and training financing by improving the efficiency of resource use, increasing income generation from non-public sources (e.g., market oriented short courses), and persuading donors to finance operating costs. Much of this could be implemented partly or fully through various types of multi-donor competitive funds at national and regional levels.

Human and institution capacity deficits apply to both the public and private sectors (IAC 2004, AAU 2001, WSSD 2002, Juma and Serageldin 2007) and is exacerbated by the under representation of women in agricultural careers, even though the majority of African farmers are women. Several studies including FARA (2004) have also identified serious capacity weaknesses in African national agricultural research institutes (NARIs), agricultural training colleges and

university faculties of agriculture. These have been found in management systems and competencies and in science and technology. There are also serious weaknesses in capacities to form and sustain the essential partnerships, particularly in regard to public and private agricultural advisory service and farmers' organizations.

### **3. The Opportunity**

#### ***3.1 A new African Agenda***

Recognizing that African agriculture must grow at 6% per annum over the next 20 years to get production ahead of population growth and make a real difference in food security and affordability, African governments in 2002 adopted the Comprehensive Africa Agriculture Development Program (CAADP) under the auspices of the African Union's New Partnership for Africa Development (NEPAD, 2001). CAADP is a framework within which the actions of all stakeholders in agricultural development can be better focused and resourced to address the escalating poverty levels, underdevelopment and continued marginalization of Africa.

NEPAD's principles include the need for partnership between and amongst African peoples and ensuring that these partnerships are aimed at achieving the Millennium Development Goals (MDGs). NEPAD's Capacity Development Strategic Framework (CDSF) identifies African Universities, tertiary and research institutions as key drivers of capacity development, with the potential to produce relevant knowledge and cadres for the continent.

CAADP has four pillars:

- Pillar I: Land and water management
- Pillar II: Rural infrastructure and trade-related capacities for improved market access
- Pillar III: Increased food supply and reducing hunger
- Pillar IV :agricultural research, technology development and dissemination with crosscutting capacity strengthening

The success of each of these pillars will ultimately depend on the implementing institutions in both the public and private sectors having sufficient human and institutional capacity to carry out the ambitious development programmes. However, it is evident that Pillar I will be constrained by shortages of soil and water scientists and technicians as well as by the lack of sufficient water and irrigation engineers. Pillar II is facing a shortage of capacity in policy analysis and trade negotiations which is very critical in this era of globalisation. Pillar III requires more nutritionists and people with skills in food security at the household, national and regional levels. Pillar IV is short of research managers to take over from a retiring leadership as well as of suitably qualified scientists and technicians.

CAADP Pillar IV confers critical responsibility for producing the new knowledge required to overcome Africa's persistent and seemingly intractable constraints to improved agricultural productivity. Underpinning this is the demand for not only strengthening the human and institutional capacity of agricultural research and development institutions but also for strengthening Africa's capacity to build capacity. Linking capacity strengthening strategies with strategies for sustained capacity to produce new capacity is the only way to ensure that

improvements in the performance of the institutions can be sustained over the medium and long terms. The prime responsibility for creating and maintaining this continuum rests with public and private agricultural research, development and training institutions working at the national level. To create a context in which such collaboration can be established and maintained African national agricultural research systems have formed sub-regional organisations (SROs)<sup>3</sup> to promote collaboration between neighbouring countries. The SROs have in turn established the continental Forum for Agricultural Research in Africa (FARA) as the apex institution for agricultural research at the continental level.

### ***3.2 New leadership in driving an African agenda***

The Forum for Agricultural Research in Africa (FARA)<sup>4</sup> is the Lead Institution mandated by the African Union Commission and NEPAD for the fourth pillar of CAADP which encompasses agricultural research, technology development and dissemination with cross cutting capacity strengthening. As a first step towards implementing this responsibility FARA spearheaded the development of the Framework for Africa's Agricultural Productivity (FAAP).

The FAAP provides guidelines and principles applicable to NEPAD's Capacity Development Strategic Framework (CDSF) which calls for Africa to undertake (i) Knowledge based and innovation-driven processes that enhance fact and evidence based decision making and encourage increased investments in knowledge and scientific institutions and science and technology; (ii) Adaptive capacity development institutions driving a progressive agenda for capacity development and producing entrepreneurial client-oriented cadres; and (iii) utilizing African potentials, skills and resources for development by mobilising Africa's own financial and human resources for development and transformation - locally, continentally, and globally. Both NEPAD and FARA believe that to achieve sustainable change, Africa must develop and sustain its own human and institutional capacity to generate, innovate and adapt science and technology to the productivity of farmers. Amongst its responsibilities for leading CAADP Pillar IV, FARA has to catalyse, advance and facilitate responses to the serious human and institutional capacity deficits which have been repeatedly cited as severely constraining African agricultural development (Declaration by the African Union, Sirte, (2004) among others).

## **4. African learning platform on agricultural innovation: The SCARDA case**

FARA's programme for 'Strengthening Capacity for Agricultural Research and Development in Africa' (SCARDA), which is funded by the United Kingdom Department for International Development (DFID) and implemented through the Sub Regional Organizations (SROs)<sup>3</sup> is pioneering a novel approach in 12 Focal Institutions in Botswana, Burundi, Congo, The Gambia, Ghana, Lesotho, Mali, Rwanda, Sudan, and Zambia and. SCARDA has adopted an holistic management and research capacity strengthening which is based on participatory identification

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- Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA)
- Conseil Ouest et Centre Africain pour la Recherche et le Développement Agricoles/ West and Central African Council for Agricultural Research and Development (CORAF/WECARD)
- Food Agriculture and Natural Resources Directorate (SADC-FANR) of the Southern Africa Development Community (SADC)

<sup>4</sup> "FARA's value proposition is the provision of a strategic platform to foster continental and global networking that reinforces the capabilities of Africa's national research systems and sub-regional organizations."

of the weaknesses that need to be addressed in both management and science. The capacity strengthening events to address the weaknesses are underpinned by constant learning, reflection and adaptation. The aim is to ensure that capacity strengthening based on thorough institutional analyses becomes a constant feature in the way that institutional change is managed to keep abreast with the changing industry that the institutions are serving and that they take full advantage of the methods, tools and aids that are becoming available in the fields of agricultural research, teaching and learning.

#### ***4.1 SCARDA objectives and outputs***

The SCARDA goal is “*to strengthen the institutional and human capacity of African agricultural research and development systems to identify, generate and deliver research outputs that meet the needs of poor people.*” SCARDA has two components of strengthening (a) Competencies and capacity in agricultural research management, (b) Capacity for professional development in agricultural research and development. SCARDA’s expected four outputs are defined as follows:

1. Agricultural research management systems and managerial competencies to conduct high quality research strengthened;
2. The capacity to undertake quality agricultural research for development sustainably strengthened;
3. Tertiary agricultural education and training institutions empowered to match capacity building offer to changing market demand;
4. SCARDA approach for capacity strengthening is continuously documented, validated with and owned by key stakeholders.

#### ***4.2 SCARDA Innovative Elements***

##### **4.2.1 Continuous Consultation with Partners**

The SCARDA programme was borne out of the assessment of National Agricultural Research Systems (NARS) in Africa commissioned after a FARA/SRO retreat in 2003 with key recommendations for the NARS (FARA, 2006) (see box 2).

After the NARS assessment, a follow-on regional workshop involving leaders of tertiary agricultural training institutions, national agricultural research institutions, development partners, regional and international training and research networks and some Northern training and research organizations was organized to develop the conceptual framework and craft the final SCARDA’s eventual content and approach.

A third regional workshop was convened to launch the inception phase in February 2007, after the proposal had been accepted for funding by the Department for International Development (DFID) of the UK.

Continental and sub-regional level stakeholder workshops were subsequently used to develop an implementation plan for the project. Scoping studies and stakeholder consultations identified focal institutions across Sub Saharan Africa for the programme.

Box 2: NARS assessment recommendations (FARA, 2006)
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The NARS assessment recommended a combination of options for improving the impact of Africa's agricultural research. These included:

-Addressing weaknesses in governance, management, scientific capacity and partnership arrangements of National Agricultural Research Institutes (NARIS) and other components of NARS, such as the universities.

-Strengthening NARS scientific capacities through collaborative programmes with the main focus being on strengthening national and sub-regional training capacities for agricultural research.

-Strengthening collaboration by promoting adherence to the guidelines and principles of the Framework for African Agricultural Productivity (FAAP) .

During the implementation, which started in 2008, SROs have implemented the holistic and participatory approach through workshops and constant consultation of their sub-regional partners and Lead Service Providers to elaborate their work plans and implementation strategies. Five major stakeholders categories are always involved in the SCARDA consultations. These include;

1. *Policy institutions*: These include policy institutions that inadvertently influence capacity building, by setting priorities and targets.
2. *Demand side institutions*. These are key actors needed to effectively and efficiently operationalize national agricultural innovation systems. They included users of agricultural research products and services such as farming communities.
3. *Supply side institutions*. These are research institutions that generate research outputs e.g. universities, Public Agricultural Research Institutions and Private Sector Research Institutions.
4. *Intermediary organizations*. These included institutions that enhance adoption and value addition in the innovation process, such as advisory/extension service providers, input suppliers, value addition and marketing chains.
5. *Capacity building institutions*. These are institutions that build capacity for building capacity and include the Regional Universities Forum for agricultural capacity building (RUFORUM), the African network for Agriculture, Agroforestry and natural Resources Education (ANAFE) and the regional AGRHYMET Centre.

#### 4.2.2 A paradigm shift to strengthening entire institutions

SCARDA uses a comprehensive approach in which the capacity strengthening needs of institutions are identified through rigorous holistic institutional analyses backed up by addressing the identified weaknesses wherever they are found in management and reinforcing the ability to conduct quality science. The holistic and integrated approach facilitates the identification of real capacity strengthening needs and ways of addressing them.

An important paradigm shift being advanced through the SCARDA approach, is in moving from capacity strengthening as a “*service provided*” through the project to “*a facilitated and*

*supported process” enabled by the project.* This establishes a clear link between the institutional analysis process, and the provision of capacity strengthening services. It also enables service providers to adopt a facilitative approach.

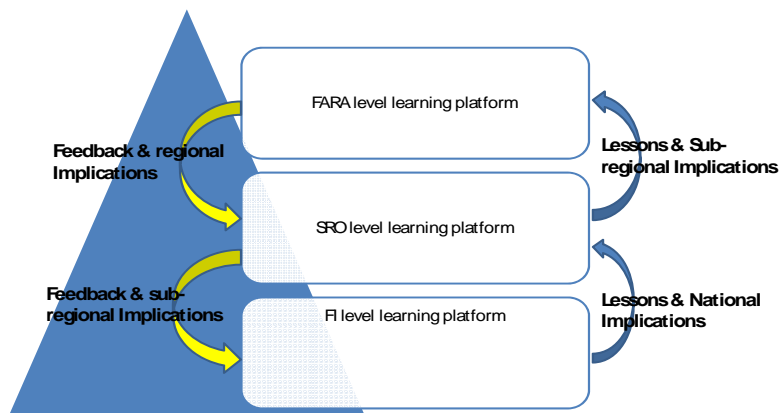
The SCARDA programme provides tailor-made packages of capacity strengthening activities for focal institutions. These packages are developed after the institutional analyses have identified full ranges of priority capacity strengthening needs in research management, scientific quality and continuing professional development and the collaborative capacity of associated actors in agricultural innovation. The capacity strengthening packages also reflect the needs of the target institutions’ partners in technology development and dissemination and include staff from such satellite institutions in the training events. This approach has contributed a lot to strengthening and sustaining the multi-stakeholder partnerships that are required to ensure that the investment in SCARDA will produce stronger national agricultural innovation systems.

#### 4.2.3 Enhancing Cooperation through Learning Platforms

SCARDA has established learning platforms that bring together the different actors in research and technology dissemination and adoption at national, sub-regional and regional levels to capture lessons and share experiences as a basis for improving their collective performance and for up- and out-scaling of the lessons learnt and best practices (Figure 1).

Given that SCARDA is a novel approach to capacity building, communication as a learning tool is especially critical to its success. The SCARDA communication plan uses a number of tools for sharing information, which include electronic group discussions where the SCARDA partners can share and discuss implementation issues, constraints or achievements and get partners’ views on strategies or advices. Web sites such as FARA Web site, NRI, ANAFE, RUFORUM and other partners’ web sites and a dedicated Newsletter are also used to widely disseminate information about SCARDA.

This AAU conference is an opportunity to discuss how learning platforms such as SCARDA work and how they can be even more successful at creating new knowledge which is the key ingredient in all successful innovation systems.



**Figure 1: SCARDA learning platform as viewed by ASARECA (2008)**

## **5. The need for better integration**

### ***5.1 Engaging tertiary agricultural education networks***

FARA is aware that unless there is a constant supply of well trained new graduates and postgraduates its efforts to strengthen agricultural research systems will flounder. It is, therefore, working with a number of different agricultural education networks to strengthen the capacity of African universities to produce graduates and postgraduates of the type and caliber required for Africa’s agricultural renaissance. FARA is also encouraging the universities to engage more actively in CAADP.

A key partner in this effort is the African Network for Agriculture, Agroforestry and Environment Education (ANAFE) which as a network of 130 universities and colleges across Africa. ANAFE’s secretariat is based in Nairobi Kenya but it always involves all its four Regional Agricultural Forums for Training (RAFTs). In each RAFT ANAFE has a Focal Institution which coordinates all the activities within its region and as a matter of principle ANAFE avoids working with only one training institution in any one region because this makes it difficult for out scaling and information sharing and dissemination. At each Focal Institution there is a Senior Education Fellow who is supported by ANAFE to facilitate, supervise, follow up and send reports on all the ANAFE activities in the region. ANAFE’s activities involve supporting curricula reform, enhancing and mobilizing teaching capacity of educators and educational institutions in Integrated Natural Resources Management, establishing links among research, education and development partners and systems and using them to ensure a steady flow of improved and appropriate agroforestry and INRM knowledge to farmers and development workers. ANAFE also strengthens action research by providing opportunities for young scientists to undertake thesis research with farmers on relevant agro-forestry and INRM topics.

FARA and ANAFE and other education networks notably including the Regional Universities Forum for Capacity Building in Agriculture (RUFORUM) a network of 20 universities focusing

on strengthening postgraduate education through strategic collaborations between its member and associated universities are collaborating with NEPAD to achieve greater involvement of the universities in producing the required human and institutional resources. FARA also hopes to establish similar collaboration with the Réseau pour l'excellence de l'Enseignement Supérieur en Afrique (REESAO) which is a similar network of universities in West Africa that is supported by the Economic Community of West African States (ECOWAS). FARA is not only working with such networks to enhance the contribution of the universities to the success of CAADP and the achievement of the MDGs but also intends to leverage that to attract investment in the universities as part of the CAADP financing packages in order to further strengthen their capacities to serve CAADP. This is based on enhanced recognition by NEPAD and the African Union of the important role that tertiary education institutions can play in the work of NEPAD; in line with NEPAD's call for "a new relationship of partnership; African ownership and responsibility, promotion of self-reliance"

### ***5.2 Engaging Universities***

As suggested above, by being more involved in major agricultural development programmes, such as CAADP, the universities will be much better positioned to attract funding and other resources that they need to be able to produce better trained graduates and to conduct more meaningful research. With more relevant courses and investment in facilities there will be better morale among the faculty who have shown amazing fortitude and commitment to stay at their poorly paid and illequipped benches. With better and more relevant courses, better equipped facilities and hopefully better paid faculty the universities will be very much more attractive to potential applications for agricultural training and will produce graduates with good future prospects for making agriculture a career of choice. This is absolutely essential for an industry that is expected to be the engine of the continent's economic and social development. Such measures are vital to make the universities more relevant to the national and regional development agendas by producing graduates with the skills and competencies required by Africa's largest and most diverse industry and in particular for the implementation and up-scaling of CAADP programmes and projects.

Even with the recent remarkable expansion of places available at public and private institutions of higher education they will not be able to accommodate sufficient numbers of students within their campuses so they must also strengthen their ability to reach out, especially to the majority of Africans who still live in rural communities. There are many different approaches being tested and implemented, in and out of Africa, for empowering rural communities with learning. These include rural learning circles, farmer field schools, lifelong learning and community colleges. This can be achieved with the judicious use of modern information and communications technologies that have enormous potential for spreading the reach of universities and colleges through technology mediated distance education (TechMODE) (Zachmann and Alluri 2008). There is a tendency to discount this because of Africa's perceived problems in connectivity. However, Africa is the world's fastest growing market for telecommunications and if it is not already possible to reach all universities it will certainly be possible before new approaches to teaching and learning can be rolled out, so there is no reason to delay the implementation of schemes to promote e-learning and distance education which will be of greatest benefit to the majority of less well resourced institutions which are traditionally bypassed by collaborative capacity strengthening programmes.

### ***5.3 Engaging rural communities***

There is now a new concept building on work that has occurred in small, often remote and isolated areas to build virtual institutions which will eventually add up to higher levels as so called Barefoot Agricultural Universities

These approaches are promoting a paradigm shift from the current approaches that are technology centered and teacher centered, to community and learner centered approaches, which promote participatory education learning and action. The proponents argue that small family farms are the biggest business in Africa and therefore an education model anchored around this may change the face of Africa. The Agricultural Education and Training Initiative in Africa (2008) notes that these will have to address

- “Institutional arrangements for a farmer education and training delivery mechanism;
- New curriculum for scientists and extension agents that is co-created with farmers (especially women farmers) and other rural entrepreneurs;  
Capacity building actions for rural women scientists/researchers and other young rural knowledge workers;
- Appropriate knowledge and skills frameworks for crafting rural institutions that is responsive to the needs of poor people, such as family business enterprises, commodity and marketing associations, and village banks;
- Research and problem solving skills for village women and youth; and
- Project execution and management skills to be applied on family and community enterprises.”

Other important factors noted in the consultations on the Agricultural Education and Training Initiative included the need to be consistent with African culture and values; to build on existing local and indigenous knowledge and skills; use pedagogical approaches that build confidence of rural communities and individuals in themselves and their local knowledge and language; contribute to communities’ self reliance and self drive mindsets; use methodologies based on adult learning principles; provide content and pedagogy with broad appeal across age and gender and promotes peer to peer exchange and learning processes; build capacity for rural scientists/researchers; promote family food security; protects the environment, promotes business development skills as well as financial literacy to farmers, build capacity for distance and mass education; have low delivery costs; encourage farmer ownership and participation in the educational process; ensure effective communication through both traditional means of communication (word of mouth; story telling etc) as well as through technological advancement such as radio, mobile phones, internet and computer assisted learning.

## **6. Conclusion**

There is both immense and urgent need to strengthen capacities of all actors in African agricultural value chains. But there is also a tremendous potential for changing African agricultural education and learning systems which will provide very significant returns to marginal investment in improving and integrating existing systems. The institutional architecture of continental and sub-regional institutions and tertiary education networks are in place with successful track records of achievement. The need for change is recognized in all

quarters. New techniques are available. In view of the high potential returns to promoting the innovative approaches advocated in this paper there are also sufficient funds for investment in improved education and learning systems. The remaining unanswered question is whether or not the different components will have the will to come together with sufficient commitment to bring about the required change in Africa's innovative capacity for sustained development. Without such will African countries, which in 50 years have gone from being ahead of their Southeast Asian counterparts to being ten times poorer on per capita GDP basis, will continue to fall further behind, in spite of their unique endowments of under exploited human and natural resources.

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