Capacity Development for Modernizing African Food Systems (MAFS) Working Paper

Improving the Relevance and Effectiveness of Agricultural Education and Training in Africa: Insights from Agricultural Role Models

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The Modernizing African Food Systems (MAFS) Consortium

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Background on the Modernizing African Food Systems (MAFS) Consortium

Objective: The MAFS Consortium aims to help African agricultural education and training (AET) institutions develop the technical skills and institutional capacity required to modernize African food systems.

MAFS Consortium Members:

- Makerere University
- Michigan State University
- Stellenbosch University
- University of Pretoria

Activities and Outputs: The MAFS Consortium has assembled a technical team from four major agricultural universities to produce a series of empirical background studies that will provide evidence necessary for informing capacity development efforts in African AET institutions. Substantively, the activities center around the following four thematic areas.

Theme 1. Food System Dynamics in Africa and Consequent Skill Requirements in the Private and Public Sectors

Theme 2. Models of AET Engagement with Private and Public Sector Employers

Theme 3. Existing Capacity of African AET: Case studies of African universities with regional footprints

Theme 4. Impact of past AET institution-building efforts in Africa

Advisory Board:

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ABSTRACT

This paper examines the career trajectories of 66 distinguished African agricultural professionals. Based on in-depth qualitative interviews, the paper explores the answers to two critical questions: How can Africa motivate its youth to consider careers in agriculture and agribusiness? How can agricultural education and training (AET) institutions better prepare youth for productive careers in agribusiness?

In order to motivate youth, the role model interviews suggest that children growing up in rural areas respond to clearly perceived family needs coupled with demonstrable profitability of modern agricultural and agribusiness opportunities. In contrast, Africa's rapidly growing cohort of urban youth respond to inspiring science education, emerging awareness of the significant social and economic importance of agriculture and access to role models who can demonstrate the range of professional opportunities afforded by modern agribusiness and commercial agriculture.

To prepare youth for successful agribusiness careers, the role models admonish agricultural education and training institutions to develop more practical curriculum, build a stronger early foundation in sciences and mathematics, increase emphasis on business management and entrepreneurship, and substantially improve the frequency and quality of interactions with agribusinesses through guest lectures, internships, applied research and attachments. In order to keep AET institutions on track in preparing youth with the skills required by agribusiness, the role models advocate systematic communication conduits for ensuring regular feedback from private and public sector agribusiness employers on AET curriculum and programs through vehicles such as private sector advisory boards, formal AET-industry consultations and employer liaisons.

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1. INTRODUCTION

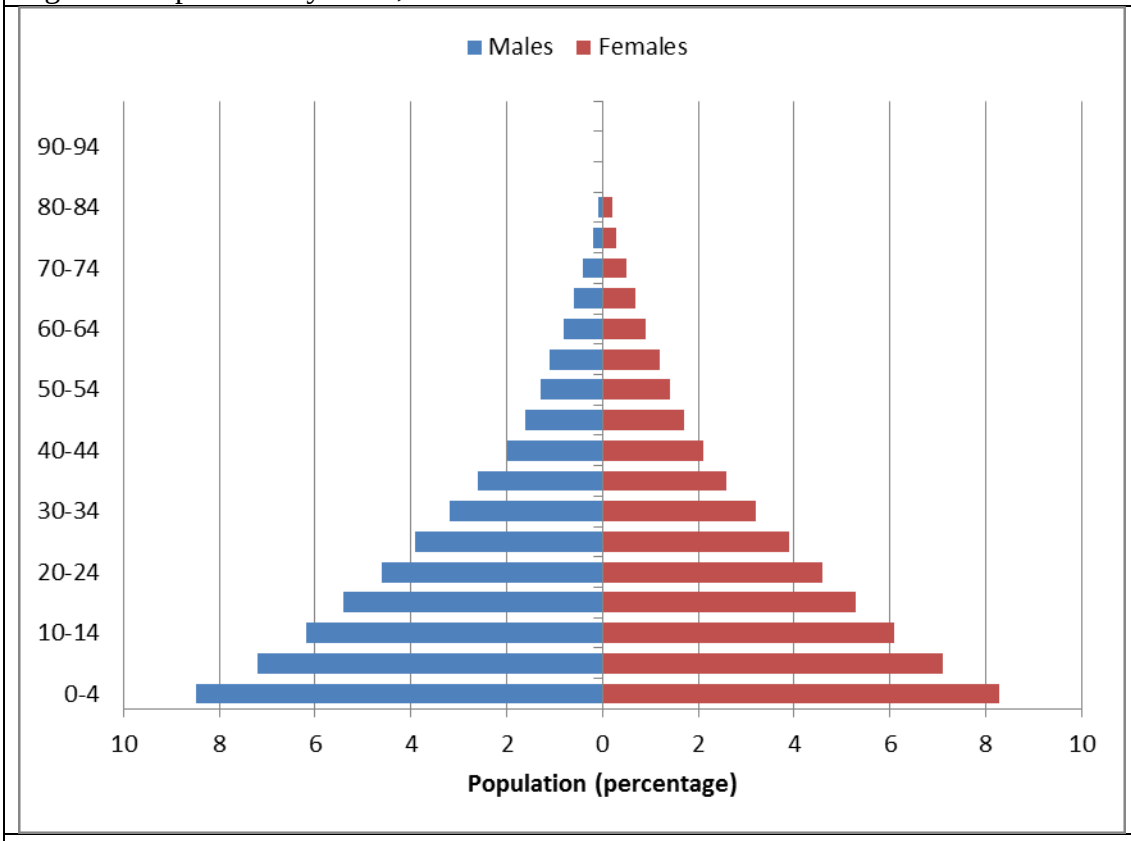
Over the next 10 years, over 220 million African youth will enter the labor market. Africa's high fertility rates have translated into a demographic bulge of historically unprecedented proportions. In addition to the 165 million currently in the 15-24 age cohort, another 220 million will enter the labor force over the next 10 years, while only 35 million over the age of 65 will exit (Figure 1). Where will these new job seekers find productive work opportunities?

Given growing urbanization and rapid increases in marketed food volumes, domestic agricultural and food markets offer one of Africa's largest opportunities for employment growth (McKinsey 2012). The spatial and structural changes under way in Africa's food system will translate into dramatically increased demand for processed foods, high-value foods (dairy, meat, fruits and vegetables), packaged convenience foods and prepared foods. Ironically, despite the large labor requirements in agriculture and agribusiness, many African youth prefer urban office work.

In order to motivate youth and prepare them for productive careers in agribusiness and commercial agriculture, Africa's agricultural education and training (AET) institutions will need to supply new skill sets for a new set of primarily private sector clients in these growing agribusiness markets. Increasingly, Africa's food system will seek workers with the technical skills needed in commercial agriculture (irrigation specialists, mechanics, veterinarians) as well as agribusiness skills in the food sciences, biochemistry and food processing, packaging, logistics, distribution, price hedging, human nutrition and food safety. In the past, Africa's AET institutions have focused primarily on agricultural extension and farm-level production skills, primarily for the public sector. In the future, they will require a major boost in skills related to post-farm processing, packing, and distribution. These shifting job skill requirements, in turn, will require a shift in faculty skill sets, laboratory facilities and in systems for actively engaging with private sector agribusiness employers and entrepreneurs (Minde et al. 2012).

This paper reports insights from successful agricultural professionals in 14 African countries about how to improve the relevance and effectiveness of AET institutions. It summarizes the experience, observations and recommendations from 65 African Agricultural Role Models identified by the Modernizing African Food Systems (MAFS) consortium. In doing so the paper aims to address three key issues. First, the paper examines motivations for entering agricultural careers. Second, it aims to identify factors that led successful African professionals to excel in agriculture and agribusiness careers. Finally, the discussion summarizes suggestions made by the Role Models about how AET institutions can better motivate and prepare African youth for productive careers in agriculture and agribusiness.

Figure 1. Population Pyramid, Sub-Saharan Africa



Source: http://populationpyramid.net/sub-saharan-africa/

2. DATA AND METHODS

2.1. Selection process

In April 2013, the MAFS consortium[1] launched an international call for nominations for African Agricultural Role Models, defined as "individuals from Africa who have made an impact on advancing Africa's agriculture and food system development in any sphere related to agricultural production (crops, horticulture, forestry, fisheries and livestock), value chain development, finance, processing and policy." Members publicized the call through presentations at a series of professional meetings, email contacts from the member institutions list serve directories and via the MAFS website.

As outlined in the call for nominations, "Our goal is to identify a broad selection of highly effective agricultural and agribusiness professionals in order to understand what has enabled these top performers to improve agricultural and food systems in Africa. Following nominations, a cross-section of nominees will be selected from different fields for in-depth interviews aimed at tracing their professional trajectories and helping us to understand how Africa's AET institutions can better prepare future professionals for Africa's growing agricultural and food systems."

In all, the call elicited 82 nominations from 14 different countries. The MAFS internal review team vetted the nominees after reviewing nomination materials submitted for each of the nominees. This initial filtering aimed to identify the most outstanding prospective candidates in the following six categories: • commercial smallholder farmers, • agribusiness, • non-profit promotional groups, • public policy makers, • researchers and • young agricultural professionals. Following this initial vetting, the team contacted and conducted in-depth qualitative interviews with each candidate using the interview protocol provided in Annex 1. In most cases, the interviews took place in person. MAFS team members travelled to Senegal, Mali, Ghana, Uganda, Kenya, Tanzania, Zambia and South Africa for this purposes. The remaining interviews were conducted by telephone. In general, interviews lasted about one hour. In a few cases, we were unable to contact nominees. In all, the team successfully interviewed 65 role models from 14 different countries (Table 1). Those interviews form the basis for the analysis below.

[1] The Capacity Development for Modernizing African Food Systems (MAFS) initiative aims to help African agricultural education and training (AET) institutions develop the technical skills and institutional capacity required to modernize African food systems. In order to do so, consortium members and collaborators conduct empirical research that to quantify structural changes in the food system, identify the workforce skills and consequent AET capacity requirements needed to modernize Africa's rapidly growing food systems. The MAFS consortium began as a collaborative effort among the Universities of Makerere, Pretoria, Stellenbosch and Michigan State, guided by an international Advisory Board composed of private agribusiness leaders and public sector educational leaders. Further details are available at www.mafs-africa.org.

Table 1. Profile of the Role Models

Category	Number	Percent
Private sector		
small farmer	6	9%
large farm or agribusiness	16	23%
Non-profit promotional agencies	8	11%
Public sector		
public policy, administration	13	19%
research	24	34%
young professionals	3	4%
Total*	70	100%
Gender		
Male	52	79%
Female	14	21%
Total	66	100%
Country and region of origin		
West Africa		
Burkina Faso	1	2%
Ghana	8	12%
Liberia	1	2%
Mali	6	9%
Nigeria	1	2%
Senegal	3	5%
Sierra Leone	3	5%
East Africa		
Ethiopia	1	2%
Kenya	6	9%
Tanzania	4	6%
Uganda	8	12%
Southern Africa		
Malawi	2	3%
South Africa	12	18%
Zambia	10	15%
Total	66	100%

* Several role models served in multiple capacities over their career, resulting in dual classifications for some.

Source: MAFS Role Model interviews.

2.2. Profile of the role models selected

The role models fall into three broad categories of agricultural professionals. Roughly one-third (32%) work in the private sector, either on small farms, large farms or in agribusinesses. Slightly over 10% work in the NGO sector, in non-profit groups promoting agricultural growth. The remaining nearly 60% of respondents work in the public sector, either as researchers, in policy positions or in line implementing agencies (Table 1).

In terms of regional representation, roughly one-third come from each of the following three sub-regions within Africa: West Africa, East Africa and Southern Africa. Roughly eighty percent are men and 20% are women.

Table 2 describes the educational background of the role models nominated and selected during this initial round of nominations. Given the predominance of researchers, nearly two-thirds of the role models have earned a doctorate, either PhD , Doctor of Veterinary Medicine or comparable degree. Among the private sector, the small farmers rarely hold more than a secondary training, while the majority of large farms and agribusinesses hold either secondary or university training up to the Masters degree level.

Overall, the role models prove to be a highly educated group. Given that AET professional dominated the nominating process, as both nominators and as nominees, this bias is not surprising.

Table 2. Educational Background of the Role Models

Professional category	Highest level of education completed			
	Secondary	MSc	PhD/DMV	Total
Private sector				
small farmer	0.83	0.17	0.00	1.00
large farm or agribusiness	0.31	0.31	0.38	1.00
Non-profit promotional agencies	0.00	0.38	0.63	1.00
Public sector				
public policy, administration	0.00	0.20	0.80	1.00
research	0.00	0.05	0.95	1.00
young professionals	0.00	0.33	0.67	1.00
Total	0.15	0.20	0.65	1.00

Source: MAFS Role Model Interviews.

3. MOTIVATIONS FOR PURSUING AGRICULTURAL CAREERS

3.1. Candidates with farm backgrounds

Roughly two-thirds of the high-performing agricultural professionals interviewed for this study grew up in rural areas on farms. All of them cited this experience as a major impetus for pursuing careers in agriculturally related professions and businesses. During our interviews, we heard many variants of the following observations:

- I grew up in a farming environment, milking cows, working in the fields and leading oxen when ploughing the soil. I love working with the animals.
- I am the son of a farmer. From this, I have seen the importance of agriculture from early life. My family sent me to school so I could serve.
- The morning I left my village to go away to school, my father told me sternly, "Never forget these simple houses you are leaving."

A majority of the farm kids likewise expressed a strong desire to devote their careers to improving productivity in agriculture (Table 3).

- I grew up in a peasant family in a small rural village. My father died when I was very young. As a result, my mother had to work very hard to feed her xx children. Ever since, my goal in life has been to find practical ways to help my mother and other small farmers who have suffered.
- My parents owned a smallholder farm on which they produced horticultural produce. I used to go with them to the market to sell these products. In due course, I realised that my parents were price takers because of low bargaining power. I was motivated to choose a career in agriculture in order to improve farmers' economic market conditions especially in my village.
- Coming from a rural area, everyone expected me to become a medical doctor, but instead I chose to become veterinary doctor. My choice was driven by the need to help solve the animal disease problem facing the country, especially anthrax.
- After taking agricultural science subject at secondary school, I started identifying gaps in the farming methods my grandparents and other family members were using and started advising them smarter methods of farming. That experience made me realize at a tender age that there was a lot to learn in agriculture in order to improve productivity and the lives of rural farmers.

Table 3. Motivations for Entering Agricultural Careers

	Farm background		
	yes	no	total
Role model backgrounds	66%	34%	100%
Reasons for entering agricultural career			
farming background, rural youth	100%	0%	66%
improve farm productivity and rural welfare	54%	33%	47%
farming is a good business	37%	29%	34%
interest in science	20%	33%	24%
inspiring agricultural professional	15%	10%	13%
inspiring teacher	5%	24%	11%
accidentally	7%	24%	13%

Source: MAFS Role Model Interviews.

About one-third of those with farm backgrounds cited lucrative business opportunities as a rationale for embarking on a career in agribusiness.

- When my father diversified his farm from cereals into poultry (layers and broilers), he made me his poultry manager. With this exposure, I saw farming as a business, not just a way of life.

Inspiring agricultural professionals they encountered in their youth served as role models and motivators for about 15% of the farm kids.

- As a boy, I saw the extension officer working in my village always around and with the farmers. I decided I wanted to become an extension officer or at least something in agriculture!

3.2. Urban youth

The remaining one-third of agricultural role models we interviewed had no farming background to draw on. Not surprisingly, their motivations and sources of information and inspiration often differed from the youth growing up on farms. Given Africa's growing urban population, the motivations identified by these non-farm youth may yield insights into effective avenues for encouraging other urban youth to consider careers in agriculture.

Though less frequently than their rural counterparts, about one-third of the urban-born agricultural professionals cited their motivation to improve rural welfare or their belief that agribusiness offered good business prospects. However, their sources of information and inspiration often differed, as the following typical responses suggest.

- I grew up in the capital city, but my father and mother came from rural areas. I spent vacations and holidays with my grandmother in the village. I saw how much time my grandmother spent producing food. So I became fascinated with agriculture. I wondered how it might be possible to reduce work requirements for people like my grandmother.
- During my graduate studies in Canada, I was inspired by the way of life and success of the Dutch immigrants who proved that with hard work farming was profitable.
- When I was a young lady, I never thought I would take agriculture as career because I was born and brought up at the farm near the capital city and I thought agriculture was a way of life. So I really wanted to take up a career that would take me away from agriculture. However when I was selected and started learning at the university and after being exposed to different issues such as malnutrition, hunger and poverty that were affecting many people, I was touched and I decided to take agriculture as career and be an avenue for me to make a difference in society.

Unlike the rural youth, urban-born agribusiness professionals often cited an interest in science, an inspiring teacher or simple accident as their reasons for entering agribusiness careers.

- My 6th form biology teacher used local examples and a school garden to demonstrate basic principles and power of biological sciences.
- The food garden at the school was there to teach us about plants, how to plant at the right time, water correctly, harvest it at the right time. Working in my school vegetable garden stimulated my interest in biology and strengthened my passion for agriculture.
- A great teacher in my high school demonstrated the extraordinary power of plants.

- The interest to do agriculture developed when a career advisor from the University who happened to be from the department of agriculture encouraged and inspired me to consider agriculture as a career.

About one-fourth of the urban-born agriculturalists described accidental twists in their career paths that unexpectedly led them into agricultural and agribusiness careers (Table 3). The following example offers one look at the many circuitous career trajectories the urban-born Role Models described.

- I came to work in agribusiness by an indirect pathway. I went into business after secondary school, where I studied art and architecture. Surprisingly, this provided a good conceptual background for entrepreneurial activity. The blank canvas on which an artist must prepare her composition is much the same as the role of the entrepreneur in conceptualizing and executing the launch of a new business. Upon completing my studies, my first job was at a firm producing fertilizer, pesticides and animal feeds. Early on, I conducted market studies on fertilizer use. This work got me into agribusiness activity with a focus on marketing and a view toward identification of market opportunities.
- My career in agriculture started with finance background. I started as an accountant and later on served as Finance and Administration Manager. During that time I was part of the team that implemented the relief pack and food security pack which included seed, fertilizer to the vulnerable households so that they could get engaged in agricultural activities. As a man in finance I was supposed to understand the all the operations and field activities in order to do proper costing. It was during that time I started understanding issues related to crop production cycle, poverty and nutritional aspects of peoples and got interested in agricultural related activities.

The contrasting motivators and information sources between the two groups of youth suggest that education and training institutions could play a strong role in shaping youth interest in agriculture. Slightly over half of the urban-born agriculturalists report a keen interest in applied science or an inspiring teacher as the key triggers motivating their interest in agriculture. Clearly school curriculum and staffing played a strong role here, in many cases during secondary or even primary school. The one-third who cite an interest in improving rural welfare and reducing poverty suggest that school science and social science curricula may likewise play an important role in raising student awareness of local economic conditions, economic trajectories and causal pathways driving productivity, poverty and national economic growth. In a similar vein, many Role Models also suggest that the notion of farming as a modern, productive business can also emerge from school curricula, field trips and private sector guest lecturers. Chapter 5 explores these opportunities and suggestions in greater detail.

4. FACTORS AFFECTING SUCCESS IN AGRICULTURE AND AGRIBUSINESS

Once motivated to pursue agricultural careers, youngsters require preparation to become productive in those pursuits. In order to better prepare students for successful careers in agriculture, it is helpful to know what skills and support systems accomplished professionals consider key to their success. To gain insights into these key supporting elements, we asked the Role Models to identify key factors shaping their successful career trajectories.

4.1. Environmental factors affecting success

Family support

Virtually all of the successful agricultural professionals we interviewed cited support, motivation and values provided by family members as critical to their success (Table 4). This support took many forms: financial, moral and motivational. Many spoke of the values, the work ethic and the discipline inculcated in them from earliest youth. Stern mothers, it seems, make strong performers in later life.

- Mother was very strict with us kids. She worked hard and imposed a strong discipline. She paid our school fees and often went without new clothes to do so.
- My mother, especially, was very visionary. She brewed local beer and joined her husband as a farm laborer to make money to take me to school. While sometimes my father would show signs of giving up, my mother always used to say that she did not want me to lead a life like theirs.
- My father invested a lot in the quality of our education, which subsequently laid a solid foundation for good career growth. He did not compromise on discipline.
- My father stopped his studies in primary school. But he encouraged us to study hard and he sacrificed a lot to ensure that his children got education.
- My father provided me with an anchor and roots. He shaped my ethics, my values and my motivations. He shaped my philosophy of life. He gave me strength. He imbued me with a strong sense of values, of right and wrong and respect for integrity. Though he did not go to school, he strongly encouraged me to go to school and to continue my studies. He was always my strongest cheerleader.

In other cases, an adult from outside the family took an active interest that proved decisive in shaping career outcomes.

- I come from a very humble background. When I was admitted to senior one at my local college, the entire village where I hail from contributed towards my school fees so as to enable me to attend school. In a way this motivated me to pursue education with a passion since I was answerable to many stakeholders in my village. Among the very vivid memories I still recall is an old lady, who is currently about 115 years old, who contributed fees during my enrollment into senior one. This very old lady amused me recently when she still contributed funds from her savings towards my private school construction project because of her love for education.
- After my first year at middle school, in a town far from my village, the poor family that had provided my lodging and food said they could no longer afford to do so. So I reluctantly returned to my home village. By chance, my former primary school headmaster passed by the middle school. He was surprised to find me gone and he asked why I was no longer enrolled. After learning the reason, he traveled to my home village to collect me. He told my mother and uncle that such a talented student must come back to school. He found lodging for me in a church and got me access to

a school feeding program which provided me with one meal per day. As a result of his intervention, I went on to become the first PhD recipient ever from my village.

Table 4. Factors affecting success in agricultural professions

Factors affecting success	Responses number	Responses percent	Number of mentions per respondent
Environmental factors affecting professional success			
family support	86	20%	1.4
professional networks, role models and mentors	73	17%	1.2
schooling	61	14%	1.0
other people took an interest and helped	4	1%	0.1
other environmental factors shaping success	3	1%	0.0
Individual characteristics			
Work ethic			
discipline, capacity for hard work	64	15%	1.0
like challenges	13	3%	0.2
Inter-personal skills			
strong interpersonal skills: listening	43	10%	0.7
Passion			
passionate about my work	11	3%	0.2
strong desire to improve rural conditions	10	2%	0.2
deep respect for rural communities	13	3%	0.2
Curiosity			
curiousity, open mind	21	5%	0.3
belief in the power of science	2	0%	0.0
Management skills			
good manager	15	4%	0.2
Respect for others			
humility, respect for others	3	1%	0.0
strong religious values	5	1%	0.1
Total	427	100%	6.8

Source: MAFS Role Model Interviews.

Schooling

The current considerable successes enjoyed by the Role Models belie frequently modest beginnings and speak to prospects for rapid social mobility when school and support systems permit. We heard many variants of the following testimonials:

- True to my mother's words, education has been a complete game changer, not only for me but for all my siblings and parents. School gave me the foundation for what I am today. It has been a complete transformation for the whole family; and within a lifetime!
- In the secondary school examinations, I ranked third in the country for the biological sciences. While deep in the cotton fields doing some serious weeding, a passerby came to me and said that he had heard from the radio that I had been selected to go to study in Canada.

For the many PhD researchers and educators, schooling clearly played a decisive role in their career paths. Yet many of our private sector Role Models suggested that basic literacy and numeracy plus more practical short courses could prove sufficient for their particular needs.

- Formal schooling was not important for me. The key instead was self-instruction and seeking out of focused, practical short courses in technical areas of importance to my business interests.
- After the University administration redirected me not to continue with the university education because I missed some summer courses, I decided to go full time employment at my father farm. I made a point that I have to work hard in farming and do it right and I never look back to university education.

Professional networks, role models and mentors.

Agricultural professionals uniformly emphasized the importance of professional roles models and mentors. Many mentioned several, leading to 1.2 mentions per interviewee (Table 4).

- I had a friend whose cousin was a District Agricultural Officer with whom we used to visit farmers. This was very interesting and fascinating to me. The District Agricultural Officer was exemplary which prompted my desire to be like him.
- The extension officer was my first role model, I visited farms with him and I am still doing it visiting farms to learn from farmers.
- I have seen agricultural innovations and value addition from all over the world including 12 different states in the USA. In over 15 African countries, I have seen how slowly or reluctantly we adopt good agro-processing and value addition.
- My first job at the CMDT (Malian national cotton company) introduced me to a very powerful network. In those years, the company had strong research and extension system with strong links to farmers. It provided excellent training for agriculture and for agribusiness.
- The success of my business has been as a result of networks with my business colleagues from the farming sector and also from the banking sector. For me to build an empire of agribusinesses, I need financial support. It is through networking with colleagues that I have sustained this business as colleagues offer valuable advice in my businesses.
- My Group Manager influenced me a great deal. He was a very foresighted person and he wanted things done on time. He was not a time waster. He indicated that if you walked in his office, you were supposed to be prepared and know what you wanted to get out of him. If not he would ask you to excuse him as had a lot to handle in the office. So that experience has really shaped me to who I am now.
- Networks are critical. I have spent my career building networks.

4.2. Personal characteristics and skills

A majority of professionals cited three broad categories of skills that they considered key to their success: discipline, interpersonal skills and passion (Table 4).

Discipline

- I work hard
- I try to be the best I can be with the abilities I have.
- The tougher the assignment becomes, the tougher I also become.
- Fear of failure drives me.

- I pray a lot. I create a "to do list" every day. This is written up every day in the night before I wake up. At the end of each day, I review what I have done and I thank God.

Interpersonal skills

Roughly 70% of the role models cited their ability to work well with others as key to their success. They spoke frequently of respect for others, good listening skills, ability to work well in groups and motivate teamwork, good public speaking and writing skills.

Passion

Over half spoke of passion for their work as a key to their success. Some expressed this directly:

- I always had a passion for agriculture, because of what my mother was doing for us.
- .I am passionate about what I am doing in agriculture. If you can dream about something, you can do it.
- I grew up on a family farm and this led me to develop a passion to work in agriculture.
- I have a passion for working with the poor.
- My interest in young people became a passion .
- I have a passion to help solve food security issues in my country
- My mother was a good farmer with a passion for beautiful things in life – her horse stud was the best for the past 12 years.
- I developed a passion and desire for agriculture through secondary school gardens and university field trips.
- I desire to do the best with every situation. For example, I push my students to be the best they can be professionally, even if it means going beyond the call of duty. This is sometimes considered a painful experience, but often the (former) students come back to thank me for those skills. I take this same attitude to my own work. I do not believe in doing anything unless I can do it to the best of my abilities

Some role models couched this passion as a singular desire to improve rural conditions:

- I have always felt a strong affection for rural areas, a deep motivation to improve farm productivity, and a love for serving the rural world.
- My personal understanding of poverty drives my desire to work very hard to improve conditions in agriculture
- I have been motivated by a powerful internal calling to improve productivity and incomes of farmers in my country

Others expressed this feeling in terms of their deep respect for rural communities:

- A deep respect for rural farming communities allows me to gain farmer's confidence and discuss realistic options for improving farm productivity.

5. IMPROVING THE RELEVANCE AND EFFECTIVENESS OF AET IN AFRICA

5.1 Motivating students to consider agricultural careers

Roughly 40% of the Role Models highlighted the importance of starting young to motivate and prepare youth for agricultural careers. They made this point in a variety of ways, as the following quotes attest:

- Agriculture should be part of primary education curriculum. Schools need to establish school farms. They need to expose kids to commercial agriculture at a young age.
- Primary school should lay the foundation in helping to transform the image of agriculture. Agriculture should not be used as a punishment in schools.
- In secondary schools, farming and agribusiness should be engraved into the curriculum. Students should be taught that agriculture is not just farming but includes all the other agribusiness activities associated with servicing the consumers.
- Primary and secondary school reforms are needed. Early instruction needs to emphasize the importance and power of agricultural sciences.
- Recognize businesspeople who have made it in agriculture.
- Send role models to schools and youth gatherings to motivate them to consider careers in agriculture, to instill purpose, pride and self-esteem, to demonstrate that agriculture and food sciences offer a wide array of highly productive, important career opportunities.
- Lower levels of education more important than university for the practicing farmer. Focus reforms on vocational and trade schools first.

In addition, 20% of the Role Models specifically suggested that AET institutions do more to help change perceptions of agriculture, to introduce cutting edge agricultural sciences and to demonstrate the wide array of productive, lucrative career opportunities in agribusiness and agricultural professions . Their suggestions took many forms, as the following examples illustrate:

- Consider what attracts young men and women into agriculture and incorporate it in the curriculum. Make the training exciting and make it move with the times.
- Institutions need to present or re-package agriculture differently. Agriculture is more than digging! Schools the need to explain to young professionals the diversity of agriculture and the wide array of available opportunities that agriculture and agribusiness has to offer as a career.
- There's a need to get more professional role models to speak and motivate the young would-be agricultural professionals.
- Link students with people who have made successful agribusiness careers. They need private sector role models, businessmen and women who can ignite passion and motivate students, showing that agriculture can be a profitable business.
- Agricultural education needs to start early and involve outside motivational speakers (like me) to encourage students and to prove to them that they can do it and that agribusiness offers many promising, well-paying careers. I would happily serve in this role
- We need to motivate youth to become interested in agriculture. We need to make it cool. We should be using ICT tools. Make libraries of plant diseases available to students. Use Google diagnostics to quickly identify pests and assess problems. Demonstrate tissue culture planting material. Send real time photos of pests by cell phone to specialists for identification and recommended remedies.

- Many years later I was exposed to the 4 H Youth cubs in the USA. It underlines again the importance to expose young people to agriculture and other hands-on career possibilities.
- People have recognized entrepreneurship as an avenue that can reduce poverty, but there are no incentives to make it happen. For example, students acquire agricultural knowledge but lack the resources to take farming as a business. So developmental funds need to be put in place where students can tap from if they want to set up their farming enterprises.

Table 5. Recommendations for Improving the Relevance and Effectiveness of AET in Africa

Recommendation	Responses		Responses by professional category			
	number	percent of respondents	Farming, agribusiness	NGO	Public	
					AET	other
Content						
hands-on practical work	29	46%	41%	86%	32%	37%
business, entrepreneurship	23	37%	50%	43%	21%	26%
value chains: marketing, processing technologies	15	24%	9%	71%	16%	21%
links to successful agribusinesses, private sector visiting lecturers	15	24%	50%	0%	16%	5%
transform image of agriculture	7	11%	5%	14%	11%	11%
sciences and math	6	10%	5%	0%	16%	11%
school farms	2	3%	0%	14%	5%	0%
local content	3	5%	5%	0%	5%	0%
other	22	35%	32%	29%	37%	37%
AET systemic improvementrs						
improve incentives, facilities	19	30%	23%	0%	47%	21%
improve quality, reduce enrollments	2	3%	0%	0%	11%	0%
increase government financing for AET	4	6%	5%	0%	5%	11%
scholarships: girls, disadvantaged rural kids	3	5%	5%	0%	11%	0%
Teaching methods						
ICT	3	5%	5%	0%	5%	5%
other	3	5%	5%	0%	5%	5%
Outside linkages and feedback						
internships, attachments	15	24%	36%	43%	11%	5%
stakeholder feedback on curriculum	13	21%	32%	0%	16%	21%
businesses	10	16%	14%	0%	16%	16%
successful agribusinesses speak to students	4	6%	9%	0%	11%	0%
alumni	3	5%	5%	0%	11%	0%
field trips to successful agribusinesses	2	3%	9%	0%	5%	0%
Ag extension and research	2	3%	5%	14%	5%	0%
student comunication and outreach for a	1	2%	0%	0%	5%	0%

5.2. Preparing students better for productive careers in agriculture and agribusiness

5.2.1. Curriculum reform

Agricultural professionals offered expansive critiques of current AET curricula. Many expressed the view that current offerings are outmoded, too theoretical and fail to provide students with the practical skills required by the growing segments of the food system. Suggestions fell most commonly into four general categories: • increased emphasis on practical training; • business management and entrepreneurship skills; • value chain perspectives; and • linking curriculum to successful commercial farms and agribusinesses (Table 5). The following sample quotes offer an overview of the views commonly expressed by the agricultural professionals we interviewed.

Increase practical, hands-on training

- Students need more practical experience and exposure.
- Students need more hands-on training. A large number of them do not come from an agricultural background.
- Agricultural education is too theoretical. Students need more practical training, including more internships.
- Institutions should be more oriented to practical training rather than theoretical training. Unfortunately, funding to support practical training has been considered not important given the budget constraints faced by many institutions in Africa.
- Agricultural schools need to continuously update agriculture curriculums and make them relevant. For example, many of the poultry scientists that graduate from the universities are not able to formulate feed. To correct this anomaly, I suggest two things: 1) provide opportunities for students to have hands-on experience; and 2) class room work should deal with what is happening in the real world. Otherwise, most universities and colleges in Africa will continue to produce half-baked graduates.
- Schools should engage successful farmers to teach practical agriculture.
- Students should have longer internships to gain more practical experience.
- Provide a platform where farmers can share their past experiences with students and show them that it is possible to succeed in farming.
- Promote onfarm training. Students should spend more time with the farmers to understand their problems. Currently, agriculture students read about tractor ploughing but they are not exposed to practical tractor ploughing.
- Student assignments should be geared towards real industry problems.
- When I was at school, we had a joint project with the ministry on groundnuts which was very successful. Later at the university, I was involved in apiculture project. This project gave me practical exposure of how people are getting great wealth from agriculture.
- Individuals have to be fully baked in theory and practical skills. It is no good for a university to produce a graduate who cannot not even understand or know a combine harvester. I recommend that students be given enough time to have practical experience (maybe a semester) and ask them to write a paper on what they learnt in the field. That should be part of the curriculum.
- Build agribusiness trade schools around cities. Modernize knowledge and skills and apply them to agriculture, agro-processing and agribusiness: Everyone, engineers, extension agents, planners, researchers, everyone gets trained. But the farmer gets no training. He / she has to rely on his / her God given talent. If my young son or

daughter wanted to choose farming as a profession, where does he get trained? If my cousin, aunt, or nephew wanted to improve his or her skills as a farmer, where does he go?

Business and entrepreneurship

- Schools need to approach the subject of money. Culturally it's not polite to talk about money. Success may imply someone cheated or is a thief. Schools need to teach business subjects.
- The student should develop a business plans in a competition such that the winners/the best plans are supported. By the time they leave the training institutions, they should be having businesses running. For successful businesses, they should be helped to partner with the private sector.
- Encourage skills development through entrepreneurship training, e.g. through the setting up of incubation centers.
- A lot of people perceive agriculture as way of life and not as a business. So they start farming only when they are old. However, for me, I started own farming when I was just 29 years. So I am challenging the young ones who would like to take up agriculture as a business to start early when they have the energy because agriculture demands more energy. That will enable them to focus their youthful energy in developing the business and contribute in feeding the nation.
- A lot needs to be changed, the syllabi we have in the high learning institution has not changed since colonial times. The curriculum we, have been tailored to train graduates to get employed by the Ministry of Agriculture or other agricultural companies. It does not have a component of entrepreneurship. The Ministry of Agriculture is saturated. So the curriculum needs to be changed to prepare graduates to start their own companies.

Value chains

- Currently, agricultural schools (higher education and vocational training) place too much emphasis on farm production. They need to expand technical training to all parts of the value chain, particularly the off-farm segments (marketing, storage, processing, packaging, food safety, wholesaling, distribution).
- Focus on technologies for improving product quality, particularly value added transformation, for example drying mangos. The post-harvest opportunities are largely not included in training.
- Focus on precise measurement of productivity and profits from innovations and value addition
- One professional suggested using value chains as a vehicle for organizing the curriculum. Another suggested considering the value chain in a holistic way and using value chain studies as illustrative case studies. Another suggested developing value chain modules.
- My home town is on the river. There is a local port where colonialists built a crop reconditioning center where palm kernel was cleaned, weighed, paid for and then loaded into ships for export to Europe. Once the ship arrived, there was a long hooting of her horn which would attract people to see the type of ship coming to move palm kernel to Europe. That was my very first knowledge about commodity value chains. Students must also learn about value chains.
- Value-chain activities will dominate most of the agricultural activities in future. Therefore, such activities should be included in the curricula of institutions.
- Link agriculture to markets and value chains: students need to see a complete picture

Link students to successful agribusinesses

- In the past, students used to be placed in companies for them to gain practical skills needed in the agricultural companies. Currently, institutions offer more theory than practical training. I propose to have curriculum that should encourage students to visit farms and industry. For example, in Germany it is mandatory for a student to have a one year practical experience at the farm or agro – company.
- There is minimal or no interaction between students and the industry these days. This has made it quite difficult for students to appreciate and understand the agricultural industry. There is need to revive that interaction and make sure students get practical experiences before they finish their studies.
- Farming is very dynamic. It is difficult for a farmer to go out to teach in these institutions. The best these institutions can do is to send their students on attachment with their local farmers. For example, these students should be given chance to manage a block of a crop from land preparation to marketing of the crop with supervision from the farmer. That way, students would appreciate what goes on at the farm.
- Put students in contact with successful agribusinesses. Field trips to successful agribusiness entities should be encouraged. Career talks by successful agribusiness persons should form part of departmental lectures.
- Ministry of Agriculture's extension department should have an office at major universities, so that they can bring problems of farmers to the universities. This link is currently lacking.

5.2.2. Systemic reforms

About 45% of the role models recommended some sort of systemic reforms, focusing on improving incentives and facilities but also including increased funding for both schools and for student scholarships (Table 5). The following quotes provide the flavor of their suggestions.

AET facilities

- Maintenance of universities facilities is not ok. Things which were there 30 years ago are still being used currently. Right now some institutions are selling what used to be demonstration fields. Where are students goings to do experiments? This is compromising the quality of training students get from these institutions.

Faculty

- Those teaching business-like courses should have six-month internships in real business, viable and successful firms. This would help them appreciate what they are teaching in class and hence avoid being too theoretical or abstract. Unfortunately, many of those who teach business courses just rely on book knowledge information which is obviously not enough.

Student populations

- Insist on the quality of entering students. This must be right otherwise it will spoil the good intentions.
- They should also look on intake. Why are they enrolling a lot of students when the facility cannot handle that?

Stakeholder feedback on curriculum

- Schools need input from clients (general population and employers) on critical needs facing these populations.
- Some of the curricula that are there now where developed to serve purposes of years ago. But agriculture is changing and becoming modern. Therefore, there is need to review and revise the curricula regularly in order to respond to changing environments.

5.3. Differing perspectives

While interviewees across the private agribusiness sector, NGOs, AETs and the public sector agreed that agricultural training needs to be more practical, distinct differences emerged in the reform priorities emphasized by these four categories of professionals.

Private sector agribusiness recommendations

Private sector farmers and agribusinesses emphasized four areas for AET improvement in order to produce better equipped students for the agricultural sector: • practical training; • entrepreneurship and business management skills; • links to agro-industry, both in the classroom and through field attachments and internships (Table 5). They consider well-designed internship and mentoring programs necessary to position agriculture and food science graduates for a wide array of highly productive, important career opportunities and also to instill entrepreneurial and managerial skills. They further emphasized that universities and other agricultural institutions should be in constant liaison with the private sector in order to ensure curricula remain relevant.

A sampling of their direct feedback follows below:

- Training needs to relate to the real world and be applicable, using case studies and research material from local contexts and applied in a practical way. Practical teaching should be a focus.
- The perception of agriculture should be transformed so that children associate it with successful livelihoods and a favorable career choice. Agriculture goes far beyond farming and includes agribusiness activities associated with servicing the consumer as well-rounded entrepreneurs. Developments are necessary at both a primary school and secondary school level.
- AETs should place adequate emphasis on the business aspects of agricultural studies and strive to produce students who are prepared to become self-employed graduates ready to tackle the world of agribusiness.
- Agricultural studies should focus on developing and refining an array of skills, including communication, leadership and the ability to work in a team, conceptual skills and problem-solving skills.
- Throughout their training, students need to continuously be exposed to agribusiness. Members from the private sector should give guest lectures.
- Universities should have a clear perspective about their alumni and identify potential role modules among the alumni for young graduates.
- Interactive relationships between the agribusiness and students should be developed and nurtured so that students can gain practical experience and insight into successful

careers in the field of agribusiness. This calls for a strengthened link between AET institutions and industry.
- Opportunities for people without certain schooling qualifications to improve their skills should also be able made available. Vocational colleges that provide short courses should be re-introduced and government should invest in such programs.
- Permanent mechanism of observing what is happening in the industry should be put in place. Therefore, the curriculum should be a moving document that responds to the challenges of industry.
- Lecturers need to be retrained at all levels. If we are saying our students are theoretical, it means that even the lecturers have been theoretical. So there is need indication training for lecturers.

NGOs

NGO staff working to promote agriculture in various ways generally shared the priorities as their colleagues. Like the private sector, they emphasized the importance of hands-on practical work, entrepreneurship training and internships. Unlike the other groups, however, NGO staff overwhelmingly emphasized the importance of value chains.

Agricultural education staff members

Members of the agricultural education institutions addressed many of the same issues as the private sector. Unlike the other professionals interviewed, AET staff rated poor incentives and outdated AET facilities as their number one problem. They, likewise, more frequently mentioned the importance of improving math and basic science education.

In their own words, they offered the following observations.

- Schools should offer a strong foundation in science because agriculture is an applied science. Farm schools should also be established and become a more favorable school choice.
- The youth should be enticed into studying agriculture, using the 'cool' aspects of the field like the library of plant diseases, tissue culture and real time photos of pests sent by cell phones to specialists for identification and recommended remedies to do so.
- Girls, particularly, should be encouraged to pursue agricultural studies and science.
- University training programs should be flexible and easily adaptable to the needs of the advancing local and regional markets. A holistic approach to teaching the value chain of commodities should always be taken by AETs. For example, if indeed the priority is in rice, then, put the curriculum together to fit the entire value chain of rice.
- Agricultural universities should introduce an agribusiness component into their curriculum as well as the opportunity for alumni to continuously improve and enrich their skills and knowledge.
- The important skills of a good practicing farmer should be remembered. Vocational agricultural education should therefore mimic the real-life agriculture sector.
- Farming should be promoted as a competitive business, with an array of opportunity and prospects to become very successful entrepreneurs.
- The benefits for a community and country to invest in agricultural education should be highlighted, from greater food security to improved rural living conditions.

- AET should incorporate ‘big picture thinking’ for agriculture and offer internship programmes with reputable successful firms. Students should be guided and be informed about future opportunities so that they can align themselves properly and adequately from the start.
- Scholarships should be made available to disadvantaged youths from rural communities and entrepreneurship training to adults of a disadvantaged background.
- Local and international trends in agribusiness need to be monitored and current issues such as climate change, gender and land policy studied and understood.

Public sector

The public sector, outside of the AET institutions, offered suggestions that largely mirrored those of their agricultural colleagues. They acknowledged that agricultural training should be far more practical than it currently is. Agriculture as a career choice should also be promoted as a successful and rewarding career path.

- A career in agriculture should be promoted from a young age and agriculture should be introduced at an early stage in a child’s schooling.
- Students need to spend more time with farmers acquiring on-farm training and internships and mentoring programs
- The agricultural education systems need more training programs like Egerton’s two-year diploma that offers a two year diploma and good practical preparation.
- Internships and mentoring programs should be offered and formal teaching should definitely be combined with practical experience
- AET should include the business aspect of agriculture in its training, including the risks involved in such a career choice.
- Both higher education and vocational training need to have a stronger focus on agribusiness and should their curricula and should not only focus on country markets, but on regional markets and growth corridors that link them as well.

6. CONCLUSIONS

Domestic agricultural and food markets offer one of Africa's largest opportunities for employment growth over the coming decades given growing urbanization, rapid increases in marketed food volumes and growing demand for packaged and prepared foods, and high value products such as fresh fruits and vegetables, meat and dairy products. Despite the large number of increasingly remunerative jobs available in African agrifood systems, the continent's youth remain broadly disinterested in pursuing careers in agriculture. Ironically, African youth are both poorly motivated and poorly prepared to pursue productive careers in Africa's rapidly modernizing agrifood system.

The African role models interviewed in this paper offer informed answers to two critical questions: How can Africa motivate its youth to consider careers in agriculture and agribusiness? How can agricultural education and training (AET) institutions better prepare youth for productive careers in agribusiness?

In order to motivate youth, the role model interviews suggest that children growing up in rural areas respond to clearly perceived family needs coupled with demonstrable profitability of modern agricultural and agribusiness opportunities. In contrast, Africa's rapidly growing cohort of urban youth respond to inspiring science education, emerging awareness of the significant social and economic importance of agriculture and access to role models who can demonstrate the range of professional opportunities afforded by modern agribusiness and commercial agriculture.

To prepare youth for successful agribusiness careers, the role models admonish agricultural education and training institutions to develop more practical curriculum, build a stronger early foundation in sciences and mathematics, increase emphasis on business management and entrepreneurship, and substantially improve the frequency and quality of interactions with agribusinesses through guest lectures, internships, applied research and attachments. In order to keep AET institutions on track, the role models advocate systematic mechanisms for ensuring feedback from private and public sector agribusiness constituents on AET curriculum and programs through vehicles such as private sector advisory boards, industry consultations and employer liaisons.

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ANNEX 1. ROLE MODEL INTERVIEW GUIDE

1. Career summary
a. What motivated you to pursue a career in agriculture?
b. education
    - primary
    - secondary
    - university
c. work history
d. What do you consider your most important achievement?

2. Reasons for your success
a. environment
    - family
    - schooling
    - professional networks (role models, mentors)
    - other outside factors?
b. individual characteristics

3. Recommendations on how AET institutions can more effectively prepare students for successful agribusiness careers