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

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Models for University Engagement with Private and Public Sector Employers

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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:
- Chair, Prof. Richard Mkandawire, Vice President African Fertilizer and Agribusiness Partnership (AFAP)
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- Prof. Hamidou Boly—Coordinator, TEAM-Africa based at RUFORUM, Makerere University, Kampala
- Dr. Maggie Kigozi—Formerly Executive Director of the Private Sector Foundation in Uganda

ABSTRACT

This study compares models for university engagement with private and public sector employers in Africa. It compares engagement models in countries with more developed food systems (South Africa) and a sample of selected African countries with less developed food systems - Kenya, Uganda, Tanzania, and Senegal. The study was conducted in two parts. Part one consisted of desk top review of the available literature in order to identify the available engagement models and development of a conceptual framework for engagement, and part two consisted of conducting structured interviews with selected private agricultural companies and public employers.

The results show no single dominant model of AET engagement. Models of AET engagement with employers vary with the type of company (local vs. international) and university (research intensive vs primarily teaching). The top three models of engagement were: 1) students internships, 2) integrated student service learning, and 3) student volunteering. In South Africa, professional associations play a significant role in developing the content of the curricula.

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1. Introduction

Food security is a critical priority for existing and expanding global populations. According to the World Health Organization's World Food Summit of 1996, ***Food Security*** occurs "when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active lifestyle", and is based on food availability (sufficient quantities of food available on a consistent basis), food access (sufficient resources to obtain foods for a nutritious diet), and food use (based on knowledge of basic nutrition and food and water hygiene).

In order to provide food security, capacity development can be applied to existing food systems to ensure that nutritious foods are economically and physically available to populations in need. ***Food Systems*** include all processes and infrastructures involved in feeding a population: growing, harvesting, processing, packaging, transporting, marketing, consumption, and disposal of food and food-related items. A food system operates within, and is influenced by social, political, economic, and environmental contexts. ***Capacity Development*** is a conceptual approach to development that focuses on understanding the obstacles that inhibit people, governments, international organizations and nongovernmental organizations from realizing their developmental goals while enhancing abilities that will allow them to achieve measurable and sustainable results. In the context of food security, capacity development would be focused on identifying the obstacles that inhibit the ability of existing food systems to meet the needs of the populations they serve in terms of quantity, quality and affordability, and creating approaches to improve the efficiency of food systems.

The *Capacity Development for Modernizing African Food Systems* (MAFS) project aims to understand the new the technical skills and institutional capacity required to train the new generation of professionals as African food systems transform and modernize. The transformation will ensure that more skilled people are available for agriculture and remunerative employment in related agribusinesses" (IFAD, 2012). The growth in these enterprises will only be achieved if agricultural higher education and training (HET) institutions invest in delivering a skilled workforce able to "develop and manage new, more productive technologies". Quite often this is a natural process with curricula and focus of teaching and research adapt to changing food distribution and consumption patters as illustrated in the advanced economies but also in countries in the South such as Brazil, Argentina and also in South Africa on the African continent. This paper argues that many African countries now gradually follow the path of food system transformation found in South Africa as more people urbanize and their habits and consumption patterns change.

It is predicted that rising urbanization and growing per capita incomes will double the marketed volumes of foodstuffs, and ramp up demand for high-value foods (dairy, meat, and fresh fruits and vegetables), processed foods, packaged convenience foods, and prepared foods. As fewer farm families support growing urban populations, farm productivity will need to increase in both crop and livestock production. Growing demand for packaged convenience foods will require substantial private sector investment in food processing technology. To scale up processing of cassava, maize, sorghum, yam, and banana products from artisanal to industrial scales, the food industry will need to undertake research on the biochemistry of basic food fermentations and on nutritional outcomes under alternative processing technologies. To fuel necessary productivity increases in Africa's modernizing food system it will require a steady flow of trained scientific and technical skills in support of

farm production, feed industries, storage, supply chain management, and food processing industries.

While academic institutions in the developed world supported their national economies and have strong extension systems, many institutions in Africa are either weak or are detached from these changing dynamics and focus remains to a large extent on primary agriculture in countries other than South Africa..

The traditional higher education models of "train and release on the street" for the Private Sector and government to pick from is not sustainable, and does not develop the human capital needed to meet these new dimensions and transformed food systems. With the growing liberalization, privatization, globalization and regional integration, competition for jobs and markets is stiff; many youths are losing out because they are not appropriately capacitated. Africa needs a new generation of competent citizens who are skilled entrepreneurs and job creators, with the capacity to integrate smoothly with the existing private sector locally, regionally and internationally. These are the individuals that will be able to transform the existing challenges into economic opportunities.

2. Objectives

This paper tackles the need for drastic curriculum change in African universities in light of the challenge of modernized food systems. How should this be happening? How should universities engage with the public and private sector to ensure that their curricula and training outcomes are in line with the needs of business and government in new modernized food systems?

It is for this reason that the broad objective of the paper is to study and develop models for university engagement with private and public sector employers so as to develop technical skills and institutional capacity required to modernize African food systems.

Specific Objectives

1. To identify and take inventory of the existing engagement models.

2. To study and recommend the best way universities can engage the private and public sectors in their capacity development of the food systems.

Research Questions

1. How are academic institutions involving the public and private sectors in their training and research?

2. How involved are the academia in the public and private sector operations?

3. What can the private and public sectors and the academia do to transform the weaknesses and vulnerabilities of the Africa's food systems into assets and opportunities?

4. How can the academic institutions involve the private and public sectors in capacity building towards transformation of Africa's food systems?

5. How can the private and public sectors involve the academia in their operations to?

3. Methodology

Countries in sub-Sahara Africa are at different levels of food systems but generally speaking, South Africa is at a higher level of development. The countries selected for the analysis are Kenya, Tanzania, and Uganda in East Africa, Senegal in West Africa and then also South Africa. By including South Africa it was the hope that lessons learned from South Africa can benefit other African countries that are at a much earlier stage of food system development.

Data Collection Methods

The methods for data collection were similar and involved three phases; 1) Desk top literature review (scoping phase), 2) interviews with selected institutions, and 3) structured interviews of private and public sectors. An identical questionnaire was used both in East Africa and South Africa.

Scoping phase: A scoping study was conducted using a desk top study and key informant interviews with members of academia. The desk top study involved literature review and internet searches. Internationally, universities are engaging both the public and private sectors in the design and execution of their academic programs. The literature review covered learning and lessons from the U.S.A., Iran, China, and the United Kingdom.

The results from the desk top study helped in designing key informant interviews. Some outputs from the scoping study included the conceptual frame-work detailing the typologies of engagement. The aim of the scoping phase was to describe existing models for engagement between academic institutions and the public and private sectors. From the preliminary data and guidance from the MAFS board members and peers, there were re-alignments in the study approach. Originally, a stake-holders consultation/validation workshop had been conceived as one of the main ways to obtain data. This approach was replaced with a questionnaire survey in the targeted countries. This was because the questionnaire information would provide robust data to evaluate the engagement models.

Interviews with selected institutions: During the key informant interviews, out of the 9 academic institutions contacted, 4 institutions responded. The 4 institutions were Makerere University, University of Nairobi, Dakar School of Veterinary Sciences, and Sokoine University of Agriculture. However, some information from the non-responding institutions was obtained from their websites. To analyze the collected data, Holland Matrix Tool for community engagement assessment was used (see Annex2). This is predominantly a qualitative tool, and was used in combination with descriptive statistics using graphs.

In South Africa interviews were conducted with heads of selected disciplines (Food Science, Consumer Science, Animal Science, Plant Production, Soil Science, and Agricultural Economics) at the University of Pretoria as well as the Presidents of various professional associations on different aspects of the curricula for professionals in the agricultural and food system.

Data collection from private and public sectors: Questionnaires were administered to 100 private and public sector employers in 3 countries in Eastern Africa, Uganda, Kenya, and Tanzania (see table 1 for the distribution and response from the 3 countries).

Table 1: Number of respondent organizations in each of the three East African Countries surveyed

		Company type		Total
		Private	Public Company	
Country of operation	Uganda	44	6	50
	Kenya	10	2	12
	Tanzania	20	4	24
Total		74	12	86

In the case of South Africa it was obvious that a stronger engagement with large food companies and agribusiness firms was necessary. It was, necessary to establish their views on how they like to engage with universities in the process of ensuring a well-skilled work force. These data were collected through in-depth interviews with a range of forward-looking enterprises in South Africa. These enterprises were asked about their current relationships with different tertiary education institutions, as well as their ideal future relationship with these institutions. Companies were also questioned about the different training methods they use in the company. The companies interviewed where targeted for the following reasons:

- Their prominence in the South African agricultural and food industry,
- The fact that they have South Africa as a base,
- Because they have investment in SSA, and
- The diversity of their operations.

The companies interviewed included 5 broad sectors – banking (ABSA and Standard Bank), agricultural business cooperatives (NWK, GWK, AFGRI), food processing and wholesale companies (SAB Miller, Nestle SA, Clover SA), and agricultural production and seed and input suppliers (DuPont Pioneer, Syngenta and Monsanto SA).

4. A typology of models for AET engagement with the private and public sectors employers

It is important to first clarify the concept of engagement. Engagement is typically considered to be referring to "the partnership of university knowledge and resources with those of the public and private sectors to enrich scholarship, research, and creative activity; enhance curriculum, teaching, and learning; prepare educated, engaged citizens; strengthen democratic values and civic responsibility; address critical societal issues; and contribute to the public good" (Committee on Institutional Cooperation – Committee on Engagement, 2005).

Engagement is also defined as: "the collaboration between institutions of higher education and their larger communities (local, regional/state, national and global) for the mutually beneficial exchange of knowledge and resources in a context of partnership and reciprocity" (Carnegie Foundation for the Advancement of Teaching, 2008). Reciprocity or 'mutual benefit' frequently appears as key descriptors within definitions of community partnership and engagement (Committee on Institutional Cooperation–Committee on Engagement, 2005; Maurrasse, 2001; Weerst and Sandmann, 2008). York University Task Force (2008).

Community engagement, or public participation as it is often referred to, is defined by the International Association of Public Participation as any process that involves the public in *problem-solving or decision making* and uses the public input to make *more informed decisions.*

Engagement is a distinctive approach to teaching and research that recognizes that some learning or discovery outcomes require access to external entities with distinctive knowledge and expertise. The hallmark of engagement is the development of partnerships that ensure a mutually beneficial exchange of knowledge between the University and the community (Holland and Ramaley (2008).

An increasing number of universities have started to explore and integrate the concept of "engagement" into their institutional missions. In many institutions, engagement most commonly takes the form of outreach and community partnership activities, often with communities adjacent to the university campus. Throughout the United States, Canada, United Kingdom, and Australia, post-secondary institutions are repositioning themselves as "engaged" institutions, and in some countries this has been the catalyst for an expanded conceptualization of engagement and a renewed dialogue about the role of higher education in civic society (Garlick and Langworthy, 2008; Maurrasse, 2001; Watson, 2008).

It is however important to acknowledge that this programme is not about community engagement or the university's service to its community but it is <u>rather about the ways in which universities engage with the private and public sector to ensure that their teaching modalities and curricula are in line with their needs as technology and society changes.</u>

Levels of engagement

According to LGA (2008) the following are levels of engagement:

A. **Inform**
This is a one way communication providing balanced and objective information to assist understanding about something that is going to happen or has happened. The goal is to provide balanced and objective information to assist the understanding of the topic, alternatives, opportunities, and/or solutions.

B. **Consult**
Two-way communication designed to obtain public feedback about ideas on rationale, alternatives, and proposals to inform decision making. The goal is to obtain public feedback on analysis, alternatives, and/or decisions.

C. **Involve**
Participatory process designed to help identify issues and views to ensure that concerns and aspirations are understood and considered prior to decision making. The goal is to work with the public throughout the process to ensure that concerns and aspirations are consistently understood and considered.

D. **Collaborate**
Working together to develop understanding of all issues and interests to work out alternatives and identify preferred solutions. The goal is to partner with the public in

each aspect of the decision including development of alternatives and identification of preferred solution.

E. Empower
Providing opportunities and resources for communities to contribute to solutions by valuing local talents and skills, and acknowledging their capacity to be decision makers in their own lives. The goal is to place final decision-making in the hands of the public in the communities of interest.

Possible models
Possible models include:

A. Volunteerism
In this type of engagement, the primary beneficiary is the recipient community and the primary goal is service. Here academic credit is not awarded, but students are regarded as valuable contributors to the development of community service at the university. It is altruistic by nature, and not necessarily integrated into student's field of study or staff''s field of expertise. It takes the shape of extra-curricular activities that take place outside of class/work time (e.g. weekends or holidays).

B. Integrated Service Learning
In this model, primary beneficiaries are community and students. The primary goal is to provide service to the community and to enhance learning through this service, and reciprocity is the central characteristic of this model. It is fully integrated into academic curriculum, and is credit based. It involves placement of students in community based organizations or facilities, such as farms.

C. Internships/Placements/Practicum
The primary beneficiaries are the students and recipient organizations, and the primary goal is student learning. It provides students with hands-on practical experience that enhances understanding of the area of study. It also provides students with vocational/professional experience, and it is fully integrated into the curriculum.

D. Community Outreach, Building and Development
The primary beneficiary is the community, and the main goal is community service. It is initiated by the institution/faculty/department, and it can receive academic credit or lead to research publication. It gives the opportunity and assists the community to celebrate excellence.

E. Cooperative Education
The primary beneficiaries are the students and communities. Its main aim is reciprocity for the benefit of all parties involved. Co-operative and contextualized partnership building approaches are used to ensure maximum community participation and decision-making in a transparent, accountable, and democratic manner in providing co-curricular opportunities that relate to, but not always fully integrated into, the curriculum. It enhances students understanding of the area of study, for example, used in universities of technology in the South African context. Placement within the industry is practiced.

F. Research, Innovation and Knowledge Exchange

The primary beneficiary is the recipient organization/community or company, and the main goal is finding an innovative solution to a problem or creating new knowledge. It involves engagement with delivery partners and translation of research into benefits for the community. It also enhances relationships with industry via corporate social responsibility goals and knowledge exchange.

Based on the discussion above it is possible to develop a framework or typology of engagement models. Table 2 below represents the different engagement types between AET and private and public sectors employers. The different functions of typical Agricultural Training and Education (AET) institutions are depicted in the left-hand column. The two columns to the right represent the way on which the private and public sectors engage with the AET institutions in relation to a specific function.

It seems the most prevalent of these models are: 1) the normal student training programs, and 2) research and technology development.

Table 2: Models for AET engagement with private and public sector employers

Functions of Agriculture Education and Training (AET) institutions	Models of AET Engagement with Employers	
	Private Sector Employers	Public Sector Employers
1. Training students for employment		
a. Curriculum content and quality	• Tailored courses built around private sector specification of future skill requirements (*Junior college model*) • Advisory Boards (formal, regular AET requests for curriculum input) • Formal, periodic AET consultation with industry & professional associations • Informal department-level engagement with major agribusinesses • Guest lectures by agribusiness executives	• Direct engagement with relevant ministries (agriculture, livestock, etc.)
b. Practical experience	• Internships • Attachments • University farm enterprises	• University farm enterprises
c. Job placement	• Job fairs • Career centers • Alumni associations	• Direct engagement with relevant ministries (agriculture, livestock, etc.)
2. Research and Technology Development		
	• Contract research (*CSIR model*) • Applied research by MSc and PhD students (*Agshare model*)	• Joint appointments (NARs/AETs) • Contract research by govt

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	• AET applied research and seminars on forward-looking issues affecting agribusiness (*BIFAP model*)	• Annual joint agenda-setting conference (national research councils)
3. Business startup		
	• University-supported business incubators (*Unibrain, InfoDev, AfriLabs etc.)* • Entrepreneurship and business management courses • Executive education seminars	

5. Global experience with University-private sector engagement

Lessons from the US

Parr *et al.* (2007) conducted a web-based Delphi survey of academics working in sustainable agricultural fields to find better ways to inform the agricultural curriculum. The responses show a clear need for interdisciplinary and applied scholarship (Parr *et al*. 2007). In addition, the participants proposed a range of teaching and learning approaches, including more practical experiences as a way to better equip the students for their working life.

The US National Academy of Science 2009 publication "Transforming Agricultural Education for a Changing World" used a list of assumptions to generate a model to predict employment opportunities for agricultural and natural resource management graduates. The assumptions included socioeconomic forces and anticipated technological advancements, and the four factors considered most important when generating the projections for employment in the period 2005–2010 are (2009: 163 – 164):

1. *Consumers and their preferences* dictate that products and services derived from agricultural and forest raw materials must help them maintain contemporary lifestyles. Population growth, changing ethnic and age demographics, and evolving food and health literacy strongly influence both what is produced and the expertise required to meet consumer demands.

2. The evolving business structures that support the U.S. food system continue to be influenced by *globalization and consolidation*. Expertise needs will evolve and create a need for graduates with excellent business skills, international understanding, and leadership qualities. Graduates must deal with increasing market uncertainty, risk analysis, petroleum dependence, niche business opportunities, and global food production and distribution systems.

3. New developments in science and technology are being driven by changes in bio-security, the *expanding global population, health concerns, shrinking natural resources, and climate change*. Emerging biotechnologies and nanotechnologies are powerful tools to increase food system efficiency. Other scientific developments will help us maintain our renewable natural resources. All of these require graduates with basic science skills and the ability to solve problems with scientific applications.

4. Public policy choices and accountability will affect the market for graduates who can provide public services, including education, natural resource utilization, food assistance, recreation, and financial support. *Public concerns regarding diet and health, food safety, and the environment* dictate the number and kinds of graduates needed to manage regulatory programs and provide services to assist producers and others working in the food and natural resource system.

The Academy (2009: 144) encourages the private sector and industry to be full-fledged partners in the educational processes, and to help implement the changes that are necessary for preparing graduates who have the skills necessary to work in the food and fiber systems, also to work across international boundaries in a global marketplace. They suggest that employers can also foster interactions with academic institutions. For example, by offering student internships, supporting career workshops and job-shadowing opportunities, and facilitating exchanges of academic researchers and industry professionals - including sabbatical opportunities and encouragement for food and agriculture professionals to seek visiting-faculty or adjunct-faculty positions.

The Academy's research also speculated about what new and emerging fields of expertise might be required in the future (2009: 194). These potentially include: genomics, genetics, molecular biology, computational biology, biological engineering/ manufacturing, bio-security, wellness, food/health interaction, human/animal interaction, animal behavior/wellbeing, renewable energy/resources, bio- based products, biosensors, bio renewable engineering, climate change, spatial sciences, water conservation, management, and policy, sustainable agriculture, land-use planning/policy, landscape restoration and design, human/environmental interaction; international/intercultural (agriculture/ business); entrepreneurship, food production policy, health/science information and decision making, production/management/ecology of GMOs, and science/risk communication. It is clear that these emerging fields reflect several societal changes from producer to consumer, rural to sub-urban, and uninformed to educate. It appears, more and more that "agriculture" is being defined as an area of basic sciences applied to wellness and sustainability.

Lessons from the UK

The University of Reading in the UK has partnered with the leading private food industry players to create the Food Advanced Training Partnership (Food ATP). The Food ATP provides post-graduate level research training to food industry professionals, and is led by the Department of Food and Nutritional Sciences (Reading), in partnership with the University of Birmingham (School of Chemical Engineering), Rothamsted Research and Leatherhead Food Research. The program allows food industry professionals to integrate learning from across the food chain from primary production to consumers, through modules such as nutrition, health & consumers, food quality and regulation, food manufacture, and sustainable food production (http://www.foodatp.co.uk/about).

Lessons from China

As a result of China's economic reform, a mismatch of agricultural teaching strategies and curricula to meet the needs of the new economic realities has become evident in China. Xiaorong and Bruening (2002) document how this situation was addressed by redesigning the curriculum at Chinese agricultural schools. It was becoming clear that the government hired

only about half of all agricultural graduates (Chen, 2000), resulting in graduates having to look for employment in the private sector or to be self-employed. The curriculum of the agricultural schools was adjusted to better align to the employment opportunities in the labor market.

6. Understanding current models of engagement between universities and the private sector

6.1 South Africa

The spectrum of engagement models highlighted in the framework discussed above is certainly present in the South African food and agricultural industry. What is not known is the extent to which the different models are commonly applied as the university, private sector and public service engage to ensure that training and research remain current. It is for this reason that we interviewed stakeholders in the academic, private, and public sectors in South Africa to verify the latest trends, as well as the customary way in which curricula in the various disciplines in the agricultural and food sciences have been developed, adapted, and redesigned to align with industry needs while at the same time ensure scientific excellence. This information assisted the team in developing an inventory of engagement between relevant university faculties and the private sector, and a discussion on the merits and implications of these different arrangements or relationships. However, the model does not make provision for professional associations, a widespread phenomenon, in South African agriculture.

South Africa is our outlier case study given that its nutrition and demographic transition for a majority of the population happened three decades ago, resulting in the fast growth in the food processing industry and the retail industry. Longer value chains, the importance of convenience, food safety and aspects related to shelf life became critical dimensions of the agricultural and food landscape. Many of the issues considered as part of the "models for engagement" theme are, to an extent, passé in the South African context, but the team documented the way in which the private sector currently engage with universities and other tertiary education institutions in South Africa.

Interviews were conducted with academics on different aspects of the curricula for professionals in the agricultural and food system. From these discussions it is clear that a wide spectrum of typical models of interaction exists. In some way it corresponds with the suggested framework mentioned in Section 4 but in essence it is much simpler and can be depicted on linear scale. At the one end of the spectrum we have departments/faculties or academics operating in isolation with little or any influence from, or interaction with, international expertise or the private sector. On the opposite end of the spectrum we have professional accreditation bodies prescribing the curriculum content of the professional degrees, see table 3.

From the interviews it also followed that curriculum development is not a structured process, but rather an evolutionary process and never prescriptive in terms of the model of engagement – except where professional registration is at stake. The process of developing and refining knowledge remains dynamic, influenced and steered by many different forces and external influences. Furthermore, the agri-food curriculum is interdisciplinary, and as such, shaped and altered by the social sciences, environmental sciences, and natural sciences.

Table 3: Spectrum of University interaction models

Independence ⬍ Professional registration	Faculty operates in an independent (almost isolated) academic environment, minimally exposed to national and international literature
	Faculty engages with international expertise and trends via visiting academics and international conference attendance
	Faculty engages, over and above international exposure, also via alumni and other networks with private sector
	Faculty has a private sector advisory board, regular engagement & influencing of curriculum by the international academic community as well as the private sector
	Curriculum is to a large extent governed by the prescriptions of a registration and accreditation body of a professional association.

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The interviews we conducted with selected discipline leaders at South African universities indicate a path dependent approach to curriculum development. They cited examples of how, over time, seemingly small interventions and exposure to external influences have impacted on the content and direction of their curriculum.

2.2   East Africa Universities and the Universities in West- Africa

The results from the surveys amongst the 4 other universities were in much more detail since there seemed to be a greater diversity in engagement process. The form of engagement, which scored highest, was the student involvement in the community activities. The ones that scored lowest were: community engagement, not explicitly and clearly reflected in the mission statement, and criteria for recruitment and promotion, not emphasizing community engagement by staff (Figure 1). This means that even in those institutions that scored very high, community engagement is not yet entrenched in their strategy and policies.

Figure1: Key engagement identifiers

Figure1: Key engagement identifiers
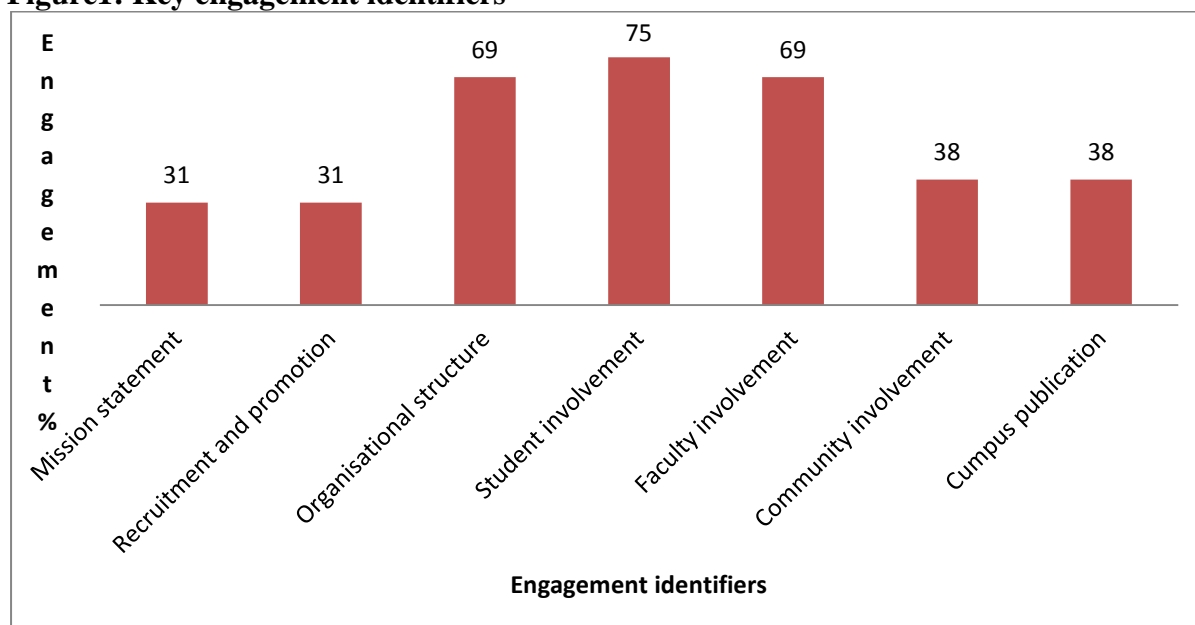
In assessing the extent of engagement, Makerere University scored highest in matters of engagement, out of the total score of 24 used to rate the various engagement identifiers, it scored 18 (table1), or 75% figure 2.

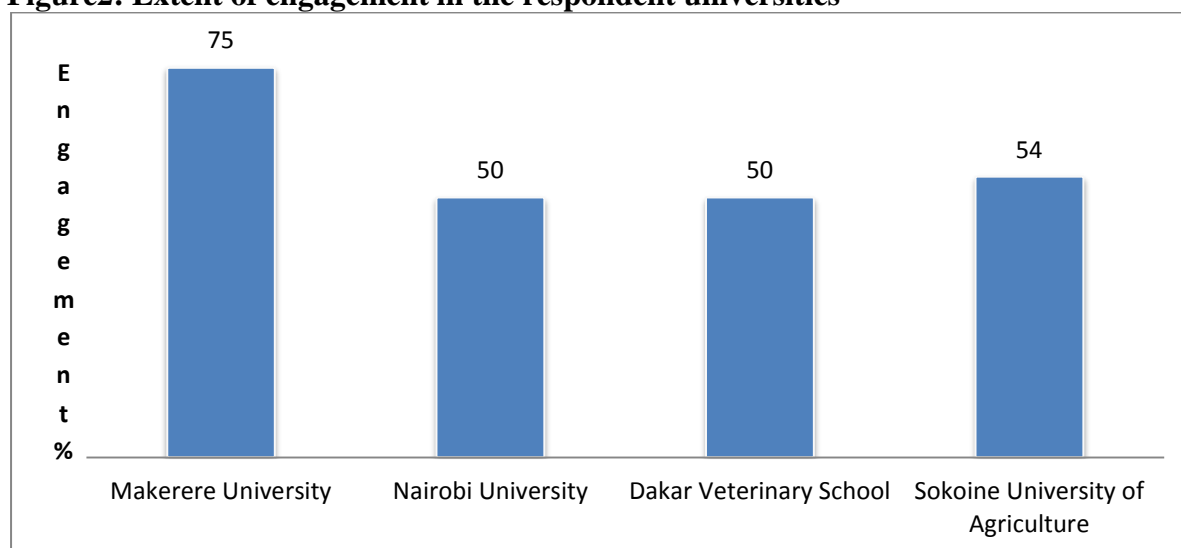**Figure2: Extent of engagement in the respondent universities**

Table 4: University engagement with the private/public sector employers in Eastern and West Africa

Identifiers of Engagement	Makerere University	Nairobi University	Dakar Veterinary School	Sokoine University of Agriculture
Mission	**Score 1**, that is low relevancy, service just mentioned in the mission statement of the university	**Score 1**, that is low relevancy, service just mentioned in the mission statement of the university and one of the strategic objectives	**Score 1**, that is low relevancy, the mission statement only emphasizes teaching and research	**Score 2**, medium relevancy. Delivery of service is explicitly stated in the mission statement of the university
Promotion, Tenure, Hiring	**Score 2**, medium relevancy, service to the university and community is mentioned in the promotion criteria, but is ranked very low, 5 out of 100 points	**Score 1**, low relevancy. Not indicated in the staff hand book	**Score 1**, low relevancy, service to the community not an emphasized criterion	**Score 1**, low relevancy, service to the community not explicit
Organization Structure	**Score 3**, high relevancy, Units exist to provide service, and these include: AFRISA at College of Veterinary Medicine, Centre for Continued Agriculture Education in the Agriculture College, The Food Technology and Business Incubation Center in the School of Food Technology, Nutrition and Bio-engineering	**Score 2**, medium relevancy. Some units exist which foster volunteerism	**Score 3**, high relevancy. There are diagnostic and Food analysis laboratories, which offer services to the community	**Score 3**, high relevancy. Units exist for offering services, e.g. Center for Pest Management

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Student Involvement	**Score 4**, full integration, service-learning courses integrated in curriculum; student involvement in community-based research. This is particularly so with AFRISA-Skills development courses. A significant number of post-graduate students in the Veterinary and Agriculture colleges are involved in community-based research.	**Score 2**, medium relevancy. Organized support for volunteer activity	**Score 3**, high relevance, opportunity for extra credit, internships, practicum experiences	**Score 3**, high relevance, opportunity for extra credit, internships, practicum experiences
Faculty Involvement	**Score 3**, high relevance, Tenured/senior faculty pursue community-based research; some teach service-learning courses. This is true in the Veterinary and Agriculture colleges	**Score 3**, high relevance. Senior staff involved in consultancy and community based research	**Score 2**, medium relevance, staff involved in consultancy services	**Score 2**, medium relevance. Staff involved in consultancy services and community volunteerism
Community Involvement	**Score 3**, high relevance. Community influences campus through active partnership or part-time teaching. This particularly true with AFRISA-SPEDA Programmes in the veterinary college	**Score 1**, low relevance. Community involvement is random or limited individual or group involvement	**Score 1**, low relevance. Community involvement is random or limited individual or group involvement	**Score 1**, low relevance. Community involvement is random or limited individual or group involvement

Campus Publications	Score 2, medium relevance. Stories of student volunteerism or alumni as good citizens. Publications in the COVABIAN, a Veterinary college newsmagazine	Score 2, medium relevance. Stories of student volunteerism or alumni as good citizens	Score 1, low relevance. Not explicit	Score 1, low relevance. Not explicit
Total Score (out of 24)	18 75%	11 50%	12 50%	13 54%

7. The private sector's preferred engagement models with tertiary institutions

7.1   South Africa

Before investigating the companies' preferred model of engagement with the tertiary education sector it is worthwhile to first establish what methods of training the companies use to ensure that skills are aligned with their in-house needs and to ensure the competitiveness of the individual company. Table 5 presents the answers from the companies interviewed in South Africa.

7.1.1   Training methods used

From Table 5 it is evident that in-house training programs developed and presented by the company's own staff was the method most "frequently" used by 10 of the 12 companies. Seven of the 12 companies also supported informal training via workshops, while 5 companies "frequently" use company funding of formal training programs and university degrees,. These programs are not mutually exclusive. Interestingly the two commercial banks indicated that they do not use outside contractors to conduct in-house training.

Table 5: Training methods currently used by companies (number of responses)

|	Informal training via workshops, seminars, conferences institutes, etc.	In-house/on-the-job training conducted by company staff	In-house training developed and delivered by an outside contractor	Company funding of formal education by a technical school, college or university
Plan to use	0	0	0	0
Don't use	0	0	2	0
Occasionally	5	2	7	7
Frequently	7	10	3	5

These preferred training programs were confirmed when nine of the 12 companies indicated that their own in-house training was very effective. Interestingly, only 50% of respondents considered funding of tertiary studies as very effective, which could mean that the remaining 50% either question the appropriateness of the curricula, or regard the long-term results of these investments as problematic. They might prefer the immediate results achieved with the in-house training programs. All three agricultural business companies (NWK, GWK and AFGRI) regard funding of tertiary studies as very effective. They nevertheless view university training still appropriate for innovative and leadership capacity but that the hands-on stuff and the softer skills are better dealt with in-house.

7.1.2   Interest in establishing a relationship with the educational sector (9b)

The response to this question was rather mixed apart from the fact that the majority of companies that were interviewed were not interested in developing any relationship with the

primary and secondary education sector. The need and interest (although mixed) is clearly with the tertiary education sector.

**Figure 3: Interest to develop relationships**
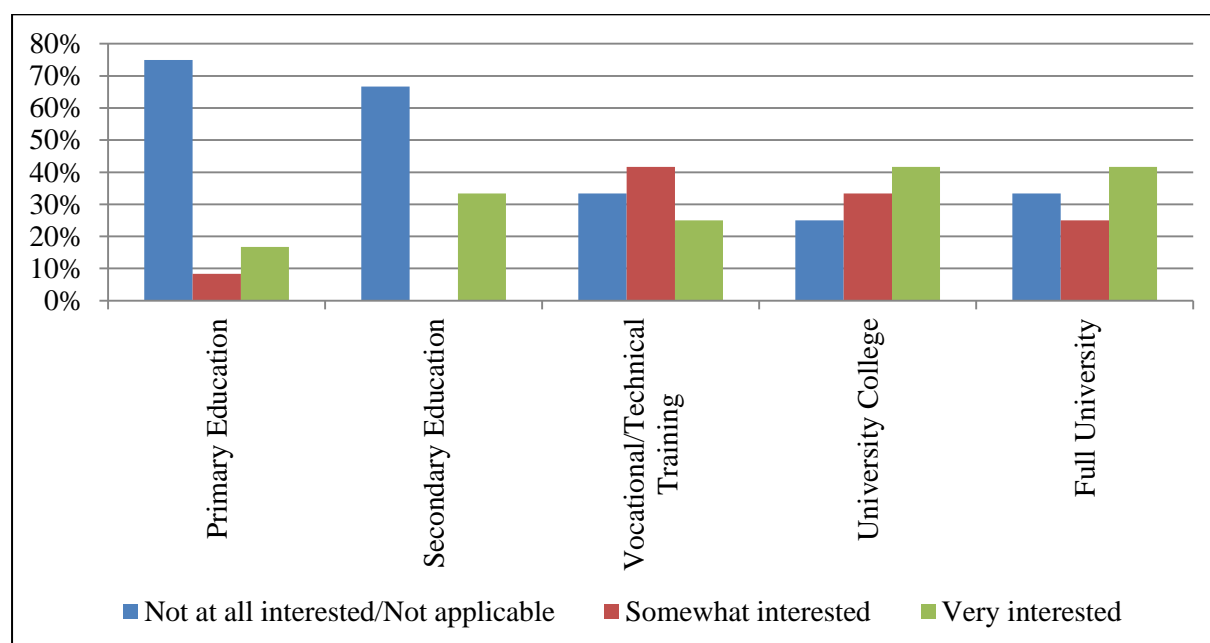
The interest in developing the relationship with universities would typically be through the provision of bursaries to students, contributions to and sponsorships of institutes, centres or bureau's within these institutions. Some also sponsor research projects and conferences depending on the relevance of these to their core business. The relationships with university colleges and technical training institutes are lower but this result conceals the fact that responses showed a high degree of variance. Companies with a more technical applied core business typically showed a good relationship with these institutions whereas companies with a more financial core showed a poor to non-existent relationship. Companies with an existing relationship with these institutions also indicated that they would like to improve their relationship. The commercial banks indicated that several bursaries are annually awarded to students for further study at universities,

Companies also expressed limited interest in improving relationships with primary and secondary institutions, citing budgetary constraints as well as a tertiary education focus due the greater relevance to their core business as reasons.

7.1.3   Current relationships between private sector and educational sector

In the previous section we unpacked the interest expressed by various companies in developing a relationship with the educational sector. In this section we try to understand the nature of the current relationship between the private sector and the education institutions.

Figure 4: How would you characterize your company's current relationship with this education sector?
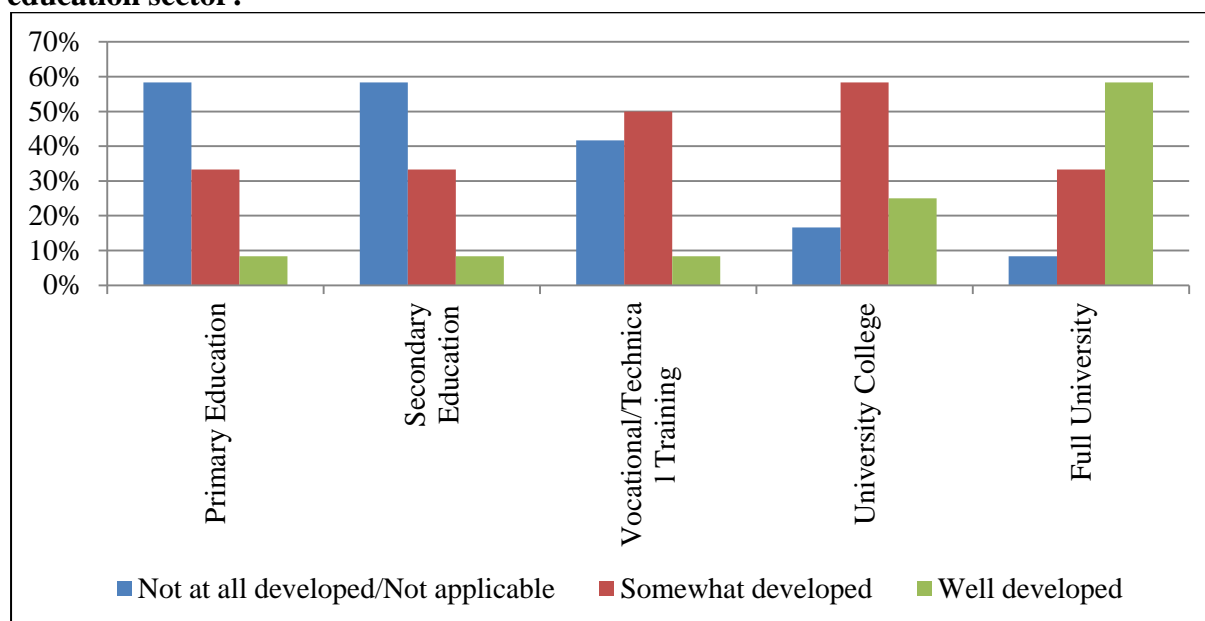
When questioned about South Africa's general education system, the responses fall into two broad themes. The first is that companies felt that the general education of students needed to improve, especially in areas such as mathematics and science. The second area of concern was that students lacked practical experience and noted that an increasingly the burden falls on the companies to train employees in order to prepare them for industry. Looking forward, companies were asked to indicate how they foresee their future relationship with the educational sector. Most companies were keen to enhance their 'Full University' and 'University College' relationships.

Companies were also asked to expand on some of their responses, and to the question if there were any particular programs that they find useful the commercial bank respondents indicated that Agricultural Economics and Finance programs were very valuable, while the processor companies indicated that they rated the Graduate School of Management Development program presented by the Gordon Institute of Business (GIBS) highly, and also supports the Wits School of Engineering. They also regard the Foodbev and Services SETA (Statutory bodies responsible for skills training) as valuable.

In response to the question what they regarded as an area that need improvement in the country's educational system to make it more agribusiness and industry relevant the responses included that agribusiness should be included in the school curriculum, that the study material used in agricultural colleges is too generic for business purposes. The respondents also indicated that they would not hire students straight from university or college and that these students first need to gain practical experience. They regard internships as a possible route. Another respondent indicated that increased emphasis should be placed on mathematics, science, accounting and general management.

7.1.4 Which aspect(s) best describes your current partnership with the university institution(s)?

The companies were asked to indicate the nature of their current relationship with university institutions, and it is clear from the answers that the companies perceive themselves to be involved with the development and review of curricula. Research and joint publications seem to be non-existent. Commercial banks are closely involved with many universities via the funding of research programs and endowed chairs as well as providing scholarships to students.

7.1.5 Which aspect(s) best describes the level of engagement of your organization with the university institution(s)?

In response to the question about the level of engagement with university institutions the respondents felt that they were sometimes consulted by the universities in the development of material but often just informed about what happened. It is however so that there is strong engagement in research programs whereby industry partners (companies) approach the university to support them with some key research questions. Some of these take place in the consultation space but other are more long term with focus on a comprehensive research program involving students at the Master's, PhD and Post-doctoral level.

7.1.6 Which of these models best describes the engagement of your organization with the university institution(s)?

The companies described the models most often used for engaging with university institutions as receiving volunteers from the universities, or, although less often, engaging via internships and placements. Recently, as a result of the scarcity of scientists in key agricultural and food disciplines, companies are becoming more involved by supporting students and placing them within their operations during university vacations.

7.2   East and West Africa

Results of the questionnaire survey of the private and public sector employers indicated the following:

The type of training currently used by the majority of public and private sector employers was on-job training using company staff and outside contractors (Figure 5).

Figure 5: Method of training currently used by the interviewed organizations
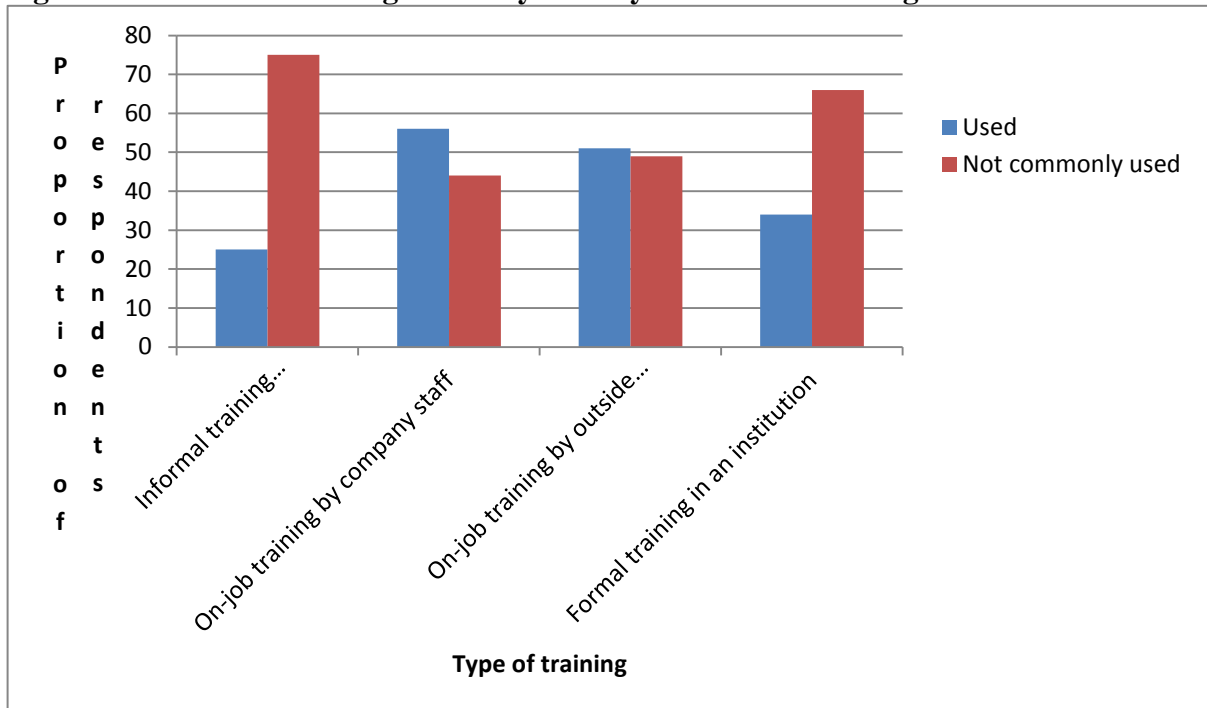
As for the effectiveness of the reported training methods, the most effective one was again reported to be on-job training. The lowest rated was seminars/workshops followed by formal training in institutions (Figure 6). Upon probing, it was noted on the job training method was most used because it was less expensive in training workers on the skills required to meet the company's objectives. However, some respondents indicated that it was not relevant since some employees do not value what is taught to them by their colleagues, but rather preferred training by outside contractors and seminars and workshops.

Figure 6: Effectiveness of training methods
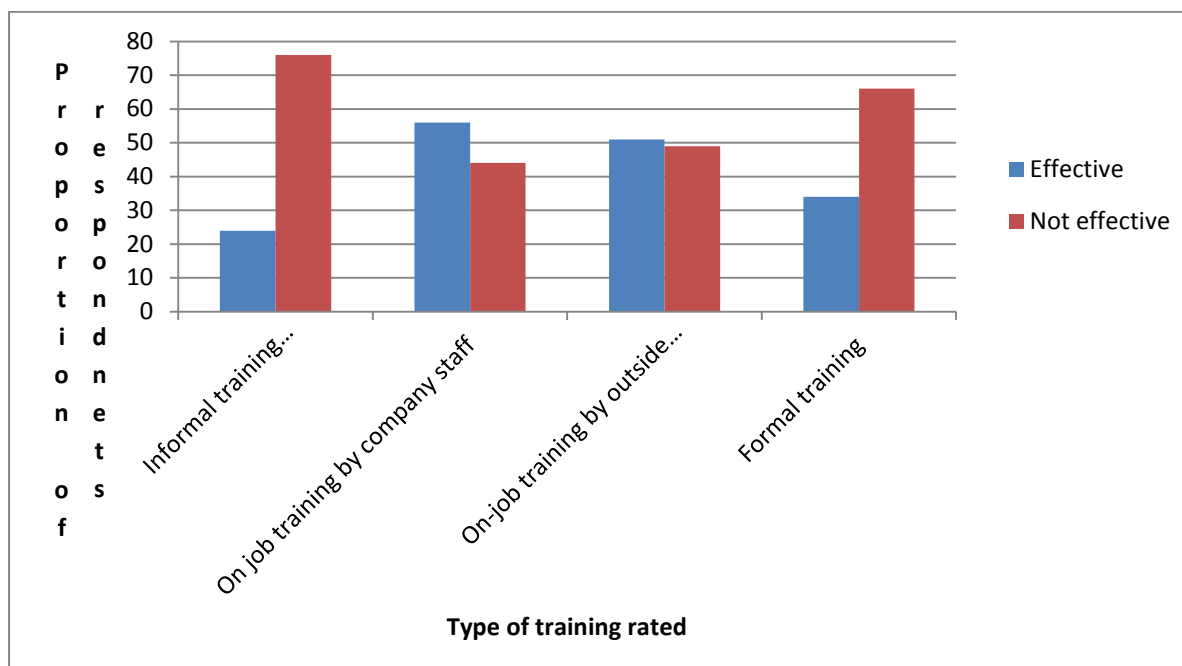
As for interest in establishing partnerships with agricultural training institutions, over 50% of the respondents had interest in universities (Figure 7). However, there was disparity between interest and actual relationships. For instance, less than 25% of the respondents reported existing relationship with universities (Figure 8).

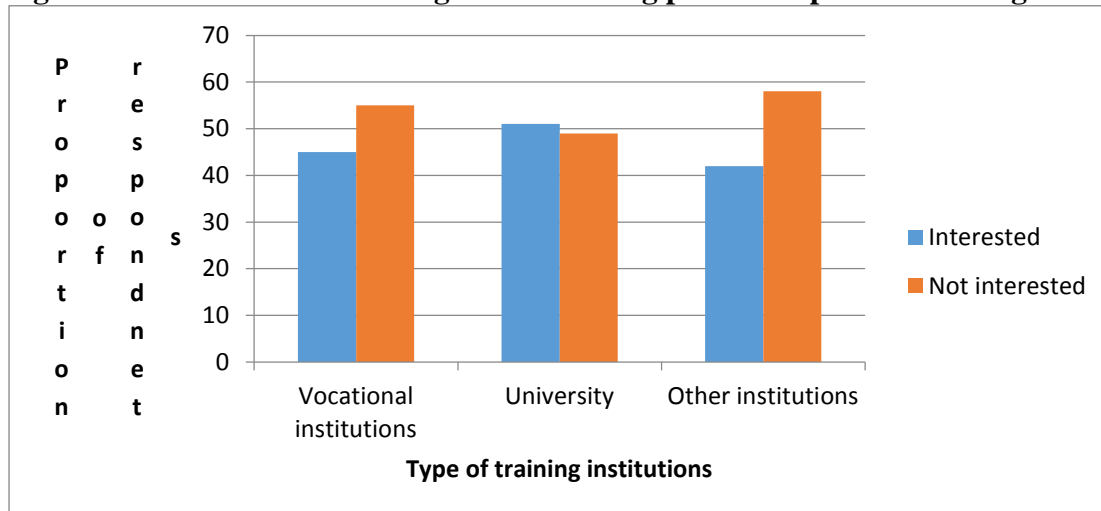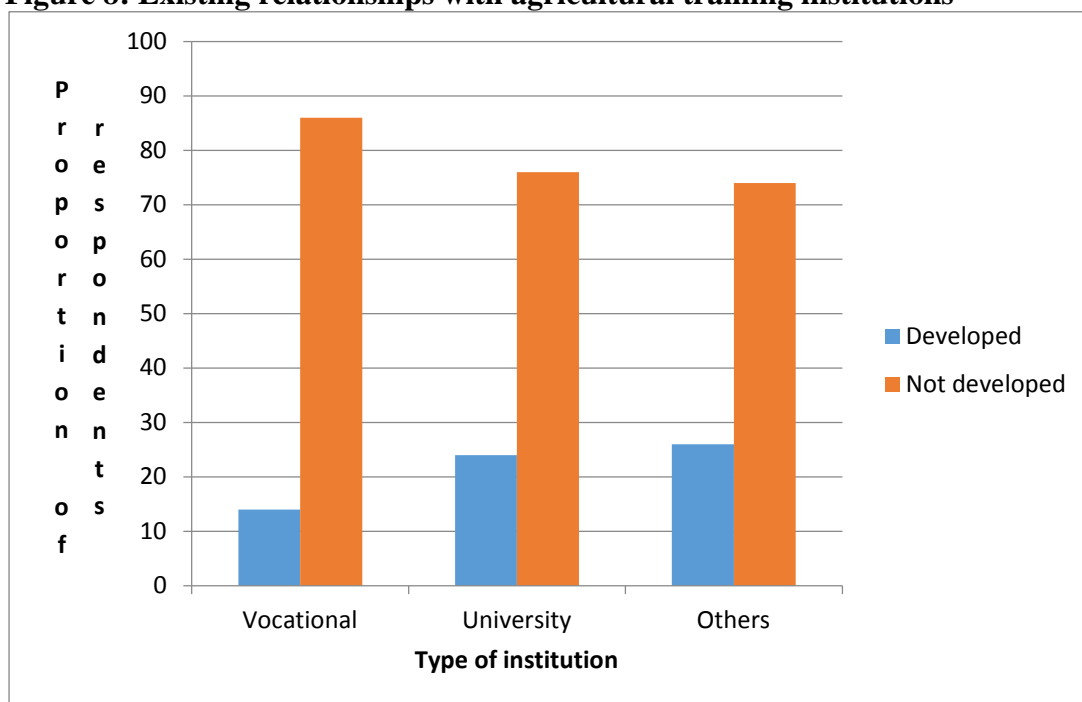**Figure 7: Interest in establishing and enhancing partnerships with training institutions**

Figure 8: Existing relationships with agricultural training institutions

The main form of relationship was reported to be mainly universities engaging the responding organizations in some form of research (Figure 9). For instance, participating by filling out questionnaires for research institutions, provision of attachment for students from institutions to enable them to obtain hands on experience in the industry, and the the most common engagement model was student internship/practicum followed by students volunteering (Figure10).

On deeper probing, the respondents indicated that the educational institutions sought to engage them more often because students need to improve on the practical aspect of learning. There are always attachment places for students from these institutions. It was argued that many students leave school without practical skills and knowledge, and it was also noted that much of the interaction between the organizations and the training institutions is informal. It was suggested that the Federation of Employers should have a Memorandum of Understanding with universities through which regular collaborations can be carried out.

Figure 9: Current forms of partnerships with the agricultural training institutions
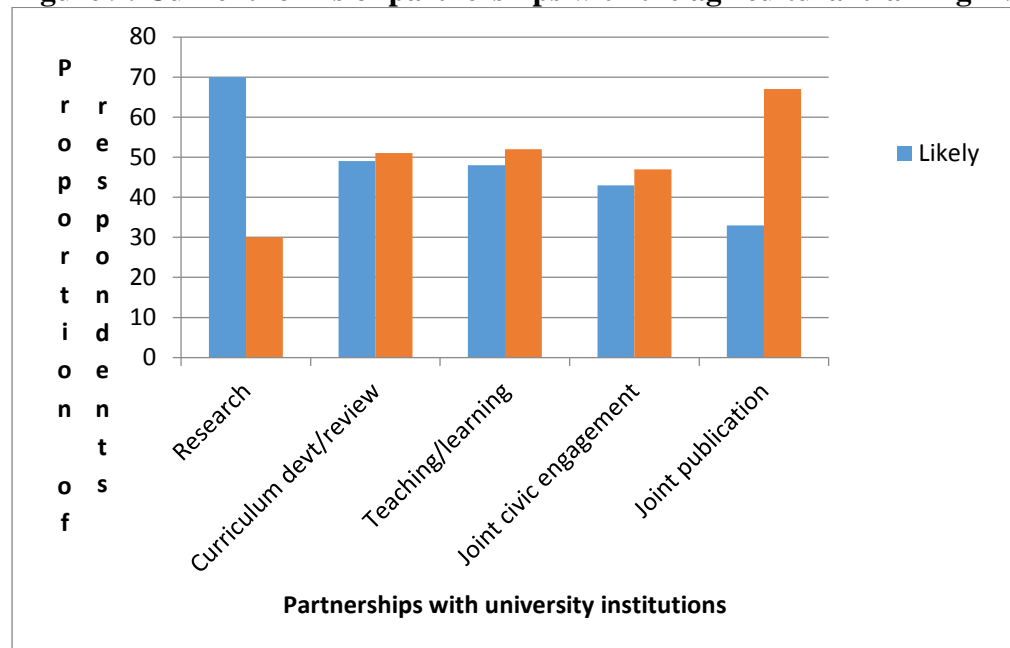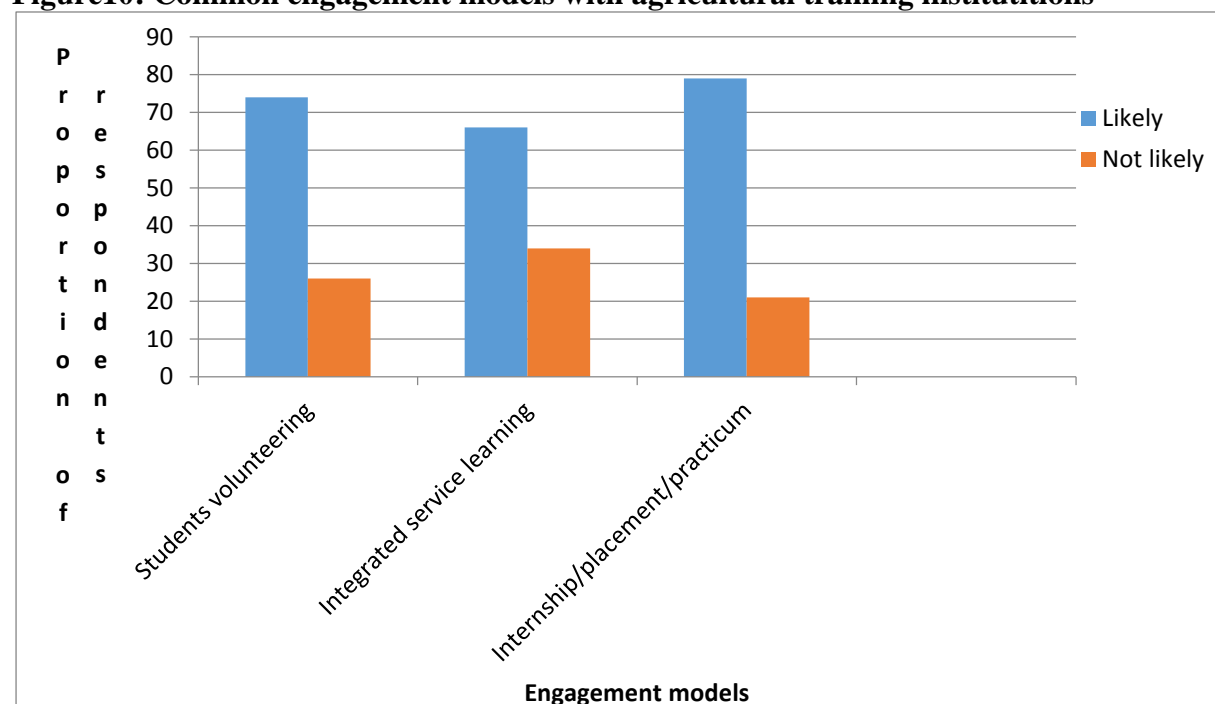

Figure10: Common engagement models with agricultural training institutitions

The challenges these organizations face while dealing with the training institutions were reported to be:

- High number of students for internships.
- The students usually come with no money to cater for their living expenses.
- The necessary time frame and work force in relation to student volume and resources.
- Limited funds to facilitate the students.
- High expectation of students from universities.
- Students come with a lot of theoretical knowledge and very little practical knowledge/skills.
- Limited space cannot offer internships to many students.
- Poor supervision from universities.
- Overwhelming number of graduates.

Respondents made the following recommendations to improve the education system:

- Integrate fully the field experiences into the formal education system.
- To urgently consider hands-on type of education that has a connection with the job markets
- Governments should give maximum support to vocational training in agricultural production.
- Improve on the communication and customer care in learning system.
- Make learning more practical especially in agri-business sector.
- Consult organizations on the areas of learning.
- Universities should organize short course to better the skills of staff of these organizations.
- Try to engage primary leavers into agricultural experience.
- Align course to job requirements and overall employment market.
- Put in more resources for research projects and give more time to clearly think out internship training.

8. Discussion

In East Africa there is a high interest in private and public employers to engage with universities. Currently the top three methods of training used by private employers include the on- job training by company staff, on-job training by outside staff, and formal training at institutions of high learning. The effectiveness of the training mirrors the top three methods used for training. The top three common models of engagement include 1) internships, 2) student volunteering, and 3) integrated service- learning. The integrated student service learning offers an excellent opportunity for universities to engage with private and public sectors.

In contrast to the situation in South African experience, professional associations (with the exception of Veterinary Medicine) representing the broad system of African Food systems, have not had a significant influence in the content of curricula. Financial support by private sector for student internships and research is minimal compared to the situation in South African private employers. As in the case in South Africa, few private sector companies' participation in the advisory board of academic departments or faculties in the East African

universities. Encouraging professional associations to play a role in the content of the curricula used at universities (and other lower institutions) and to participate on Boards would be a great step to encourage understanding and appreciation of the skills and competencies that private sectors expect of their employees. This, in return will enhance university engagement with private and public employers.

The South African case study of engagement models between the agricultural and food industry and the Agricultural Education and Training sector has clearly shown that the focus is much more on the comprehensive universities. Although the private sector appreciates the theoretical knowledge provided through training at university level, they still value in-service training as critical in dealing with softer skills. It is often a criticism that Universities do not pay enough attention to these matters but the reality is that University curricula are already overloaded (even though all the content may appropriate) time for issues such as presentation and interpersonal skills cannot be dealt with in full.

The private sector companies interviewed engage with the universities in a variety of ways:

1. Through the professional associations to influence the content of curricula
2. Support of students and the provision of internships and other forms of placements
3. Support of research programs
4. In a few cases participation in the advisory board of academic departments or faculties

In essence there is no dominant model of engagement with variation according to discipline, company, and university. There does seem to be some reluctance by private companies to engage fully with universities. This could be due to time constraints, but it could also be that they are actually happy with what takes place at universities. It could also be that they do not want to reveal too many of their trade secrets to academics.

9. Conclusions

Overall, the university engagement with private companies is higher in South Africa than East Africa. Professional associations have significant influence on the content of the curricula in South African Universities, but not so in East African Universities.

At present, there is no dominant (or best) model of university engagement with private and public employers. The type and level of engagement depends the company, type of the institution, discipline, and the level of development of the food system industry. Nevertheless, it reasonable to conclude that the three common models of engagement in East Africa and South Africa are: 1) Internships, 2) integrated student service learning, and 3, students volunteering.

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